SECURITY AND CRISIS MANAGEMENT
-THEORY AND PRACTICE

SAFETY FOR THE FUTURE 2022

PROCEEDINGS

BELGRADE 2022
8th INTERNATIONAL FORUM “SAFETY FOR THE FUTURE” 2022

8th Scientific-professional conference
SECURITY AND CRISIS MANAGEMENT -THEORY AND PRACTICE
(SeCMan)

September 29th and 30th, 2022. Sremska Kamenica, REPUBLIC OF SERBIA
FOREWORD

A forum Safety for the Future arose out from the idea and the need to see security problems as a whole, and yet separately, through a prism of scientists and experts to bring science, company practice and economy together. The forum contains several important events: the International Scientific Conference "Security and Crisis Management-Theory and Practice", an exhibition of tools and equipment, demonstration exercises on the usage of different assets and equipment in various security activities and numerous debates and discussions with a variety of topics.

This year, for the eighth time, we are realizing the conference "Security and Crisis Management-Theory and Practice", with new elements of researching security phenomena in the field of crisis management, but also including all related areas. The fact is that the environment in which individuals and legal entities exist is increasingly complex, and the range of phenomena that affect the security of an entity is becoming wider. It is consist of familiar and unfamiliar circumstances. Managing those circumstances is possible to a certain extent if there is an optimal and necessary quantum of knowledge. Hence, knowledge is the foundation on which is necessary to build the capabilities of individuals and legal entities to be able to recognize, prevent and react to threats.

Crisis management has become an everyday need, essential for the survival of individuals, companies or society as a whole. It is more and more difficult to assess the risk of events with negative effects at the very beginning of their occurrence, and coping with negative consequences leaves harder effects on society. Scientific research of security phenomena has become the priority of society's sustainable development. Scientific knowledge is necessary for systematic knowledge of phenomena in the environment, and practice for checking their usability.

Scientific findings do not always come to those who perform security tasks, such as individuals or legal entities. Therefore, there is a need for scientists and experts to meet and exchange ideas, opinions and knowledge. Materialization of knowledge is carried out daily in the process of modern business and management. Exposed to the impacts of a turbulent environment, and focused on sustainability, modern business and management require permanent monitoring of changes and adaptation to these changes.

Comprehension of the environment in which modern society exists is possible if there is the necessary knowledge of the phenomena that characterize it. That knowledge provides an opportunity for preventive action through an efficient risk assessment system. Only knowledge, formed as a symbiosis of science and profession, has quality and strength, which guarantees the possibility of preventive action and an optimal level of readiness to react to negative events. The resistance of contemporary society to negative events depends on the degree of knowledge development.

This year's conference is organized in specific conditions, with physical gatherings. Namely, the world is facing a serious risk of an outbreak of armed conflict on a global scale. Not analyzing the necessity of solving international disputes through war, it is the fact that in the year 2022 we are standing on the edge of possible war between the Russian Federation and NATO. That automatically implies the conflict on a global level. The special military operation, conducted by the Russian Federation on the Ukrainian territory, has triggered a sequence of events which affect the security of the whole world (economy, demography, energy, finances, etc.). This crisis is just another proof that forum Security for the Future properly observes the complexity of the security environment and steers it towards crisis management. Bearing in mind that it is not possible to put all the problems in one Proceedings
or to answer all the questions, the forum will continue to deal with the contemporary security challenges, risks and threats in the future, as well.

Proceedings from the 8th International Conference - Security and Crisis Management - Theory and Practice, present a new value in the observation of a portfolio of security phenomena at the strategic, company, and individual levels. The papers published in the proceedings are new findings and views of the authors. A wide range of issues, confirms the assumption of the necessity of such a conference. The papers presented at the last seven conferences have unambiguously demonstrated the need for regional cooperation and the harmonization of joint capacities. And spreading knowledge becomes a priority in the development of a security culture.

The proceedings represent a review of existing knowledge, a source of new knowledge, assistance to researchers and practitioners in solving security problems, support for those who practically deal with security and a source of an initiative to improve existing knowledge in the field of security, management and engineering.

We hereby invite all interested scientists and professionals to improve the quality of future publications with their papers.

Program Committee
PROGRAM COMMITTEE

Branko Babic PhD, *Higher Technical School of Professional Studies, Novi Sad - Chairman*
Aleksandar Andrejevic PhD, *EDUCONS University, Sremska Kamenica, Serbia*
Andrea Andrejevic Panic PhD, *EDUCONS University, Sremska Kamenica, Serbia*
Goran Andjelic PhD, *EDUKONS University, Faculty of Security Studies, Sremska Kamenica, Serbia*
Darko Bozanic PhD, *University of Defense, Military Academy, Belgrade, Serbia*
Marijan Brozovic PhD, *Polytechnic of Karlovac, Croatia*
Ruggiero Cafari Panico PhD, *Full Professor of European Union Law, University of Milan, Italy*
Gian Luigi Cecchini PhD, *Full Professor of European Union Law, University of Trieste, Italy*
Sinisa Domazet PhD, *EDUCONS University, Faculty of Security Studies, Sremska Kamenica, Serbia*
Drazan Erkic PhD, *The Republic of Srpska Ministry of the Interior - Police Administration Zvornik, Bosnia and Herzegovina*
Tatjana Gerginova PhD, *University of St. Kliment Ohridski, Faculty of Security Skopje, Northern Macedonia*
Ljubomir Gigovic PhD, *University of Defense, Military Academy, Belgrade, Serbia*
Ladin Gostimirovic PhD, *College of Business and Technical Education, Doboj, Bosnia and Herzegovina*
Emina Hadzic Dreznjak PhD, *University of Sarajevo, Faculty of Civil Engineering, Bosnia and Herzegovina*
Predrag Ilic PhD, *Institute for Protection, Ecology and Informatics, Banja Luka, Republika Srpska, Bosnia and Herzegovina*
Zeljko Ilic PhD, *Republic Administration CZ, Republika Srpska, Bosnia and Herzegovina*
Vladimir Jakovljevic PhD, *University of Belgrade, Faculty of Security, Belgrade, Serbia*
Aco Janicijevic PhD, *Accreditation Body of Serbia, Belgrade, Serbia*
Jelena Jesic PhD, *EDUCONS University, Sremska Kamenica, Serbia*
Radislav Jovicic PhD, *Business and Technical College, Doboj, Bosnia and Herzegovina*
Dragisa Jurisic PhD, *Security Research Center, Banja Luka, Republika Srpska, Bosnia and Herzegovina*
Samed Karovic PhD, *EDUCONS University, Faculty of Security Studies, Sremska Kamenica, Serbia*
Savo Kentera PhD, *Atlantic Alliance of Montenegro, Podgorica, Montenegro*
Nenad Komazec PhD, *University of Defense, Military Academy, Belgrade, Serbia*
Tomaz Kramberger PhD, *University of Maribor, Faculty of Logistics Celje, Slovenia*
Mirjana Laban PhD, *University of Novi Sad, Faculty of Technical Sciences, Novi Sad, Serbia*
Ivona Shushak Lozanovska PhD, *Faculty of Law, St. Kliment Ohridski University, Bitola, Northern Macedonia*

Goran Maksimovic PhD, *Security Research Center Banja Luka, Republika Srpska, Bosnia and Herzegovina*

Nada Marstijepovic PhD, *Faculty of Maritime Studies, Kotor, Montenegro*

Marina Mihajlovic PhD, *University of Belgrade, Faculty of Technology and Metallurgy, Innovation Center, Belgrade, Serbia*

Aleksandar Milic PhD, *University of Defense, Military Academy, Belgrade, Serbia*

Branislav Milosavljevic PhD, *Institute for Strategic Research, University of Defense, Belgrade, Serbia*

Dragan Mladjan PhD, *Criminal Police University, Belgrade, Serbia*

Nenad Mustapic PhD, *Polytechnic of Karlovac, Croatia*

Vesna Nikolic PhD, *University of Nis, Faculty of Occupational Safety Nis, Serbia*

Dragan Pamucar PhD, *University of Defense, Military Academy, Belgrade, Serbia*

Ruggiero Cafari Panico PhD, *Full Professor of European Union Law, University of Milan, Italy*

Aca Randjelovic PhD, *University of Defense, Military Academy, Belgrade, Serbia*

Tomislav Radovic PhD, *Faculty of Management Zajecar, Megatrend University, Belgrade, Serbia*

Momcilo Sakan PhD, *Independent University of Banja Luka, Bosnia and Herzegovina*

Slobodan Simic PhD, *Security Research Center Banja Luka, Republika Srpska, Bosnia and Herzegovina*

Augusto Sinagra PhD, *European Union Law, University of Rome "La Sapienza"*

Miomir Stankovic PhD, *University of Nis, Faculty of Occupational Safety Nis, Serbia*

Katarina Strbac PhD, *Faculty of Engineering Management, Belgrade, Serbia*

Jovan Vunicic PhD, *Polytechnic of Karlovac, Croatia*

Nahla Yassine-Hamdan PhD, *American University in the Emirates, College for security and global studies, Dubai, United Arab Emirates*

Dusko Tomic PhD, *American University in the Emirates, College for security and global studies, Dubai, United Arab Emirates*

Eldar Saljic PhD, *American University in the Emirates, College for security and global studies, Dubai, United Arab Emirates*

Dr.h.c.. mult. Mgr. JUDr. Jozef Zaťko, PhD., MBA, LLM, Honor. Prof. mult., *Európsky institút d'alsieho vzdelávania, Podhájska, Slovensko*

Peter Plavcan PhD, *Danubius University, Sládkovicovo, Slovak Republic*

Marija Vukic PhD, *IRC Alfatec, Nis, Serbia*

Zeljko Zoric PhD, *Sector Security Company, Banja Luka, Republika Srpska, Bosnia and Herzegovina*

Dragana Kosic Msc, *Sector Security Company, Banja Luka, Republic of Srpska, Bosnia and Herzegovina*

Tatjana Bojanic, *Institute for Standardization of Serbia, Belgrade, Serbia*
ORGANIZING COMMITTEE

Milica Mladenovic, PhD candidate, *S4 GLOSEC Global Security, Belgrade, Serbia*
Chairman

Slavica Dabizljevic, PhD candidate, *RASEC, Belgrade, Serbia*

Maja Mijatovic, MSc, *S4 GLOSEC Global Security, Belgrade, Serbia*
IMPRESSUM

Editorial
Komazec Nenad, PhD, Belgrade, Serbia
Babic Branko, PhD, Novi Sad, Serbia

Publisher
Regional Association for Security and Crisis Management-RASEC
S4 GLOSEC Global Security

Reviewers
Kramberger Tomaz, PhD – Slovenia
Karovic Samed, PhD – Serbia
Strbac Katarina, PhD – Serbia
Pamucar Dragan, PhD – Serbia
Babic Branko, PhD – Serbia
Randjelovic Aca, PhD – Serbia
Jurisic Dragisa, PhD – Bosnia and Herzegovina
Bozanic Darko, PhD – Serbia
Komazec Nenad, PhD – Serbia
Maksimovic Goran, PhD – Bosnia and Herzegovina
Tatjana Gerginova, PhD – North Macedonia
Milic Aleksandar, PhD – Serbia
Slobodan Simic, PhD – Bosnia and Herzegovina

Design
Mladenovic Milica, PhD candidate
Komazec Nenad, PhD

Edition
70 copies

The press:
Stamparija Donat Graf, Grocka, Belgrade

ISBN
978-86-80692-09-8

Notes:
The authors opinions expressed in this book do not necessary reflect the views of the institution in which they are employed
All papers are reviewed and checked for plagiarism
Papers which express any form of discrimination shall not be published
CONTENT

1. THE WORLD AT THE CROSSROADS OF SECURITY PROCESSES
_Mitar Kovac_..........................................................................................................................19

2. 50<sup>th</sup> ANNIVERSARY OF THE BIOLOGICAL WEAPONS CONVENTION AND THE SMALLPOX EPIDEMIC IN THE EX-YUGOSLAVIA: EXPERIENCES AND CHALLENGES IN THE NEW SECURITY ARCHITECTURE
_Elizabeta Ristanovic, Ana Gligic, M.B.Al-Daheri_..................................................................................31

3. ECOSYSTEM-BASED DISASTER RISK REDUCTION IMPLEMENTATION FOR INCREASED RESILIENCE TO WATER-RELATED NATURAL HAZARDS
_Branislava Matic, Milica Zivkovic_..................................................................................................39

4. NEURO LINGUISTIC PROGRAMMING (NLP) IN MANAGERIAL PRACTICE
_Katarina Jankovic_..........................................................................................................................46

5. CONCEPTUAL CIVIL PROTECTION MODEL IN THE REPUBLIC OF SRPSKA WITH REFERENCE TO THE REGIONAL DEPARTMENT ORGANIZATION
_Zeljko Zoric, Dragana Kosic_........................................................................................................52

6. FUTUROLOGY OF THE PRIVATE SECURITY SECTOR IN BOSNIA AND HERZEGOVINA
_Sinisa Djukic, Zeljko Zoric_...........................................................................................................58

7. RIGHTS AND OBLIGATIONS OF THE CITIZENS IN EMERGENCIES
_Slajana Eric_.......................................................................................................................................65

8. THE STRENGTH OF RESILIENT CITIES AND THEIR CHALLENGES
_Jasmina Gacic_....................................................................................................................................73

9. CHALLENGES, RISKS AND THREATS TO THE SECURITY OF THE REPUBLIC OF SERBIA
_Nenad Kovacevic, Antonio Mak, Branko Teodorovic_.........................................................................81

10. USE OF UNMANNED AERIAL VEHICLES INTEGRATED INTO THE C4IRS SYSTEM IN MODERN COMBAT OPERATIONS
_Marko Radovanovic, Aleksandar Petrovski, Zeljko Jokic, Aleksandar Aleksic_.................................88

11. ORGANIZATIONAL MEASURES TO RAISE THE CAPACITY OF LOCAL SELF-GOVERNMENTS IN EMERGENCIES
_Samed Karovic_..................................................................................................................................99

12. ORGANIZATIONAL MEASURES TO RAISE THE CAPACITY OF LOCAL SELF-GOVERNMENTS IN EMERGENCIES
_Sinisa Domazet_................................................................................................................................106

13. EMERGENCY SITUATIONS CAUSED BY BIOTERRORIST ACTS AND LARGE PANDEMICS IN THE MIRROR OF THE COVID-19 PANDEMIC
_Jovanka Tosis, Zorana Ivetic_........................................................................................................112

14. THE EFFECT OF BIOTERRORISM TO THE ENVIRONMENT
_Zorana Ivetic, Jovanka Tosis_...........................................................................................................118
15. SECURITY ASPECTS OF FLAWED SETTLEMENTS OF THE ROMA POPULATION IN THE AREA OF THE AUTONOMOUS PROVINCE OF VOJVODINA
Jelena Jovanovic.................................................................125

16. HIGHER EDUCATION IN EMERGENCY SITUATIONS - PROBLEMS AND OPPORTUNITIES OF ONLINE TEACHING AND LEARNING
Vesna Nikolic, Tamara Vukić......................................................136

17. SECURITY OF COMPUTER DATA IN THE CRIMINAL POLICY OF THE REPUBLIC OF SERBIA
Slavica Dinic..............................................................................145

18. PROTECTION OF VITAL HYDROTECHNICAL FACILITIES FROM TERRORIST ATTACKS BY ENGAGING COUNTERDIVERSION DIVERS
Serif Bajrami, Misa Zivkovic, Nikolina Paunic, Popovic, Milan Kresojevic.................................................................152

19. ECOLOGICAL SECURITY IN THE BROADER CONTEXT LEVEL OF GLOBAL PROCESSES
Slobodan Simić.............................................................................157

20. CIVIL DEFENSE OR CIVIL PROTECTION
Dragisa Jurisić.............................................................................164

21. FUTURE TRENDS IMPACT ON REPUBLIC OF SRPSKA CIVIL PROTECTION
Goran Maksimović......................................................................170

22. CONCEPT OF THE PROJECT OF IMPROVING THE ORGANIZATIONAL STRUCTURE OF CBRN UNITS FOR USE IN CASE OF NATURAL DISASTERS BASED ON EXPERIENCE FROM FLOODING IN THE REPUBLIC OF SERBIA IN 2014
Dusan Jankovic.............................................................................182

23. GEOPOLITICS AND TERRORISM IN MODERN SOCIETY
Drazan Erkić, Miroslav Baljak......................................................189

24. COMMUNITY POLICING AND COOPERATION WITH EXTERNAL ENTITIES IN THE FIELD OF SECURITY - THE CASE OF THE MURSKA SOBOTA POLICE DIRECTORATE
Damir Ivancic, Leon Vedenik, Katja Eman.........................................198

25. THE ROLE OF THE MANAGER IN RAISING THE QUALITY OF HUMAN RESOURCES MANAGEMENT IN THE MODERN CORPORATION
Tatjana Gerginova...........................................................................207

26. IMPACT OF CLIMATE CHANGES ON THE DISASTER RISK REDUCTION SYSTEM IN THE REPUBLIC OF SERBIA
Katarina Strbac, Nemanja Pribivcevic, Marko Mihajlov.......................213

27. MODEL PROPOSAL FOR INTEGRATION OF DATA OF THE FLOOD RISK MANAGEMENT TO THE DISASTER RISK ASSESSMENT
Merita Borota, Hatidza Berisa, Aleksandar Drobnjak.................................................221
28. PROTECTION OF TUNNELS AS CRITICAL INFRASTRUCTURE ON THE CONNECTION NIS - VRANJE FROM THE DANGER OF EARTHQUAKE
Vukasin Vuckovic, Aleksandar Petrovic, Boban Runkovic.............................................................228

29. THE PLACE AND ROLE OF THE ARMY OF SERBIA IN THE DISASTER RISK REDUCTION SYSTEM IN THE TERRITORY OF THE REPUBLIC OF SERBIA
Nikola Vukojevic, Uros Polovina, Jelena Lazarevic.................................................................232

30. APPLICATION OF MULTI-CRITERIA DECISION-MAKING IN THE SELECTION OF A LOCATION FOR THE DISPOSAL OF FLUORESCENT TUBES CONTAINING MERCURY IN THE TERRITORY OF THE CITY OF NIS
Vukasin Vuckovic, Darko Bozanic, Dusko Tesic............................................................................245

31. EVOLUTION AND CHARACTERISTICS OF THE THEORY AND STRATEGY OF DETERRENCE OF THE RUSSIAN FEDERATION
Milan Miljkovic, Hatidza Berisa, Srdjan Zgonjanin.................................................................253

32. CHALLENGE RISKS AND THREATS TO INFORMATION SECURITY
Hatidza Berisa, Tamara Gajic, Jovan Prelic...............................................................................260

33. MONETARY POLICY RISKS ON THE DEVELOPMENT OF ENTREPRENEURSHIP
Milan Mihajlovic, Srboljub Nikolic, Aleksandar Savic.............................................................269

34. APPLICATION OF ELECTRONIC CHARTS DISPLAY AND INFORMATION SYSTEM IN A RIVER NAVIGATION ON THE SHIPS OF THE RIVER FLOTILLA
Serif Bajrami, Nikolina Popovic Paunic, Svetislav Sošić..........................................................278

35. OPERATIONAL DESIGN ON THE EXAMPLE OF NAVAL OPERATION EU ATALANTA – SOMALIA
Serif Bajrami, Goran Radic, Zoran Sebez, Milorad Petronijevic..................................................285

36. REQUIRED KNOWLEDGE NECESSARY FOR SECURE AND SAFE REMOVAL EXPLOSIVE REMNANTS OF WAR
Jovica Milicevic, Bojan Glamocija, Jelena Krstić.........................................................................292

37. CHALLENGES IN FLOOD RISK MANAGEMENT IN BOSNIA AND HERZEGOVINA
Edisa Nukić, Jelena Markovic, Fahrseta Zepic.............................................................................298

38. TWO FLOOD RISK ASSESSMENT METHODOLOGIES FOR THE TERRITORY OF NOVI SAD
Cveta Lazic, Srdjan Kolakovic, Slobodan Kolakovic........................................................................309

Sande Smiljanov........................................................................................................................317

40. IMPROVISATION DURING MANUFACTURING MINE EXPLOSIVE ORDNANCE AND CONTROL OF PRECURSORS AS AN ELEMENT OF STATE SECURITY
Jovica Milicevic, Bojan Glamocija, Jelena Krstic..........................................................................325

41. DRONE SAFETY IN U-SPACE USING DIGITAL TWINS
Tomaz Kramberger, Bojan Rupnik................................................................................................331
42. CAUSAL RELATIONSHIP BETWEEN SOCIAL SECURITY AND EMERGENCY SITUATIONS
Nenad Komazec, Aleksandar Milic, Aca Randjelovic, Zoran Lapcevic.................................339

43. THE SUBJECT OF MILITARY SCIENCES IN THE SPECTRUM OF MODERN CRISES
Nenad Komazec, Svetislav Soskic.....................................................................................346

44. THE GLOBAL CHALLENGE OF TERRORISM DURING COVID-19
SrDjan Zgonjanin, Hatidza Berisa, Milan Miljkovic............................................................354

45. IMPROVEMENT OF INFRASTRUCTURE WORKS BY REMOVAL OF EXPLOSIVE REMNANTS OF WAR - CASE STUDY „DENINO BRDO“ -
Zoran Stevanovic, Djordje Krunic, Miodrag Milenkovic..................................................360

46. CIVIL DEFENCE SYSTEM OF THE REPUBLIC OF SERBIA
Milica Mladenovic...........................................................................................................367

47. OFFENSIVE OPERATION FORCE MODELING – ANALYSIS OF AN EXAMPLE OF BATALLION TACTICAL GROUP OF RUSSIAN FEDERATION IN UKRAINE
Miloje Ilic, Misa Zivkovic, Zoran Djuric.............................................................................373

48. THE CAPABILITIES FOR USING A MECHANISED BATTALION IN A BREAKTHROUGH FROM THE ENCIRCLEMENT
Branko Velickovic, Ninoslav Djudjic, Predrag Ruzic.............................................................380

49. THE CONCEPT OF MODERN ARTILLERY RECONNAISSANCE IN FOREIGN ARMED FORCES AND ITS IMPLEMENTATION IN THE SERBIAN ARMED FORCES IN THE FUNCTION OF OWN UNITS SAFETY
Zoran Djuric, Marko Markovic, Branislav Bojanic, Vuk Novakovic....................................388

50. THE INTERDISCIPLINARY NATURE OF CRISIS MANAGEMENT
Viacheslav Chebotarov, Beata Glinkowska-Krauze, Iegor Chebotarov, Tetiana Bukoros........395

51. COUNTERMOBILITY IN POPULATED AREA’S DEFENCE
Srdjan Kostic, Miroslav Jovanovic, Zoran Sebez..................................................................403

52. THE CONTRIBUTION OF UAVs IN IMPROVING THE LANDMINE FIELD DETECTION PROCEDURE
Dejan Blagojevic, Bojan Glamoclija, SrDjan Jovkovic, Milan Protić.....................................409

53. THE INTERNATIONAL INNOVATION PROJECTS FOR IMPLEMENTATION OF THE CONCEPT OF ECOLOGICAL AND ECONOMIC SECURITY OF AGRICULTURAL NATURAL MANAGEMENT IN UKRAINE
Petro Skrypchuk, Viktor Rybak, Sergiy Skrypnyk.................................................................417

54. STRATEGIC MANAGEMENT IN MODERN ORGANIZATIONAL SYSTEMS
Slavisa Arsic, Mitar Kovac, Vladimir Katancevic.................................................................425

55. SAFETY DURING REMOVAL OF EXPLOSIVE REMNANTS OF WAR
Aleksandar Milic, Srdjan Kostic, Bojan Slijukic, Stefan Pusulić........................................432
56. ALTERNATIVES TO PRISON SENTENCES
Emil Turkovic, Slavica Dinic.................................................................438

57. INTEGRATED CONTROL SYSTEMS ON THE SHIP’S BRIDGE
Svetislav Soskic, Milan Kresojevic..........................................................445

58. APPLICATION OF AHP AND MABAC METHODS IN CHOOSING A COMBINED
CONSTRUCTION MACHINE FOR FLOOD PREVENTION AND EARTHQUAKE
REMEDICATION
Nemanja Pribicevic, Darko Bozanic, Dusko Tesic.......................................454

59. MIGRANT CRISIS AS A SPECIFIC RISK MODERN EUROPE
Dusko Tomic, Eldar Saljić........................................................................461

60. ESSENTIAL AND FORMAL ASPECT OF THE STATUS OF MILITARY SCIENCE
Bozidar Forca.........................................................................................473

61. EDUCATION OF RISK MANAGERS: A NEW APPROACH
Aleksandar Petrovic, Zeljko Marinkovic, Vladimir Ristic..........................480
THE WORLD AT THE CROSSROADS OF SECURITY PROCESSES

Mitar Kovac1

1 Director of the Eurasian Security Forum, Belgrade, Republic of Serbia,
mitar.kovac21@gmail.com

Received: 9th September 2022
Accepted: 15th September 2022

Original scientific paper

Abstract: The article discusses the basic aspects of security processes of disintegration of states and integration processes in Europe and the Eurasian area. After the collapse of the Warsaw Pact, NATO gradually continued its march to the East, causing permanent crises and conflicts in many countries along the value line of division that is imposed and established between individual countries in the Eurasian space during the Ukrainian crisis. All the great powers of the modern world want to influence the process of Eurasian integration and realize their interests in that part of the world. In terms of human and natural resources, it is the central area of the world. Therefore, the integration processes, conflicts and wars, which take place in the Eurasian space, have a huge impact on global security. This conflict, in recent times, is representatively reflected through the civil war in Ukraine, which in its course and with the direct and indirect participation of the great powers will significantly define European security and outline key solutions for global security in the future. A multipolar world is certain, it is only a question of the cost and suffering of the people until it is accepted by the influential power centers in the West.

Keywords: International relations, security processes, European Union, Eurasian integration, Russia, USA, Ukrainian crisis

(introductory lecture of the forum - work by invitation)

1. INTRODUCTION

International relations after the Cold War established a new distribution of power and influence in the world. Shortly after the dissolution of the Warsaw Pact and the collapse of the Soviet Union, individual former Soviet republics, motivated by common interests and historical closeness, began a new model of integration processes in order to reduce the consequences of the breakup and improve mutual relations. In addition to their geographical proximity, numerous connections and interdependence that were established in the USSR also contributed to this.

In the context of the processes that are carried out in the function of a significant reconstruction of international relations with the aim of changing the distribution of power of the main actors in international politics, various integration processes are successfully developing in Eurasia, which resulted in the creation of several regional organizations, starting with the
Commonwealth of Independent States, the Customs Union, The Collective Security Treaty Organization and the Shanghai Cooperation Organization complement each other and create a broad platform for cooperation and partnership. In addition to being a huge expanse in terms of territory, Eurasia also has significant demographic potential and natural resources. From a geopolitical point of view, this entire space is also extremely important because it significantly affects the state of global security.

Bearing in mind the centuries-old competition of the most influential states in the international community to expand spheres of influence and realize their own national interests, the contradictory processes of the disintegration of sovereign states and the creation of supranational integrations, to which the powers of sovereign states are transferred, are still taking place today. This especially applies to the European Union, which is based on its way of governing and representing states, a discriminatory and unequal organization in which the national interests of the leading and most developed states are favored.

Under the influence of the US, the EU seeks to expand gradually, often in line with NATO's eastward expansion, through the process of admitting new states from the former Warsaw Pact. Such a purposefully instructed process led to many crises and local wars, and was particularly reflected in the emergence and course of the Ukrainian crisis, as well as the start of the war between the NATO pact and Russia on the territory of Ukraine. Russia could no longer allow such a trend of expansion, primarily NATO, and even the EU, which directly threatens its vital national interests. The Ukrainian regime's terror against the Russian people led to a civil war. The Russian population does not want to stay in such a state that is Russophobic and has banned its basic rights.

The world is at the crossroads of security processes, through which a new multipolar world order is being built. All this is refracted through the war in Ukraine.

2. THE RELATIONSHIP OF THE NATO PACT TO THE UKRAINIAN CRISIS

After the disappearance of the Warsaw Pact, NATO had the hidden goals of the gradual transformation of the Eastern European countries and their acceptance into membership, even though it was claimed at the beginning that this would not happen and that it would not happen with the countries that were part of the USSR. With the end of the Cold War and the unification of Germany, unrest arose in Europe with a large number of internal conflicts that turned into civil wars. Many of these countries fell apart and under the influence of the USA and Germany, new countries were recognized and promoted as former communist creations. According to the process of creation of new states and state creations, new nations were promoted according to political criteria, which historically did not exist in the Twentieth Century. That process, after the civil war in the former SFRY, continued further in the east, with a small break after the strategic design of the concept and vision of NATO, in the new geostrategic context of international relations.

That's how the Ukrainian crisis arose, following the same logic of conflicting interests, which has a strong impact on changes in regional and global security like never before after the Cold War. The crisis in Ukraine led to the fact that the ministers of defense of NATO members decided to open new command centers in Eastern Europe, said the Secretary General of the Alliance, Jens Stoltenberg, on February 5 in Brussels. NATO's plan to open new command centers in Eastern Europe has been hailed by some politically motivated experts as a sign that the Balkans will not be ignored. The alliance's defense ministers agreed to establish commands and bring units to Bulgaria, Estonia, Latvia, Lithuania, Poland and Romania. The opening of these centers is the first phase of the militarization of Europe, along the already established
line of value division and conflicting interests of the leading powers of the NATO pact towards Russia. That step comes "in light of the changing security climate east and south of the Alliance's borders, according to a NATO statement. The new centers in six eastern, allied countries will ensure that "we have the right forces, in the right place, at the right time," said NATO Secretary General Jens Stoltenberg. "Our decisions make it clear that NATO is determined to defend all allies against all threats from all directions", he added.

The command centers in Eastern Europe justify themselves by strengthening regional security, say some of the so-called trained analysts of the security situation in Europe and the world. According to Adrian Cioroianu, a Romanian historian, writer and former foreign minister, "NATO's decision to establish command centers is not a declaration of war, but indicates the instability of the Alliance's eastern borders." Experts point out that the new NATO centers are the result of the crisis in Ukraine in order to show that NATO remains "great support and protection for its allies" in this part of Europe. The establishment of permanent NATO and US military facilities, such as the missile defense base in Devesel and new command centers, is a significant political message to Russia that Romania will not return to its sphere of influence. However, it should be known that this is only one side of the coin, so it can be said that the consequences of such a decision have not been considered, because NATO facilities become a legitimate target in a possible conflict with Russia or the security organizations of which it is a member. This positioning of NATO hints not only at guaranteeing security in specific regions and institutional strengthening and greater human capacities at the external borders of the Alliance, but also at the accumulation of military forces along the imaginary line of conflict between the interests and value systems of the leading countries of the West and the East.

Simultaneously with the strengthening of military forces, NATO is putting pressure on the countries of the Western Balkans to distance themselves from Russia in every way and to join the sanctions introduced by the West, primarily the USA and the leading EU countries. The statements of the politicians of the western countries are also in this context. Washington continuously exerts pressure on Serbia on issues concerning the relations between the EU, Russia and Serbia. In this context, the statement of the former US ambassador to R. Serbia Montgomery, "that he is worried about Serbia, because the EU threatens not to open chapters in the negotiations," and that Serbia should distance itself from Russia and join the sanctions of the West.

The Ukrainian war episode is only an indication of the conflict situation in which the expansion of the Euro-American factor has been stopped and pacified, if only for a moment. The West will not give up its expansion beyond the borders of the Russian sphere of interest without major traumas, because it is the logic of force that can only be changed by force. The parade of American soldiers in combat vehicles and with weapons through the countries of Eastern Europe, which actually looks more like the march of the "victorious army", is primarily a political message to Europe and a warning that America has no intention of giving up control over the old continent. Although everything, in many ways, looks like another somewhat childish propaganda exercise, in essence it is a very clear and serious symbolic manifestation of American power and Washington's European policy.

Under the pretext of the danger from Russia and the Ukrainian crisis, the American conquest of Europe and a "heavy hug" that will surely hurt are on the scene. This is the essence of this phase of the generation of the Ukrainian crisis and the tightening of relations with Russia, regardless of how incredible it sounds from the point of view of media propaganda and politicians' statements. Since the First World War, when America entered the international and European political scene, the constant of American policy has been to not only establish control but also to prevent any connection between Europe, primarily Germany, with the East,
with Eastern Europe and Russia. And that is the American goal to this day. For decades, that goal was effectively realized by generating fear of communism and the Soviet Union. Hence the American support for the rise of Nazism in Germany, which is a historical topic that is persistently suppressed. With the later practically American occupation of Europe and the fabrication of the Cold War, America managed to separate Western and Central Europe from its East. To that end, American support for the formation of European integrations, which ultimately led to the European Union, is crucial.

Times are changing, so the instruments of American control over Europe and its isolation from the East have become weaker and weaker. In such circumstances, the historical destiny of Europe to turn towards its east and Russia surfaced. With the disintegration of the bloc division of Europe and the affirmation of globalization and the breaking down of borders, that historical destiny of Europe got its new chance. Europe thus naturally, not because some political elite really wants it or has a secret plan, turned naturally again towards Eurasia in terms of cooperation, primarily in the field of energy, economy and resources. The USA has felt this and wants to prevent that trend. It is simply a natural process. Without its east and Russia, Western Europe, which declared itself "the only Europe", is not a continent, but only a peninsula of Asia, which it was until a few centuries ago. Europe is only whole and tension-free when its east and west meet and without any lines of division within it. America, however, has no intention of losing control of Europe. The first step was to rush the European Union to expand into Eastern Europe so that the countries of the East would be loyal to America for their European destiny and to become an American rather than a European political instrument. In this, America succeeded to the greatest extent in political control over the European Union. This is the American "new Europe" versus the "old Europe", if by chance the EU tries to profile itself as an independent political entity and, led by Germany, cooperates with Russia or becomes "too close" with it.

Germany is fatefully, culturally, and economically oriented towards the East, primarily towards Russia. America does not accept that natural process and now, when it has largely used up its political arsenal and failed to regain control, it is turning to strengthening its military presence and generating fear of the outbreak of a new war in Europe. After 77 years since the Second World War, America again wants to use military force to create new forces in Europe under the guise of the Ukrainian crisis.

However, it is uncertain how this process will develop further. By far the most effective instrument of American power in Europe, NATO is showing some signs of weakness. There is less and less necessary agreement within the European NATO members. For example, the European members of NATO rejected the invitation of Eastern European countries to station their soldiers on their territory as a guarantee of defense against "Russian aggression" and did not even accept to participate in military exercises in the Baltic. They were only soldiers of the USA and the Baltic republics. In most countries of Eastern Europe, there are US military installations, not NATO. The question arises whether NATO is a sufficient instrument to survive the test of a regional war in Europe.

Everything suggests an increased militarization of Europe, which raises doubts that politics will gradually turn into the language of military power and wars that would devastate it and throw it into the trap of international influence. In this light, a recent statement to a Polish newspaper by one of the American ideologues, Zbigniew Brzezinski, in which he advises the Poles to prepare for war, is interesting. The timing of the statement coincided with the parade of American soldiers. Although this advice was given in the context of the crisis in Ukraine and the "Russian danger", the experienced Brzezinski was not, however, clear against whom that war could be. It is clear that America has no intention of letting go of control over Europe.
and it is clear that Europe and Germany are the key American problem in this part of the world and they want to use them at any cost in a new campaign against Russia.

Everything seems to be preparing for that collision of opposing interests of the USA and Russia through the creation of the Ukrainian crisis and its course. The US Congress passed the "Prevention of Russian Aggression Act" last year. During the next two years, the so-called NATO Security Fund should be created in Europe, which would include Ukraine, Georgia, Moldova, Azerbaijan, Bosnia and Herzegovina, Macedonia, Montenegro, Kosovo and Serbia. Diplomatic platitudes about harmonizing weapon standards, joint training and cooperation in peacekeeping missions conceal the intention of further militarization of Europe through NATO's new role in the Ukrainian crisis. The USA is obviously increasing its military presence around Ukraine and in it, and in that way is intensifying the geopolitical confrontation with Russia.

The fact that the differences between American and European policies regarding relations with Russia are becoming more and more obvious does not worry Washington, because the USA counted on such an obstacle to its plans because it has a large number of EU members who follow its policy and look first at Washington and only then at Brussels. The EU cannot exist without the will of the US, which is clear even to the leading members of the EU. In addition, the USA, unlike Europe, does not depend on Russia either economically or in terms of energy. The negative consequences of the sanctions do not affect the USA, all the costs of the Ukrainian conflict fall on the richest EU countries.

The USA hopes that by supplying weapons to Ukraine, it will cause additional economic problems for Russia, as a result of which the citizens of that country will lose confidence in Vladimir Putin and, in the end, the power will be transferred to some kind of "new Yeltsin", so that Russia will lose its importance and stop be a geopolitical rival of the USA and a possible long-term partner of China. As long as Russia is as strong, united and determined as it is now, there are no realistic chances of NATO imposing a solution to the Ukrainian crisis through war.

3. THE EUROPEAN UNION AS A FACTOR OF SECURITY

Almost all the so-called Europe's visionaries in Germany, from the end of the First World War onwards, advocated the idea of Europe as a federal state, as opposed to De Gaulle's idea of Europe as a community of sovereign states, but the federalization plan was implemented slowly, step by step, starting with a single market for coal and steel, economic communities and unions until the complete federalization of Europe, established by the Treaty of Lisbon. The Treaty of Lisbon is essentially the Constitution of the European Union. Today, the EU is trying to be a federal state in the full sense, with a number of problems and contradictions and inequalities in decision-making mechanisms. EU laws are above the laws of member states.

The European Commission is entirely supranational and all European Commissioners are expressly prohibited from listening to any advice from their countries of origin. They must work exclusively in the interest of the Union and not in the interest of the Member State. Only the Commission has the right to propose laws and supervises, directs and has authority over the entire legislative process.

The different extent of representation of member states in the European Parliament is one of the indicators of the fundamental inequality of peoples and states in that highest legislative body. Thus, the representatives of small nations and states are often outvoted in the decision-making institutions of the EU and cannot exert their influence on the creation of documents and laws, nor on the creation of policies and key decisions. Small and medium developed
countries in the EU are more in a blackmailed position, exposed to pressure and represent a
cover for the interests of the most developed and powerful countries of the West.

Due to such a discriminatory decision-making system, instead of calming down the situation
in Europe, the EU, under pressure from the USA and Great Britain, Poland, Romania and the
Baltic states, is developing a further escalation of the crisis, which can lead to unforeseeable
consequences for regional and global security. Poland plans to build border towers along the
land border with Russia's Kaliningrad region. The six towers will be up to 50 meters high and
will send images to polish border guards who monitor the 200 kilometer long border. The
recordings from the towers should record the activities on the Russian side of the border, and
the information obtained should help Ukraine, but also the entire European Union in creating
a policy towards Russia. It is the official justification for the financing and implementation of
such an insane project, which is basically warmongering and reminds us of the towers, wire
and reflectors that are a symbol of a divided Europe, a symbol of violence and a prelude to
further conflicts and wars. Only unenlightened people are not aware of the consequences of
those moves, which are essentially security and civilizational problems. Who is bringing
Europe back 84 years to the eve of a new European and world war? This is a big issue that is
not being discussed honestly and in good faith in official places in the UN and the EU. Such a
move by Poland was certainly not planned or adopted in its national institutions. Skeptics
would certainly say that the move that Poland has decided to take is also a kind of confirmation
of the preparation of both Russia and the whole of Europe for the possibility of new conflicts
on European soil.

According to such unreasonable measures and investments that are made to the detriment of
the citizens of the member states, the European Union has clearly decided to directly
participate in the construction of the line of division of the EU itself towards Russia and its
allies. All of this is done by the leading EU countries under the guise of protecting the
sovereignty and territory of the member states on the eastern borders. Such measures cause
additional aggravation of the crisis and mutual distrust. There are many EU members who
under pressure accept such decisions from Brussels, but the majority of the people of those
countries are not behind such decisions, because they recognize in these measures the further
militarization of Europe and the introduction of suffering and suffering in the future.

Due to the greed of multinational companies and the increasingly open march to the East of
the most developed countries of the West, Russia has rightly felt the danger and is taking
measures to stabilize and protect national security and vital national interests. There is also
news from Russia about the expansion of the Russian military presence in the Arctic. According
to available information, Russia has installed missile systems in that area. In
addition to the missile system, fighter interceptors and a new radar on the island of Nova
Zemlya in the Arctic Sea will be deployed in the ore-rich area, Major General Kirill Makarov
confirmed. In recent years, the Russian military has been increasingly present in the far north,
at a time when Moscow is laying claim to large parts of the Arctic landscape in order to secure
its rights to exploit oil and gas. Due to the melting of the ice, the Arctic is becoming an
increasingly important waterway, which has led to territorial disputes between several
countries.

Conflicts of major powers around and in Ukraine can become a trigger for new crises and wars
around the world. Some leading countries of the European Union, under the guise of protecting
citizens, have decided to make it clear once again that "Ukraine is an enemy and an enemy of
Europe". Such a thesis is essentially warmongering and an untrue message for the public,
which is looking for an enemy of Europe in Russia. The attempt to create such a front and
exclusivity will primarily fall on the heads of the protagonists of the failed strategic concept
of a violent march to the East towards new strategic resources and their uncontrolled exploitation. It is the logic of capital that cannot always pass and that leads to crises and wars. All past campaigns to the East, with the involvement of European resources or a group of European states, only brought suffering, death and destruction. And this strategic concept of sanctions against Russia, the militarization of the drawn line of the borders of the EU and the countries that strive to become future members, will lead to the destruction of the essence, meaning and original values of the EU. Such an instrumentalized and militarized EU will not be able to survive.

The European Union itself is not yet sure of its future, nor has it profiled itself as an independent subject of international relations. It can be said more that the EU is fundamentally and in a strategic sense, an instrument of US policy, primarily in Europe and the Eurasian area. Many crises, such as the civil war in the former SFRY, the Ukrainian crisis, the Greek economic crisis, the Middle East with its security reflections on Europe, secessionist movements, and the unequal relationship between large and small states in the EU itself make it unstable and non-unique in creating a common foreign policy, security and defense policies. All these inequalities of peoples and states in the EU will be multiplied with the further escalation of the Ukrainian crisis and possible regional war in the future. Those contradictions and the consequences of conflict can make the essence of the EU meaningless, because it is organized in such a way as to affirm and realize the interests of its leading and most developed countries. This is why it can be said that after the negative experiences of the Serbian people with Yugoslavia, communism, socialism, there is no rational reason to endanger vital national interests, under the guise of a better life, by including them in supranational integrations, such as NATO and the EU. The political and military neutrality of the Republic of Serbia, in these difficult times, is a framework that can affirm its national interests for a long time.

4. GENERAL CONTEXT OF INTEGRATION PROCESSES IN EURASIA

The process of integration in Eurasia in the Twentieth Century began primarily on the basis of a common communist ideology and then socialism, as a social order in the USSR. That order was first imposed by violence through revolution. That false ideology destroyed the national and religious freedoms of peoples and ethnic communities. The republics that made up the Soviet Union of Socialist Republics (USSR) from 1922 to 1991, during the period when they became a common state, were extremely closely interconnected, not only politically and geographically, but also through the common disposal of natural resources, energy reserves, and labor force, economic and transport infrastructure, defense and military potential, market, technology, science, education, culture and numerous other connections.

The collapse of the USSR led to a sharp deterioration in regional security. The dissolution of the Soviet Union and the USSR was not followed by the dissolution of NATO, but accelerated integration processes in the West began. In the former members of the VU, separatism, terrorist organizations and various forms of confrontation and conflicts appeared among the newly created states. Bearing in mind all these unfavorable trends, Russia was also forced to influence the formation of new integrations. The response to those trends began on June 15, 2001, when the Shanghai Cooperation Organization (SCO) was formed, with a Declaration (http://www.ehu.es/ceinik/tratados) signed by the presidents of five independent states from the former Soviet Union and the president of the People's Republic of China. The basic function of this organization was the achievement of regional security, and the need for other forms of cooperation in the economy, culture, science, education and other areas immediately appeared. Today, SCO (http://www.infoshos.ru/) members are countries that cover about 60% of the territory of Eurasia.
The main areas of cooperation between the member countries of the Shanghai Cooperation Organization are politics, security and economy. The Declaration on the establishment of the SCO states that the goals of the organization are "strengthening mutual trust, friendship and good neighborly relations, ensuring and preserving peace, security and stability in the region, building a new, democratic, just and rational political and economic international order".

The Collective Security Treaty Organization (CSTO) is another integration alliance in the post-Soviet space that deals with security. It was created in October 2002, in accordance with the Agreement on Collective Security of May 15, 1992. CSTO members are Russia, Kazakhstan, Belarus, Armenia, Kyrgyzstan and Tajikistan.

From a geopolitical point of view, the area of Central Asia has always had great importance for international relations, but only the development of political geography enabled the formulation of the first geopolitical ideas at the beginning of the last century, which look at the influence of geographical factors on political decisions from a global perspective. In order to highlight the geopolitical and geostrategic importance of this region in world politics, the British geopolitical theorist Halford Mackinder, in his work "Democratic Ideas and Reality", in 1919 designated the "Heartland" or "Heart of the World" as part of the Eurasian space "which is being drained towards the Arctic or within the continent", i.e. the area from which the rivers flow to the inland seas and the Arctic Ocean. The "Heartland" thus defined covers a huge area, a significant part of which is Central Asia. He believed that whoever can control this region can control the whole world (Mackinder, 1919).

With the end of the Cold War, Central Asia is developing into an important geostrategic and geo-economics region, which significantly affects all economic, political and security trends in the international community. With the collapse of the Soviet Union, new independent Central Asian states appeared on the global scene: Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan, stretching from the Caspian Lake to the western borders of China. Faced with the numerous challenges of the political and economic transition, they were quickly included in the geopolitical calculations of the world's powerful states.

At that time, the Russian influence in the international community was too weak to sufficiently stabilize the region, and on the other hand, the influences coming from outside were insufficient to destabilize it more strongly, because it was certain that they would be faced with a reaction of Russia, regardless of its power at the time. Nevertheless, in that part of the world, a security and geopolitical vacuum was created, which opened the possibility for a fundamental change in international relations, especially their political-security aspects, and the establishment of new alliances.

In the current circumstances, for the US, Central Asia represents a strategically important area due to the fight against terrorism, but above all due to the huge reserves of oil and natural gas located in that area. September 11 and after the war in Afghanistan brought Central Asia into the spotlight of international attention due to its strategic importance for the West, as an important geopolitical space. However, it should be mentioned that the USA, in the period from 1922 to 1991, when the independent states of Central Asia were an integral part of the USSR, had very little contact with them and that, therefore, the American view of this area was rather "blurred", and in 1991 they faced the challenge of building relations with countries with which they had not previously cooperated much (http://sr.wikipedia.org/).
The idea of a single economic space was proposed at the beginning of the nineties of the last century, after the former Soviet republics declared their independence and formed the Commonwealth of Independent States. The integration project aimed to create a unified economic policy and create a unified commission to regulate customs tariffs and trade. In February 1999, Russia, Belarus, Kazakhstan, Kyrgyzstan and Tajikistan signed the Agreement on the Customs Union and the Common Economic Area, which provided for three stages of integration:
- Eurasian Economic Community and Free Trade Zone,
- Customs Union,
- Common economic space.

The Eurasian Economic Community (EEC, Russian: ЕврАзЭС) is based on the principles of the United Nations and international law, and has had observer status at the UN General Assembly since 2003. The Agreement on the Establishment of the Eurasian Economic Community was signed on October 10, 2000 in Astana, capital of Kazakhstan, and entered into force on May 30, 2001, after it was ratified by the parliaments of the member states. Members of the Eurasian Economic Community since its foundation are Russia, Belarus, Kazakhstan, Kyrgyzstan and Tajikistan. Ukraine and Moldova have had observer status since May 2002, and Armenia since January 2003.

The United States of America and its allies systematically criticize and try to disqualify Eurasian integrations, trying to portray them as the new USSR, as if they were logical and the only justified integrations in the West. As the then Secretary of State Hillary Clinton stated in December 2012: "The USA will not allow the reconstruction of the USSR in a new version under the guise of economic integration, which is being created under the coercion of Moscow" (http://www.globalaffairs.ru). Such unfounded theses serve to maintain the global advantage of the USA in modern international relations, preventing the coalition of the great powers and civilizations of Europe and Eurasia, primarily Russia, Germany, China and Japan.

It is characteristic that today the struggle for influence in Central Asia is being waged precisely between the EU and the USA, on the one hand, and Russia and China, on the other. All the mentioned powers have quite strong positions due to a number of historical, political, economic and cultural factors. The fact that Russia and the republics of Central Asia were part of the former Russian Empire and later the USSR, gives Moscow the opportunity to attract them into the sphere of its own cultural influence, in every respect. On the other hand, the USA is proposing to the region a new integration project, the Trans-Pacific Partnership (TPP). The central place in the realization of this plan is given to Afghanistan, and it basically envisages the reconstruction of what was destroyed by the war in this country. The essence of the American plan is that it expresses the will to manage Afghanistan through a new project, but not the willingness to invest money, but they hope and expect that the surrounding countries will do it for them (http://vvv.profi-forek.org).

In recent years, China has emerged as a leader in the region, compared to Russia and the US. Its future potential, along with its current wealth, are the best argument in negotiations with its neighbors. It invests mostly in Central Asia and provides political support to those countries, and improves bilateral relations. China has for Central Asia its proposal of integration project

---

1 This idea was presented by Nursultan Nazarbayev, the President of the Republic of Kazakhstan, in his speech at the Lomonosov State University in Moscow in March 1994, two years after the Commonwealth of Independent States (CIS) was founded.

2 The Agreement on the establishment of the EEC was amended by the Protocols on Amendments of January 25, 2006 and October 6, 2007.
"Silk Road Economic Belt", which it strongly promotes. The project involves the construction of a new transport corridor that would connect China via Kazakhstan, Russia and Belarus with Western Europe.

Russia's idea of the development of the Eurasian Union is aimed at preserving its leadership position in the countries of the post-Soviet space, where most of them are the countries of the former Soviet Union, while China, adhering to the idea of the "Silk Road Economic Belt", seeks to create a Eurasian economic zone, which would form China, the countries of Central Asia and Europe. That competition between the great powers is primarily motivated by the struggle for resources and competition in the economic and economic sphere.

Ukraine is a key country for Russia and for the leading states of the EU, the USA and their geopolitical interests in Europe and Eurasia. Kyiv's foreign policy, after the Cold War, was constantly changing, depending on the election results, pressure from the USA and the EU, the price of Russian gas transportation and the economic situation. Depending on the action of those factors, they were on the side of the West or turned towards Russia.

By including Ukraine in political, economic and security integration, under the auspices of the EU and NATO, the USA, in cooperation with the leading countries of Europe, tried to achieve its strategic goal of breaking out on the borders of the European part of Russia, in order to manifest a latent and permanent threat and a continuous crisis in the states on its borders, as well as by causing crises in the border areas in the west and south of Russia, tried to challenge and diminish its status as a global world power. The ultimate goal of the campaign against Russia and the East is essentially to bring under control the huge resources and the area of Eurasia, and then change the value system in those countries and create a larger number of new smaller states, following the model of the former SFRY. Many geopoliticians in the West make different analyzes about the need to divide Russia into several states and to destroy its imperial character and potential forever. Thus, according to their scenarios, Russia would cease to exist as a superpower, which throughout history was a dam for all empires and ultimately the judge of their disappearance. Also, Russia is trying to preserve Ukraine outside the process of its violent transfer to the side of the West, under the guise of democratization, as the cradle of its own ethnic and state-building identity, but also as a country that civilizationally, economically and militarily-strategically barrages the offensive space of the West up to the Russian borders (Stepic, 2013).

Russia, without influence on Ukraine, has less importance for European developments and would remain more of an Asian country in whose lobby NATO's offensive combat forces would be installed. This would directly threaten Russia's security and reduce the reaction time of its defense system. That is why Russia has no alternative in terms of its national interests in part of Ukraine, especially in the east and southeast, where the majority of the Russian people live.

It is indisputable that Ukraine is deeply divided both nationally and religiously, into the southeastern part determined to join the Russian Federation and the rest of the country, which is mostly determined to integrate into the EU and NATO, with the fact that there are parts in the west mostly inhabited by Poles, Hungarians and Slovaks. The political and territorial future of Ukraine is uncertain, because it is a deeply divided society nationally, ideologically, religiously and socially, especially in terms of value systems.

5. THE FUTURE OF EURASIAN RELATIONS

The future of the European Union cannot be built on opposition and conflict with Russia and other Eurasian states. On the contrary, avoiding confrontations and erasing the lines and points of conflict is the way out for European and Asian countries to live in peace. That unique
continent, economically and security-wise, should function harmoniously, building mutual trust through constructive dialogue and developing and improving mutual cooperation. The movement of NATO to the East will lead, in addition to Ukraine, to new points of confrontation and for a long time will make the area of conflicts of interests in Eurasia unstable. When it comes to the effects of the introduction of sanctions and blockades, economic and even political, they only represent a sure way to new or deepening of existing confrontations and conflicts.

In Europe, on the basis of divisions and conflicting interests, two world wars began and caused the greatest consequences in the history of the human race, in terms of the scale of human victims and material destruction. The application of double standards in international relations and exclusivity, blockades and the use of force can lead this region, and subsequently the world, into a vicious spiral of violence from which no one would emerge victorious. The nations of Europe and Eurasia would suffer the most.

It remains to be hoped that the wisdom of the political elites in the countries of Europe and Asia will find the right way out in a compromise, and not in the constant deepening of the existing ones and the creation of new security divisions and problems. The accumulation of weapons and military personnel along the line of conflict and the construction of the so-called Anti-missile shield\(^3\) are a sure way to suffering, not to security and prosperity. If one's intention is for the EU and Russia to clash for a long time, then it can become a world problem and threaten European and global security in the near future.

The strategic partnership of the Republic of Serbia with the Russian Federation represents a strong confirmation of the historical and spiritual closeness and friendship of the two nations and a broad framework for strengthening overall cooperation. It is based on democratic values inherited by both countries, the principles of sovereignty, equality and territorial integrity of states, peaceful resolution of conflicts, mutual respect and benefits, non-interference in the internal affairs of other states.

**6. CONCLUSION**

European integrations, that is, the inclusion of new countries in the EU and NATO, formally take place without political coercion, on a voluntary basis, with full understanding of mutual benefits and obligations. In essence, these are all directed and directed processes, with the creation of public opinion in those countries, and if necessary, through the implementation of various forms of pressure and conditioning, and then dependence on those supranational institutions. The security problems in Europe became so much bigger that the former members of the Warsaw Pact were admitted quickly and without essential need, many of which did not even come close to meeting the requirements for admission to EU or NATO membership. After the dissolution of the Warsaw Pact, it was logical for NATO to dissolve as well and not to find a new meaning of existence and become an instrument of power of the largest

---

\(^3\) At the summit in Lisbon in 2010, the leaders of the NATO countries made a decision to build a missile shield in Europe, and the European Phased Adaptive Approach (EPAA) was accepted as the basis of the construction project. Although in the first phase of the project it was planned to install a radar in the Czech Republic, this country abandoned that plan in 2011. The problem that arose with the withdrawal of the Czech Republic was solved by the transfer of operational control over the American AN/TPY-2 type radar in Turkey (from the USA) to NATO in the winter of 2012. The reason for building a missile shield, both in the USA and in Europe, is the development of ballistic missiles in "unstable parts of the world" or, to put it less diplomatically, in "rogue states". In recent years, Iran has been cited, explicitly or implicitly, as the main source of anxiety. Russia opposes the construction of a missile shield in Europe, considering that its security is threatened.
multinational companies in the West, which are looking for new markets and resources under profitable conditions. It is a process of violent so-called globalization in the function of multinational capital.

After more than two decades after the collapse of the Soviet Union, Russia is increasingly finding its place in the multipolar world, and NATO sees its violent expansion as a problem for its national security. Over the last few years, Russia has made a significant effort to regain its international credibility and overall power. In this regard, it seeks to strengthen its position in Central Asia and to develop relations with the countries of the Commonwealth of Independent States, in order to preserve its leading role among the newly formed states, formed after the collapse of the USSR. By strengthening these countries and cooperating with them, Russia strengthens its national security. The future of Europe, the EU, Russia, China and other European and Asian countries is not in conflict and "drawing some new lines of division", but in cooperation and solving all problems, including security ones, peacefully. The persistence of the USA and Great Britain on the division of Europe directly threatens Eurasian security and brings it to the eve of war.

The secession of Kosovo and Metohija, despite international law and its unilateral recognition by the leading countries of the West, opened a new period of unrest and chaos in the future in Europe, Eurasia and around the world, through the strengthening of secessionist movements and the emergence of new states. That trend is likely to continue, especially since these secessionist movements, in addition to internal contradictions, were fueled by external factors.

Once international law is violated, by the application of military force and violence against a sovereign state, as was done to Serbia, it causes the emergence of such strong changes in international relations that they can hardly be controlled. That is why secessionist movements often start to flourish in countries that have violated international law and return like a boomerang with ill-considered moves and violence. The world today is in the transition of the global security system and the affirmation and profiling of the multipolar world. In that process, the positioning of the state and the people can bring benefits or consequences.

When empires are in conflict, any absolute alignment to any side, small states and peoples, which are in the conflict zone, brings mostly misfortune. That is why, after centuries of suffering and demographic destruction of the national being of the Serbian people, the preservation of military neutrality is of strategic importance for the Republic of Serbia and its positioning in international relations.

REFERENCES

Stepic, M. (2013). Geopolitics of Neo-Eurasia, Institute for Political Studies, Belgrade
Abstract: In the shadow of the still actual COVID-19 pandemic, as well as all its medical, scientific, economic, socio-psychological and geopolitical consequences, 50 years have passed since the smallpox epidemic in the former Yugoslavia. In this year we are also celebrating the 50th Anniversary of the signing of the Biological Convention. Smallpox is a class A biological agent with potential aerosol transmissivity, high infectivity as well as relatively high fatality rate. That is exactly why it is extremely important to remember the readiness and efficiency of the Yugoslav reaction in suppressing this epidemic and all the controversies that followed it. Lessons from that period can be still used today, half a century later, as a guide for the effective preparation for the management in such situations. Unfortunately, biological weapons are becoming more and more important in the modern hybrid wars, especially in the time of great precomposition of the world, which is moving towards its multipolarity. The power of microorganisms is clearer to everyone, especially in the context of the opportunities that development in the field of biomedicine, molecular biology, bio- and nanotechnology opens up in that context. The question of bioweapons becomes again a subject of conflict between the great superpower. In relation to the 50th anniversary of the signing of the Biological Convention, it is a real time for question of why an independent international body under the auspices of the UN has not yet been constituted to deal with the prevention of the proliferation and use of biological weapons? Pandemics and epidemics will certainly occur in the future, because it is a law of nature, a consequence of migration, climate change, but microorganisms can certainly be misused as weapons in war and in the hands of terrorists. That is why it is important to work on improving the capacity for prevention and response in such situations. This primarily refers to the intelligence and security sector, but also scientific and research resources, well-organized and prepared military and civilian healthcare, the ABHO service, as well as the crisis response and communication system. Lessons learned from previous epidemics - smallpox and COVID-19 should
certainly be analyzed in detail and critically in order to enable the preparation of the resources for the more efficient and organized reaction in the event of the appearance of such or even more dangerous pathogens.

**Keywords:** epidemic, pandemic, smallpox, COVID-19, biological weapons, Biological Weapons Convention

(introductory lecture of the forum - work by invitation)

1. **INTRODUCTION**

Since the anthrax campaign of 2001, which followed the terrorist attack in New York and Washington, the issue of weapons of mass destruction (WMD) began to occupy an important place in the international narrative and became a formal reason for many conflicts that were initiated in different parts of the world. Epidemics of SARS in China in 2003, then avian and swine flu, as well as the latter epidemic of the Zika virus in South America, with the socio-political framework of their occurrence and all the implications, as well as the quick and radical changes in attitudes and definitions of pandemics by the WHO, and the strengthening of the budget for biological defense in the leading superpower of the world, indicated to attentive analysts, but also to security-enlightened people from the medical profession and science, that in the coming times, the occurrence of more serious epidemics and/or pandemics can be expected, for which the societies should prepare in time by analyzing previous experiences, by following the latest achievements of science, by investing in one's own knowledge and intelligence, but also by preparing a response strategy in crisis situations caused by such an event. An important prerequisite for that was raising the awareness of the experts, the security sector, but also decision-makers, who often did not pay special attention to this problem.

Then came the SARS-CoV 2 virus or COVID-19 pandemic with all the health, socio-psychological, economic and geopolitical controversies that accompanied it and the questions it raised. The spread of panic, fear, inexplicable restrictive measures, misuse of terms, medical unanimity opposed to the basic knowledge of medical microbiology and immunology, the race in the production of vaccines that soon took on the proportions of a real geopolitical game reigned in the international public discourse.

The analysis of scientific papers published in high-indexed journals on the eve of the pandemic (2016-2020) showed that in fact a large number of experts and teams of institutes in the most developed countries of the world were engaged in the crossing and recombination of different coronavirus strains, examining the transmission routes and virulence, the immunopathogenesis as well as the effects of monoclonal antibodies and known antiviral agents. The research teams and the financiers of such research were interesting. The simulation conducted at the prestigious John Hopkins University was particularly interesting, as well as the discussion at the Munich Security Forum held just before the global lock-down.

The management of the crisis inevitably influenced the results of the elections that were held that year in 70 countries of the world, including the most powerful ones, such as the USA. The greatest absence of international solidarity was shown by those who declaratively advocate the most for universal values, while the People's Republic of China made the greatest strides in medical diplomacy and helping others.

Experience has also shown that countries that had preserved the rests of the former socialist system with an emphasis on public health, as well as knowledge from the former concept of civil protection, in the existing circumstances responded most effectively to the challenge of the pandemic. Our country was among them.
We will remind here to the most important facts and experiences in the fight against smallpox, which are still unique and relevant, even though exactly 50 years have passed since this event. Namely, it was the largest post-war epidemic in Europe, during which 175 patients were officially registered, 35 of them died. This epidemic was specific for the time of its appearance, the affected territory, dimensions and some epidemiological characteristics, but also for the well-organized, synchronized and efficient reaction of the competent services in the fight against it. Experiences and lessons learned from this epidemic can be a significant and valuable contribution to the global fight against smallpox, which again represents a serious threat, as well as for work in emergency situations.

Smallpox is one of the deadliest diseases in human history. It is believed that it appeared for the first time around 10,000 BC in northeastern Africa, from where it spread to the Far East, all the way to India and China. It caused frequent epidemics during the Middle and New Ages. At the time when European colonizers were conquering the New World, smallpox was a powerful biological weapon to subdue the mighty Aztec and Inca empires and destroy the Indian tribes. During the 20th century, the smallpox virus caused 300-500 million deaths worldwide. This is precisely why the WHO started a global campaign to eradicate smallpox in 1967, during which all current and potential hotspots were covered by vaccination. The campaign was successfully completed in 1979. It was then agreed that only two laboratories in the world (Vector Institute in Novosibirsk, in the then USSR, Russia and CDC Atlanta, USA) would retain the variola virus, while the others must destroy it. After eradication, mass vaccination was stopped. The vaccination is recommended only to protect laboratory personnel from possible infection with other orthopoxviruses (vaccinia virus, monkeypox and other poxviruses).

Due to its microbiological characteristics, the possibility of aerosolization and interhuman transmission, as well as resistance to the environmental factors, smallpox virus is classified as a class A potential biological agent. According to the available data, this virus entered the biological weapons arsenals of the most powerful countries in the world during the Cold War and was the subject of serious research, including its cross-recombination with the Ebola virus. The world's population is generally sensitive, since vaccination against the variola has stopped after eradication, the mortality rate is high, and there is no specific therapy. In the last years of the 20th century, it was registered the intensive production of variola vaccine in some countries of the world. Given that it is a highly contagious pathogen, where one infected person can transmit the infection to 10 to 20 others, and therefore special protective measures are needed in the treatment of patients (isolator rooms with negative air pressure and adequate protective equipment) as well as in microbiological work with material samples (laboratories with the highest, fourth level of protection), in case of its appearance, it could be expected huge problems in the work of both health and all other public services.

In today's world of global contradictions, the use of biological weapons represents a real danger, both in war and in bioterrorist actions when this agent can be found in the hands of individuals or groups with vicious intentions over which no one has control. Considering all the above, it is extremely important to raise awareness of this problem, monitor the epidemiological situation and implement preventive measures, and above all to have adequately prepared human and material resources for dealing with the occurrence of the disease. In this connection, the unique experiences and lessons learned from previous epidemics and the response of competent services in those situations are also valuable.

The smallpox epidemic that affected the former Yugoslavia in 1972 was suppressed quickly and efficiently, due to the joint efforts of specially formed anti-epidemic bodies at all levels,
the good organization of health services, the support of the Yugoslav People's Army, as well as international solidarity and WHO assistance.

It was the largest post-war epidemic in Europe. Even then and today, there were doubts and speculations that it might have been a bioterrorist attack on Tito's Yugoslavia, although scientific facts do not support this claim. A total of 175 people fell ill, and 35 people (20%) died. Among the patients there were 99 (56.6%) men and 76 (43.4%) women. Most of the sick were in the Republic of Serbia, 174 people, while one case was recorded in Montenegro. Since the last case of smallpox in Yugoslavia was recorded even four decades before this epidemic (1930), doctors did not have practical experience in diagnosis, nor sufficient knowledge of the facts related to epidemiology and the fight against this quarantine disease, so the clinical diagnosis of the disease was established late.

Epidemiological and serological tests showed that the pilgrim-hajji Ibrahim H. from the village of Danjane (SO Orahovac) near DJakovica, brought the smallpox into Yugoslavia. He visited Mecca and Medina (Saudi Arabia) with 24 other hajjis and returned by bus via Iraq, visiting a dervish sanctuaries in the vicinity of Basra and Baghdad where there were several cases of smallpox in that period. Upon his return to the village, according to his own account, Hadji fell ill with a clinically undiagnosed illness (fatigue, chills, shivering), and he also had several small pimples on his face. However, during the examination, a month later, no scars were found on his face and body, nor were there any traces of vaccination, even though it was carried out in December 1971 at the Institute for Health Care in Skopje (Macedonia). By the way, all participants of the Hajj were previously vaccinated with a lyophilized domestically produced vaccine (Immunobiological Institute in Zagreb (Croatia)), as well as against cholera. The success of the vaccination was not controlled. By testing of the sera of the passengers who traveled to Hajiluk by the same bus, it was determined that 20 of them did not have a satisfactory vaccination antibody titer, which opened some questions related to failures in the implementation of immunization measures.

By the way, in Yugoslavia were conducted the measures for control of travelers coming from infected areas. Pilgrims were treated as a particularly risky group. They usually went on the pilgrimage in an organized manner, by plane, with prior sanitary treatment, health control during the journey, as well as health supervision upon return, which was generally carried out in agreement with the Islamic community, but there were also private arrangements, as this one. The fact that in the WHO report Iraq first appeared as an infected area in the first half of March 1972, and that the disease existed two months earlier, had a negative impact on the epidemiological research of the monitored groups, as well as the fact that the first case of the disease was atypical. All the pilgrims stated that they were healthy during the journey. They were revaccinated during the epidemic. Serological examinations were performed before revaccination at the Torlak Institute in Belgrade, as well as at the smallpox laboratory of the Center for Disease Prevention and Control (CDC) in Atlanta (USA). The results showed significant differences in the positive findings of Ibrahim H. compared to the serums of other pilgrims. Based on this, it is considered to be the most likely source of infection (index case).

The epidemic developed in the territory of the province of Kosovo in three generations. The number of secondary diseases from one source of infection was closely related to the length and intimacy of contact between patients and susceptible persons, and it depended on the clinical form and stage of the disease. Patients with typical changes on the skin and mucous membranes usually caused the largest number of secondary diseases. However, the patient Ljatif M. from Novi Pazar, the first contact with the index patient, with a hemorrhagic, always fatal, but unrecognizable form of variola, and under the diagnosis of a severe allergy to penicillin, walked through several health institutions and in direct contact infected a total of
38 people, which represents the largest number of infections from one person recorded in the world literature.

In this epidemic, differences in the length of incubation between vaccinated and unvaccinated individuals were not observed. Of all 175 patients, 105 (60%) were previously vaccinated, 66 (37.7%) were unvaccinated, while 4 (2.3%) had no known vaccination status. Here it is necessary to point out the big difference in lethality between previously vaccinated (8%) and non-vaccinated persons (35%). It is worth mentioning that 52% persons were infected outside the hospital, while 48% were infected in hospitals. The exception was the hot spot in the province of Kosovo. There were twice as many outpatient cases, which was atypical. By the way, the common characteristic of post-war smallpox epidemics in Europe was that most of the patients were infected in hospitals (index 2.4:1.6), while the situation was reversed in the case of the epidemic in Yugoslavia (index 1.1:2.0). Another specific characteristic of the epidemic in the province of Kosovo, was related to the fact that the focus for intrahospital infections in this area, in addition to the infectious one, was also the delivery department, although the exact way of introducing the virus into the maternity ward has not been determined. Otherwise, the characteristic of the epidemic was a large number of infected infants (14).

Vaccination in the first hotspots started on March 16, one day after the virological confirmation of the disease. By the decision of the competent authorities, the Federal Epidemiological Commission, vaccination was extended to the entire vulnerable population of Yugoslavia, so that a total of 18 million people were covered by this measure. Along with vaccination, treatment with hyperimmune anti-smallpox serum was carried out, especially in cases where the vaccine was an insufficiently safe prophylactic. Detailed records of vaccinations and post-vaccination complications were not kept.

All health institutions in the country were taking adequate measures to fight against smallpox. Health surveillance of hotspots in the province of Kosovo included daily visits to residents, temperature measurement and inspection of the skin and oral mucosa. In the search for contacts, nearly 3,000 surveys were conducted in Belgrade alone. Contacts were taken care of in special quarantine institutions, but there were also quarantines of individual households and entire villages. Since primary vaccination after contact was the main protective measure, many prime-vaccinated people who came into contact with sick people did not get smallpox at all. However, primary vaccination after contact in the Yugoslav epidemic did not have a greater impact in terms of the occurrence of milder clinical forms of the disease, which was in contrast to the then available literature data.

The microbiological diagnostics was performed in the laboratory of the Torlak Institute for Immunobiology and Virology in Belgrade, whose experts were specially trained to work with dangerous pathogens. The facility was founded in 1966. In 1967, the Marburg virus imported from Africa was identified there. The laboratory team consisted of 3 experts and 1 mid-level medical worker in charge of virological work and two experts in electron microscopy. Immediately after the outbreak of the epidemic, a state of emergency and a 24-hour duty regime were introduced in the Laboratory. The team of experts has been strengthened. During the processing of materials, a special regime of personal and collective protection was organized in the laboratory (suits, coats, masks, glasses, gloves, boots, bathing after work, permanent disinfection of working rooms, strictly controlled transfer and sterilization, i.e. burning of all infectious objects and limiting personnel contact with the outside environment). In this regard, it is important to mention that not a single case of laboratory infection was recorded in the laboratory, which speaks in favor of good training and work organization, considering that biological safety standards were not exist at that time.
By the way, the smallpox epidemic happened before the beginning of the tourist season, so its quick suppression was also extremely significant from that aspect. It was sociopolitically significant that the country was entering a period of destabilization, because the Constitution of 1974 which paved the way for the degradation of the state was being prepared. Preparations for the 80th birthday of the Yugoslav Marshal were not interrupted, despite the epidemic. In the same year the British Queen Elizabeth came to an official visit. Schools, colleges and cultural institutions were working normally during the epidemic. The public was informed by competent experts about the spreading of the disease and the measures that should be taken, and corresponding Bulletins were published in the daily press. The WHO was also informed about all this, and for the purpose of coordination and objective information of the world public, the competent experts of the WHO were invited. The work and coordination of all management bodies and state administration bodies responsible for health affairs were at an enviable level. The Federal Executive Council monitored the work and gave full support to the Federal Headquarters for the fight against smallpox, whose task was to collect and publish data on the movement of the disease, coordinate the work of the republican and provincial headquarters, procure and distribute vaccines and other resources, and take other measures based on the assessment of epidemiological situations. It can be said that the Yugoslav health service quickly and efficiently carried out the task of suppressing the smallpox epidemic, which was also large in terms of the number of cases (175) and by geographical spread (25 hotspots). The exceptional dedication of health workers and other social entities, as well as the disciplined behavior of the population, certainly significantly contributed to this.

It is also important to point out what the media image was like during the smallpox era. The first information on Radio-Television Belgrade appeared seven days after the confirmation of the infection, although CNN immediately when the virus was seen under the electron microscope in Torlak announced the news about the appearance of smallpox in Yugoslavia, which raises many questions, primarily of a security nature. Information about the spread of smallpox was broadcast daily until April 15, after which it was reduced to sporadic. It is interesting that the Relay of Youth started on that day from Iriški venac. During the previous period, half-hour or one-hour shows were organized every day, in which selected ministries or doctors carefully disseminated information about people’s behavior and the fight against smallpox. Trust in the health system, official bodies and the state was extremely high, so all measures were implemented more easily. An inspection of the program archives revealed that there were also critical, but well-intentioned attitudes. Marshal Tito never appeared on television during the epidemic. The last patient was discharged from the hospital on May 19, while seven days later was celebrated his birthday.

In summary, our health care and the whole of Yugoslavia gained an extremely high reputation in the world due to the extremely effective fight against smallpox, and the lessons learned are still extremely current and represent a roadmap in the fight against future epidemics/pandemics that will certainly occur, either due to environmental laws of nature or as a result of human actions.

In the year of 50th anniversary of signing the Biological Weapons Convention, which prohibits the possession, use and transfer of potential biological weapons, it seems that the same is becoming more and more relevant. Not only the experiences and challenges of the COVID-19 pandemic, the discussions at international economic and security forums, simulations of future pandemics, the incomes of multinational companies, but also the geopolitical gambit we live in impose numerous open questions. In this connection, the issue of biolaboratories in the territory of Ukraine and the former Soviet republics, in the vicinity of the People's Republic of China as well as in Central Africa, their activities, and the ways of financing their projects is also very relevant. Russia has recently presented evidence, the US indirectly confirmed
involvement, and the People's Republic of China is seeking clear answers to the questions raised within the UN Security Council. It is indicative that this body reacted much more expeditiously in the past when some others made accusations that were used as an immediate reason for bombing of the sovereign countries. The possible reasons for the construction of such laboratories could be: a-dislocation of potentially dangerous research prohibited by the Convention outside its own borders, b-examination of the epidemiological-epizootological situation on the ground that is of strategic interest and the occupation of which is planned, and c-collection of biological material of a certain population in order to possibly improve biological and ethnically specific weapons. Taking into account the real threat, the question arises why no truly independent control expert body has been constituted within the UN until now in the framework of the Biological Convention, whose signature depositories were the USA, USSR and Great Britain, and which entered into force in 1975. The main task of this body would be the control of implementing of the provisions of the Convention, which now resembles a gentleman's agreement rather than a binding legal act. Such bodies exist within the framework of the Chemical and Radiological/Nuclear Convention, but despite the numerous resolutions of the UN Security Council, which deal with the issue of biological threats, the analogue body has not been constituted so far. Perhaps the right time for a diplomatic initiative in this direction is right now, when the world is at a major turning point.

It is the joint task and obligation of scientists, the security-intelligence system, as well as decision-makers, at the national and international level. Any other outcome would pose a real danger of turning the world into a new microbiological Chernobyl.

REFERENCES


ECOSYSTEM-BASED DISASTER RISK REDUCTION IMPLEMENTATION FOR INCREASED RESILIENCE TO WATER-RELATED NATURAL HAZARDS

Branislava Matic¹, Milica Zivkovic²

¹ University of Educons, Faculty of Environmental Protection, Vojvode Putnika 67, Sremska Kamenica, Republic of Serbia, branislava.b.matic@educons.edu.rs
² University of Educons, Faculty of Environmental Protection, Vojvode Putnika 67, Sremska Kamenica, Republic of Serbia, milica.zivkovic.edu@gmail.com

Received: 22nd August 2022
Accepted: 30th August 2022

Abstract: Natural hazards related to water, e.g., hydro-meteorological events cannot be prevented. These hazards generate a majority of disasters globally. Although there is significant uncertainty regarding their occurrence in the future, the current body of knowledge indicates changes in frequency that will very likely increase the disaster risks. With no intention to discuss and elaborate on various threats to security and ecosystem services approaches definitions, an overview of the ecosystem services’ role in local, national, regional and global disaster risk reduction is presented. The role of Eco-DRR in hydrometeorological disasters risk reduction and environmental security is supported by the synthesis of the elaborated contemporary policies, conventions and frameworks. As indicated for selected river basin, there is a rationale to increase Eco-DRR implementation in the policies and legal framework to reinforce sectoral cooperation and improve disaster risk management.

Key words: hydrometeorological hazards, Eco-DRR, water-related DRR, Natural Water Retention Measures, flood risk management

(introductory lecture of the forum - work by invitation)

1. INTRODUCTION

Water-related disasters generated by hydrometeorological hazards have increased recently according to Centre for Research on the Epidemiology of Disasters (CRED) and UN office for Disaster Risk Reduction (UNDRR) report (CRED UNDRR, 2019). Document provide analyses of data available in the CRED Emergency events database (EM-DAT) and comparison for two time periods, i.e., 1980-1999 and 2000-2019. Results indicate significant increase in total number of disasters for later period, number of flood events, storms, droughts, high temperature, etc. In order to be recorded as a disaster in EM-DAT, an event must meet at least one of the following criteria: 10 or more people reported killed, 100 or more people reported affected, declaration of a state of emergency and call for international assistance (ibid).
Disaster is a serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources (UNDRR terminology, 2016). Disaster risk is compound of hazard (magnitude and frequency), exposure (people and their assets) and vulnerability (Estrella and Saalismaa, 2013). Changes in frequency of hydrometeorological hazards become reality and uncertainty of future intensity is still high. Thus, water related disaster risk reduction (WRDRR) complexity multiply and the main goal of DRR, i.e., preventing new, reducing existing and managing residual risk at the global level is advocated by Sendai Framework for Disaster Risk Reduction 2015-2030 (SFDRR), to reduce disaster risk and losses in lives, livelihoods and health in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries.

Ecosystems (ES) and their services (ESS) interlinkage with DRR is integrated in SFDRR and consideration and incorporation of integrated environmental and natural resources management approach is recommended. SFDRR priority 1: Understanding disaster risk (article 23) specify that “Policies and practices for disaster risk management should be based on an understanding of disaster risk in all its dimensions of vulnerability, capacity, exposure of persons and assets, hazard characteristics and the environment, and Priority 3: Investing in disaster risk reduction for resilience (article 30-g) articulate mainstreaming of disaster risk assessment, mapping and management into rural development planning and management of, inter alia, mountains, rivers, coastal flood plain areas, drylands, wetlands and all other areas prone to droughts and flooding, including through the identification of areas that are safe for human settlement, and at the same time preserving ecosystem functions that help to reduce risks (ibid).

The role and significance of ecosystem services for integrated river basin management resulted in identification of measures that increase river basin capacity to retain water (Natural Water Retention Measures-NWRM), decrease flood risk and contribute to achievement of EU Water Framework Directive environmental objectives in the Tisza River Basin (Matic et al.,2021).

As elaborated in following this paper explains rationale for Ecosystem-based disaster risk reduction (Eco-DRR) better integration in the Disaster Risk Management Plans for areas prone to hydrometeorological risks and justify NWRM and Eco-DRR comparability that increase resilience to water-related disasters.

2. ECOSYSTEM SERVICES AND WATER-RELATED RISKS AND DISASTERS

Ecosystems services (ESS) are benefits provided by ecosystems (terrestrial and aquatic various categories) to human societies. There is increasing body of knowledge that indicate higher risks to water related disasters in areas with decreased ESS (e.g., development of human settlements in floodplain areas). Indeed, ESS higher level of service and proper management increase resilience to hydrometeorological hazards. Despite the ecosystems approach is illuminated in last decades by transposition in global, regional and national policy and legal frameworks, the ecosystem services approach and implementation span from ancient times to present. It is known by communities around the world, such as the centuries-old protection forests in Switzerland, and has been documented by scientists for decades (Estrella and Saalismaa, 2013).

2.1. Ecosystem services and hydrometeorological hazards

Ecosystem services (ESS) are benefits provided by ecosystems (terrestrial and aquatic various categories) to human societies. There is increasing body of knowledge that indicate higher
risks to water related disasters in areas with decreased ESS (e.g., development of human settlements in floodplain areas). Indeed, ESS higher level of service and proper management increase resilience to hydrometeorological hazards. Despite the ecosystems approach is illuminated in last decades by transposition in global, regional and national policy and legal frameworks, the ecosystem services approach and implementation span from ancient times to present. It is known by communities around the world, such as the centuries-old protection forests in Switzerland, and has been documented by scientists for decades (Estrella and Saalismaa, 2013).

2.2. Eco-DRR

Ecosystem-based disaster risk reduction (Eco-DRR) is the sustainable management, conservation and restoration of ecosystems to reduce disaster risk, with the aim of achieving sustainable and resilient development (Estrella and Saalismaa, 2013). Since Eco-DRR definition inauguration it has been used by scientific and practitioners’ communities in all sectors relevant for DRR management.

Table 1: ECO-DRR selected examples (excerpted from Sudmeier-Rieux et al., 2019)

<table>
<thead>
<tr>
<th>Ecosystems</th>
<th>Hazard Mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mountain forests</td>
<td>Floods reduction by peak runoff control</td>
</tr>
<tr>
<td>vegetation on hillsides</td>
<td>Drought mitigation</td>
</tr>
<tr>
<td></td>
<td>Erosion reduction</td>
</tr>
<tr>
<td></td>
<td>Increased slope stability</td>
</tr>
<tr>
<td>Wetlands</td>
<td>Flood control</td>
</tr>
<tr>
<td>Floodplains</td>
<td>Reduce speed and volume of runoff</td>
</tr>
<tr>
<td>Lakes and Riverine</td>
<td>Realise wet season flows during drought periods</td>
</tr>
</tbody>
</table>

Data exhibited in table presents some of the ES benefits and their HESS (flood reduction, drought mitigation, runoff speed and volume reduction) that contribute to hazard mitigation. In addition, they often contribute to multihazard DRR, mountain forests and hillsides vegetation mitigate peak runoff and landslides due to slope stability.

Difference of the same hazard impact and disaster magnitude due to area cover by forest on the island of Hispaniola (divided by Haiti and Dominican Republic) during the intense rainfall (24–25 May) and Tropical Storm Jeanne (mid-September) in 2004 is enormous as elaborated in Estrella and Saalismaa, 2013. Total causalities for two disasters are 5,419 and 702, on Haiti and Dominican Republic, respectively. Difference in the GDP and human poverty index between countries are tremendous and very likely contribute in disasters magnitude during the 2004. Total area covered by forests in Dominican Republic (1,972,000 ha, 40.8%) and Haiti (105,800 ha, 3.8%) is tremendous (ibid).

2.3. Eco-DRR implementation limitations, issues and constrains

Eco-DRR as a part of DRRM is a complex and demanding, requires multidisciplinary teams’ commitment to cooperation, horizontal and vertical linkage, and system thinking. Example presented in preceding clearly underline that misunderstanding, single sector approach, lack of hydrological processes understanding at the local and regional level very likely generate devastating disasters.

This ecosystem based approach should not be viewed as a single solution to risk reduction. It should be part of a larger disaster risk management strategy and should always be complementary to other essential risk management measures and activities. Like all DRR activities it reduces risk but doesn’t remove risk (Estrella and Saalismaa, 2013).
Not all hazards can be effectively mitigated by ecosystems, which is for instance the case for earthquakes (Sudmeier-Rieux et al., 2019). When it comes to hydrometeorological hazards like floods, the magnitude of flood event can be limiting factor and Eco-DRR or similar ecosystem based approaches (NWRM) are more suitable for more frequent events of lower magnitude. Integration with the existing /future grey infrastructure should be considered whenever is possible, e.g., retention of water at the large dams’ reservoirs catchment will decrease sedimentation and water amount discharge.

In addition to before mentioned, space availability and land price might be limiting factor in urban and peri urban areas. Even it the rural areas with low population density, lack of effective legal framework or its implementation at the local level without support of local population and political will should be consider as a constrain. With respect to local level it is very important to have comprehensive understanding of natural features to avoid purely copy paste with respect to DRR planning.

3. ECO-DRR, WATER RETENTION AND RISKS

The regenerative potential of the social and natural systems envisaged in the aligned intergovernmental agendas will be better understood, and progress will be accelerated, by incorporating systemic risk and systemic opportunity into the design of policies and investments across all scales. Figure 1 depict the main objectives of contemporary DRR given the characteristics of systemic risks in different domains (UNDRR, 2019).

Figure 1. Innovation curve” – from destructive to regenerative approaches “

Source: (UNDRR, 2019)

SFDRR (2015) transpose ESS in number of its priorities, goals and targets. Over 190 countries report their transposition advancement in national DRR policies and legislation (strategies, laws, by laws, action plans, etc) transposition. It is not quite clear to which extent systemic approach depicted at the Figure 1 is implemented in DRR plans.

Secondly, when it comes to hydrometeorological hazards there is always uncertainty with respect to extreme events (floods, droughts, heavy rainfall, etc) frequency and magnitude, regardless all advancement in technology. These uncertainties might have adverse effects on planning processes due to overestimation or underestimation of future events estimation.

Solution based on ecosystem services (ESS) concept for water - related disaster risks reduce vulnerability and exposure by regulating natural phenomena extremes. They are characterized by multi- benefits, multidisciplinary approach and are consider as a no regret, win -win

3.1. Natural Water Retention Measures

Natural Water Retention Measures (NWRM) are multi-functional measures that aim to protect and manage water resources using natural means and processes, therefore building up Green Infrastructure, for example, by restoring ecosystems and changing land use. NWRM have the potential to provide multiple benefits, including flood risk reduction, water provision, groundwater recharge, etc. As a result, they contribute to achievement of the key EU policies such as the Water Framework Directive (WFD) and the Floods Directive (FD) among the others (EU DGE, Jaritt, N., Williams, H., Hanus, A., et al., 2016). Some of the NWRMs are: retentions, reforestation, buffer strips, natural terracing, etc. Given the NWRM scope and goals their location and selection require hydrological and environmental analyses.

Despite definitions used by different sectors for ecosystems solutions (Nature Based Solutions, EbA, Eco-DRR, etc) NWRM overlapping with Eco-DRR concept and strong interlinkage in water -related disasters is no doubtful.

3.2. NWRM application at the Tisa River Basin

The largest sub-basin of the Danube River Basin-the Tisza River Basin (Figure 2) drains an area of 156,869 km² is shared by Tisza countries (Ukraine, Slovakia, Romania, Hungary, and Serbia) and can be divided into two main parts: the mountainous Upper and the Lowland Tisza Basin. Its transboundary water resources management is built on the Tisza countries co-operation within the scope of the International Commission for the Protection of the Danube River (ICPDR) Tisza Group.

![Tisza River Basin overview](ITRBMP 2019)

**Figure 2.** Tisza River Basin overview

*Source: (ITRBMP 2019)*
Updated ITRBMP 2019 incorporates elements of the flood risk management plan – flood risk reduction measures reported by Tisza countries through ICPDR DANUBE GIS database following the procedures. As a subcategory of these measures Tisza countries collected data and information and reported the potential identified “win-win” measures associated to flood risk management that might lead to achieve the objectives of EU WFD in the Tisza River Basin (TRB).

Tisza countries proposed measures that are based on national official data included in river basin and flood risk management plans at the level of river basin, sub-basin, and river district, the most effective approach for water management based on the natural geographical and hydrological unit for integrated river basin instead of administrative or political boundaries.

Total number of “win-win” measures included in the ITRBMP 2019 (Endorsed by Tisza Countries Ministries Memorandum of Understanding signature in September 2019) is 65 with 36 measures being identified as a NWRM and other measures that advocate for increase of retention capacity (Matic et al., 2021). Figure 3, subcategories of NWRMs identified by Tisza Countries.

4. CONCLUSION

The rationale for Eco-DRR concept implementation will result in resilience to water-related natural hazards. The contemporary DRR at the global level SFDRR 2015 advocates for ecosystems and their services consideration in DRR at local regional, national and transboundary level. Implementation of the Eco-DRR should not be viewed as a single solution to risk reduction and effective cross-sectoral cooperation, diverse stakeholders’ interactions, participatory approach, and update of plans. Since it is multidisciplinary approach comprehensive understanding of the natural features, social aspects, policies, and constrains is mandatory for improved DRR. Interaction between Eco-DRR and NWRM concepts and objectives to support increase in resilience to water related natural hazards is evidence based for Tisza River Basin flood risk management.

Different definitions and concepts (Eco-DRR, NWRM, NbS, EbA, etc) based on ecosystems, their services and benefits might result in low level of acceptance among practitioners and general public, combined with confusing statement that this is a new approach, although majority of measures all implemented for centuries around the world at the local level. In some publications they are advocated as the wizard stick, with no clear message on constrains, with respect to low probabilities events, land ownership, potential space limits in urban areas, etc. That might increase scepticism and rejection among stakeholders and decision makers, despite the great number of benefits that are evident. Eco-DRR concept for low probability high
magnitude events should be considered as a support for grey infrastructure. More research, better monitoring of already included and applied ecosystem based concepts will increase their integration in policies at the national level.

ACKNOWLEDGMENT

Results and information on Tisza River Basin presented in this paper are funded by DTP Interreg program within the scope of JOINTISZA project (DTP1-152-2.1): Strengthening cooperation between river basin management planning and flood risk prevention to enhance the status of waters of the Tisza River Basin, and joint work by Tisza countries experts within the scope of ICPDR Tisza group, GWP CEE, WWF Hungary, and REC.

REFERENCES


NEURO LINGUISTIC PROGRAMMING (NLP) IN MANAGERIAL PRACTICE

Katarina Jankovic

1 General Staff of the Serbian Armed Forces, Directorate for Development and Equipping J-5, Technical Test Center, Center for Testing Weapons and Military Equipment, Nikinci, Republic of Serbia, jankovickatarina95@gmail.com

Received: 28th July 2022
Accepted: 12th September 2022

Professional paper

Abstract: In order to improve the economic system, there is a need to introduce innovative approaches in the managerial structure. One of the most modern methods is neuro-linguistic programming (hereinafter referred to as NLP). In the business world, NLP methods are directly applied to improving interpersonal relationships, creating business relationships based on trust and precise goal setting.

NLP was first developed in America in the 70s of the twentieth century, as a result of studying the skills of successful people. Today, numerous global companies use NLP methods to increase their productivity, manage human resources, and create as few costs as possible. Some of them are "Sony", "Coca Cola". Research conducted in these companies shows that thanks to the introduction of the NLP method, they managed to reduce the lack of interest of clients by as much as 67%. In the Republic of Serbia, research shows that the most desirable companies (Oil Industry of Serbia, Marbo Company) are companies that operate according to NLP methods. The introduction of the NLP method into the business system in the Republic of Serbia would improve the business of small and medium-sized enterprises.

The paper describes some of the NLP techniques that have found their application in improving managerial skills. The aim of the paper is to show how this important skill affects successful business decision-making, efficient management of the organization and acquisition of a sustainable competitive advantage.

Key words: neuro-linguistic programming, management, leader, education

1. INTRODUCTION - DESCRIPTION OF THE PROBLEM

The application of neuro-linguistic programming (NLP) has spread from psychotherapy to business, sales, marketing, and all segments of business and private life. NLP studies how successful people achieve good results in the fields they deal with and offers numerous techniques to effectively teach success models to anyone interested.

What makes a top manager? In addition to professional knowledge and experience, a manager's focus must be on continuous personal development. A person in the position of manager is expected to make decisions quickly and efficiently, as well as the ability to perform his part of the job and manage others at the same time. Communication skills, influential and effective
negotiation, delegation, follow-up, organization, motivation, solution and goal orientation - these are all skills that are necessary for a successful manager.

In recent years, in the world and in our country, when it comes to the choice of methodology for personal and professional development, NLP occupies a leading position. Regardless of occupation, skills of good communication, negotiation, avoiding conflicts, influencing skills, creating good interpersonal relations are needed in all spheres of business practice.

The demands and challenges for people in management positions are increasing and they often work in stressful situations. NLP offers a set of techniques, by means of which every manager can successfully develop his skills of advanced communication, communication with demanding interlocutors, recognition of different communication personality types and techniques for harmonization, the knowledge of which can largely avoid conflict and stressful situations. Also, for negotiation skills, as well as the skills of efficient and convincing presentation, as well as public speaking, getting rid of nervousness, which is also the subject of NLP, are extremely important for every manager.

Good managers are those who know that they are only as successful as their employees, and they also know that they can only progress if their employees are also progressing. A good manager knows what motivates his employees and moves them to action according to their personal motivation, the so-called motivation without repression, in short, how to influence the development of employees in the most effective way.

2. WHAT IS NEURO LINGUISTIC PROGRAMMING - NLP?

Neuro-linguistic programming encompasses a range of skills, techniques and models that use the mind, emotions and body to communicate with exceptional efficiency. NLP studies how successful people achieve exceptional results in a wide variety of fields and teaches other people those skills, techniques and patterns. By changing the way of thinking and behavior, as well as by becoming aware of their potential, every manager can reach the goal faster and easier.

The popularity of the NLP method increased in the seventies of the last century, when it was discovered that it helps in the fight against phobias, anxiety, and also has a positive effect on professional success. NLP uses perceptual, behavioral and communication techniques to help managers change their thinking and behavior (Krzic, 2013).

The term NLP includes three words (Krzic, 2013):

**Neuro** - refers to the nervous system and how communication with other people is achieved through the five senses: sight, hearing, touch, smell, and taste. This is how information is received and reality is created based on it

**Linguistic** - refers to the way in which language patterns are used in everyday speech and how speech can influence the representations of other people. The words used affect the way of thinking, mood, behavior, attitudes and actions. They also influence the interlocutors.

**Programming** - refers to internal processes, i.e. programs of thinking, feeling and behavior and the ability to replace certain patterns of behavior that are not useful with more useful ones (in accordance with the values and goals to be achieved).

The NLP method was designed and developed in the 70s of the 20th century by Richard Bandler - mathematician and psychologist and John Grinder - university professor of linguistics at the University of Santa Cruz in California (USA). They conducted research on the topic - what is the key difference between successful and less successful people. They wondered how they could discover the key elements of success and describe them so that other
people could learn them. They called that process - modeling. They studied how successful people communicate, how they motivate themselves, how they make decisions, how they learn. They believed that it was possible to identify the patterns of thinking and behavior of successful individuals and that it was possible to teach them to others.

Various authors have defined NLP as (Krzić, 2013):

"The ability to master one's own states, using one's own brain” – Richard Bandler

"Studying the extraordinary and how to reproduce it " – John Grinder

"An attitude (reckless curiosity) and a methodology (modelling) that leave behind a series of techniques” – Richard Bandler

"A way to use the language of the mind to consistently achieve specific and desired goals” – Ted James.

3. NLP IN BUSINESS PRACTICE

Basically, NLP techniques can be summarized in a couple of axioms and postulates that unify this field of psychology into a single thought system, that is, they represent scientific foundations. Some of the reasons for applying NLP techniques are (Okonor, Seymour, 2017):
- It gives great flexibility in behaviour in difficult situations
- Increases learning speed
- It helps in becoming a more influential member of the group
- NLP is a tool that can be used to achieve excellence in any field.

By implementing NLP techniques and methods in the business world, especially their integration into daily activities is what makes the difference between exceptional and average managers. There are several possible ways in which the application of NLP techniques can contribute to better performance (Malesević, 2019):
- Effective and influential communication;
- Building relationships with employees based on trust and respect;
- Setting clear, unambiguous and practical goals for employees in the organization who are lower in the hierarchical ladder of the organization;
- Counselling and problem solving - thanks to NLP knowledge and skills, successful managers can understand every situation, all inconsistencies and dissatisfaction of employees. A manager who knows NLP techniques will motivate employees in the "right direction" in accordance with the organization's goals.
- Ability to find appropriate solutions for situations that could get out of control;
- Managers who have mastered the techniques and skills of NLP will be able to manage meetings and people;
- Better understanding of those present, understanding of body language and other types of non-verbal communication enables a better assessment of people and their abilities, especially when it comes to staff recruitment or the selection of managers;
- Better negotiation possibilities, especially when using manipulative techniques;
- Better possibility of presenting goals, ideas, business attempts;
- Improved possibility of assessment and judgment during job interviews with candidates, especially in cases where the interview is time-limited;
- Improved professional interviewing techniques.
4. MANAGER COMPETENCES FOR THE XXI CENTURY

Research shows that for employees in the modern business environment, the most important skills are solving complex problems, critical thinking, and creativity. Also, it is predicted that two thirds of children who have yet to enter primary school will work in jobs that do not yet exist. This is not surprising, if we bear in mind that most of today's most sought-after professions did not even exist five or ten years ago, and that "trend" continues. So, unless we have the ability to continuously adapt, opportunities pass us by. We are on the threshold of the so-called fourth industrial revolution and the speed of changes in the world we live in has greatly exceeded the predictions of the eighties.

All predictions of the future of the labor market, education, and business, come down to the fact that the man of the future will need skills that have nothing to do with specialized knowledge, but with the ability to adapt and continuously learn. The application of NLP in business brings numerous benefits and opportunities for development. Whether it is high employee motivation, effective communication or significant productivity improvement, the effects of NLP methodology in the business environment are obvious. Just a few of them are motivating team members more effectively, reducing misunderstandings, and increasing employee satisfaction and productivity.

That is why it is important for a manager to master NLP techniques and dedicate himself to his personal development, because in this way he will contribute to the development of his business. The assumption is that any manager who masters NLP techniques will bring a double benefit to the organization. On the one hand, through personal development, he will become a more valuable member of the collective, and on the other hand, he will learn how to influence his entire team and their success. This is a consequence of improved communication, a realistic understanding of goals and increased awareness of the potential of all team members.

Among the wide range of business applications of NLP methodology, some are singled out:

1. Communication skills - the main characteristic of successful managers

Effective communication is vital for anyone who wants to be an exceptional manager. It is the key to starting and maintaining relationships between people. Poor communication, such as that caused by using the wrong words or phrases, will cause conflict in the workplace. NLP is a safe way to eliminate ineffective and harmful communication.

Likewise, NLP is one of the few methodologies that simultaneously offers several equally effective approaches to improving communication in the workplace. The result is successful, convincing, clear, and precise communication. In addition, NLP can increase a manager's ability to connect with others to build trust. It is a well-known "compliance technique" with which a manager can communicate with the widest range of people and maintain long-term quality business relationships (Squire, 2018).

2. Stress management and personal development

Stress is a physical and mental reaction that all human beings experience. Originally related to unfavorable and dangerous signals from the environment, it represents a chronic condition in modern business. This is a consequence of people's distorted perception towards new tasks, challenging projects, and a turbulent business environment. Managers in particular face many challenging tasks in the workplace, so stress is an inevitable part of their everyday life. Today, effective management of stress and emotions is a prerequisite for a good psycho-physical condition of every manager. By applying NLP, a manager can learn how to manage his emotions. One of the NLP techniques that can help to reduce stress levels is "anchoring". By
applying this technique, a person can change even the most difficult and undesirable emotional states.

3. Leadership skills and influence

NLP skills enable a leader to effectively motivate and guide team members. NLP techniques can be the main support in creating leaders who are committed to defining goals and creating a clear vision. One of the NLP techniques - "compatibility" represents the state of an established "bridge of trust and harmony" between two or more people. It can be the main support when building trust between managers and team members. Once trust is established, the manager can begin to effectively lead and manage the team. It becomes obvious that effective managers must have well-founded principles of controlling their own behavior in order to encourage employees to move forward, towards the goal, as individuals and as a team.

4. Sales skills

The already mentioned NLP technique - "compatibility" is also important for the development of sales and long-term client relationship maintenance skills. In the first stages of sales, the NLP technique of "perceptual positioning" can be useful (Rensburg, 2022). Seeing the situation from another angle increases the probability of reaching a win-win solution. In addition, language patterns as well as advanced skills in asking the right questions are extremely useful during negotiations. The result of their application is reflected in the understanding of the real problem and needs of the client.

Sales and negotiation skills are key characteristics of a good manager because of the significant role they play in reaching the desired agreement and achieving the goal. NLP techniques are an integral part of any successful sale or negotiation.

5. Time management skills

Time management is the process of planning and controlling the time spent on specific activities. Improving your time management skills at work allows you to improve your performance and achieve your goals with less effort and more effective strategies. NLP uses various tools and techniques to help successful managers get more done in less time. Some of those techniques are the "ABCDE" method, the law of the trinity, color coding...

6. Setting goals

Clearly defining goals is one of the prerequisites for success, but despite this, 95% of people still do not set goals. For whom are these people working? For those 5% of successful managers who set goals!

In addition to the SMART model, NLP has a specific approach to goal setting that goes further, ie. offers a way of "programming" the mind to lead to the desired results. Attention will therefore be directly focused on internal and external resources that help to move from the current to the desired state. NLP also teaches how to translate organizational vision into strategy and action steps.

NLP methodology encourages people to reach their full potential. Therefore, investing in personal development will also affect the development of the organization itself. That is why it is necessary for managers to develop their skills and encourage the same in their employees using NLP methodology.
5. CONCLUSION

The modern business environment has one significant characteristic: an uncontrollably accelerating pace of change with many challenges and uncertainties. The balance between promising situations and dangers for each organization depends on its ability to adapt. That is, the question necessarily arises, if the environment is rapidly changing uncontrollably, at what speed are organizations changing? That is why it is a necessary goal to create organizations that are capable of constant renewal, because any delayed adjustment can lead to great losses.

The qualities of the "new" leader are: integrity, flexibility, respect, trust. Managers of the new generation have a crucial role in encouraging employees to use all resources in the form of knowledge, abilities and skills that they can use in the business process. A tool that can significantly help them in this is NLP. Organizations that appreciate and encourage creativity, quality, and value the execution of tasks and the development and satisfaction of the individual, the constructiveness and active involvement of employees are encouraged, represent organizations dominated by the constructive organizational style. Their employees are characterized by innovation and dedication, and the managers of such organizations are characterized by a culture of employee leadership.

REFERENCES

Francois Janse van Rensburg, NLP Human Resources Coaching, 05/28/2022, available online: http://letslive.info/nlp-human-resources-coaching


Law on Protection of the Population from Infectious Diseases (Official Gazette of the Republic of Serbia no. 15/2016, 68/2020 i 136/2020)


CONCEPTUAL CIVIL PROTECTION MODEL IN THE REPUBLIC OF SRPSKA WITH REFERENCE TO THE REGIONAL DEPARTMENT ORGANIZATION

Zeljko Zoric¹, Dragana Kosic²

¹ Sector Security, Sinise Mijatovica Street 9, Banja Luka, Republic of Srpska, Bosnia and Herzegovina, zeljko.zoric@sectorsecurity.org
² Sector Security, Sinise Mijatovica Street 9, Banja Luka, Republic of Srpska, Bosnia and Herzegovina, dragana.kosic@sectorsecurity.org

Received: 5 July 2022
Accepted: 4th August 2022

Abstract: Frequent emergencies show that the traditional civil protection system organization is not able to respond to their challenges. Today’s emergencies, in addition to discrediting previously adopted civil protection systems, clearly show that existing national civil protection systems can hardly respond to such challenges without interstate cooperation. This is due to the fact that today’s natural disasters, technical and technological accidents, as well as conditions resulting from social crises, are taking on such proportions that they often cover the territories of several countries. In order to be more ready to deal with such situations/conditions, it is necessary to first define and build civil protection state systems on modern scientific bases that will be efficient and effective on regional level at least. This paper will describe the applied research methodology, as well as the most significant research results. The aim of this research is to adopt civil protection system model that would be generally acceptable. The concept elaborates the civil protection organization system on at least three levels: strategic, tactical and operational, i.e., state, regional and municipal. For the needs of this paper, the emphasis is put on the middle level, the level of regional civil protection system organization. The possibility of applying the conceptual civil protection model was confirmed by the assessment of implementation experts in the territory of the Republic of Srpska.

Key words: civil protection, methodology, model, research results

1. INTRODUCTION

With the disintegration of Bosnia and Herzegovina at the beginning of the 1990s and the beginning of war actions on the territory of this former Yugoslav republic, the existence of the civil protection system, which had existed until then, ceased. During that armed conflict, civil protection in the Republic of Srpska was not recognizable, nor did it carry out what was expected of such a system. At the end of the war, the society peacetime organization began, which recognized the need to organize and legalize the civil protection system. Until 2012, this system was developing looking for the solution that would be the most acceptable. Thus,
the civil protection was part of Ministry of Defense, Ministry of the Interior and Ministry of Local Government and Self-government. The Republic of Srpska regulated the field of civil protection for the first time, while respecting modern trends in 2012, by adopting the Law on Protection and Rescue in Emergency Situations (The Official Gazette of the Republic of Srpska, no. 121/12), which covers the field of protection and rescue, as well as the organization and activities of civil protection in protection and rescue system. As an administration, it was part of Ministry of the Interior of the Republic of Srpska. This law was in force until 2017, when it was amended. These changes did not significantly affect the civil protection system organization in the Republic of Srpska.

2. CIVIL PROTECTION LEGAL REGULATIONS IN THE REPUBLIC OF SRPSKA

Civil protection system in the Republic of Srpska (RS) is centralized, organized through the civil protection administration, regional departments and departments in municipalities/cities. The law clearly defines the emergency, extraordinary event, catastrophe, natural disaster, technical-technological accident, facilities and means of protection, means of assistance, consequence elimination, personal, mutual and collective protection, disposal of unexploded ordnance and dangerous substances. Inspection supervision is performed by inspectors as authorized officials in the Administration. The slow application of the law is visible in the fact that the establishment of the inspectorate, which would monitor the application of legal solutions in the field of civil protection, took five years from the adoption of the law, and the first admission of inspectors to the Civil Protection Republic Administration was only in 2019. Such delays in the application of the law only add to the confusion in responding to emergencies. If it is known that many municipalities do not have civil protection departments/services, and that very often in many municipalities these services/departments consist of people incompetent for civil protection affairs, it is clear why civil protection system does not function in many emergencies. Inspection supervision is the basic level of the Administration through which it realizes real insight into protection and rescue system of the local community. RS has only once complied with the proposal of the Law on Protection and Rescue published in the Official Gazette of the Republic of Srpska, no. 121/12.

3. COMPLIANCE OF THE LEGAL FRAMEWORK OF PROTECTION AND RESCUE IN THE REPUBLIC OF SRPSKA WITH THE LEGAL FRAMEWORK OF THE EUROPEAN UNION

The primary sources of law used in drafting the Law on Protection and Rescue in Emergencies are:


The secondary sources of law used in drafting the Law on Protection and Rescue in Emergencies are:


The evaluation of the obligation fulfillment at that time was marked as “partial fulfillment”. No subsequent evaluations were performed.

4. ANALYSIS OF THE EXISTING CIVIL PROTECTION SYSTEM ORGANIZATIONAL STRUCTURE – CIVIL PROTECTION REPUBLIC ADMINISTRATION OF THE REPUBLIC OF SRPSKA

The analysis of the existing civil protection system organizational structure was performed through the available documents that are on the website of the Civil Protection Republic Administration. Furthermore, the analysis was performed from the point of view that civil protection is a complex system too, not only Civil Protection Republic Administration of the Republic of Srpska. According to system theory – complex systems, Civil Protection Republic Administration of the RS should be treated as part of Civil Protection System of the RS. By definition in system theory, administration represents only a small part of the whole system. Administration means management and control of the whole (system). True, regional departments are included within the Civil Protection Republic Administration (RUCZ) of the RS, but a good part of the system is still missing. Here are a few extremely important shortcomings:

- There is no explicit structure and organization of civil protection system of the RS (more precisely, there is a very small part of the system – RUCZ RS), namely:
  a. There is no explicit structure and organization of civil protection system of the RS – at the level of the RS: Civil Protection System of the Republic of Srpska as a whole; There is only the RUCZ RS which is only a small part of the whole called the system;
  b. There is no explicit structure and organization of the civil protection system of the RS subsystem

- There are no five regional subsystems of civil protection system of the RS; There are only regional departments and nothing more, with the important difference between departments and subsystems;
  a. There are no city subsystems of civil protection system of the RS for nine cities;
  b. There are no municipal subsystems of civil protection systems of the RS for fifty-five municipalities

- There is no explicit appointment (responsibility, competence) for strategic management and control of civil protection system of the RS; What is “implied” is that it is the competence of the RS Government, because all administrations, including the RS RUCZ, are managed by the RS Government;

- There is no explicit hierarchal responsibility for the management and control of civil protection system in the RS in conditions without emergencies or crisis situations, and especially in emergencies and critical situations, as follows:
  a. There is no explicit strategic management and control of civil protection system of the RS – at the level of the RS;
  b. There is no explicit strategic-executive management and control of civil protection system of the RS – at the level of the RS;
  c. There is no explicit tactical management and control of civil protection system of the RS – at the level of five areas in the RS (Banja Luka, Doboj, Bijeljina, Sokolac, Trebinje);
d. There is no explicit tactical-executive management and control of civil protection system of the RS – at the level of five areas in the RS (Banja Luka, Doboj, Bijeljina, Sokolac, Trebinje);

e. There is no explicit operational management and control of civil protection system of the RS – at the level of nine cities in the RS (Banja Luka, Doboj, Bijeljina, Sokolac, Trebinje, Prijedor, Zvornik, Istocno Sarajevo, Gradiska, Derventa);

f. There is no explicit operational-executive management and control of civil protection system of the RS – at the level of nine cities in the RS (Banja Luka, Doboj, Bijeljina, Sokolac, Trebinje, Prijedor, Zvornik, Istocno Sarajevo, Gradiska, Derventa);

g. There is no explicit executive management and control of civil protection system of the RS – at the level of 55 municipalities in the RS.

Such an approach to building a system can be said to be implicit. Here the adjective “implicit” is used to explain/justify the use (replacement) of the word system-administration. This means that it is assumed that administration is a system. However, if a complete definition of a system is applied, with a set of global behavioral characteristics; functions and interfunctional relations; global characteristics of interest; goals; purpose; vision; mission; global building features; wholeness; behavior; inputs-outputs; resources; including the structure; elements; functions; processes; activities; operators; system-environment interactions; measures; hierarchical structure; …it turns out that a whole range of entities that explicitly demonstrate a complex system does not exist. The situation (impression) is somewhat improved by the legislative definition, but even in that framework, there is a lot of “invisible”, implicit, which means that there is no civil protection system of the RS, but only a small part of the system defined by the RUCZ of the RS.

5. CIVIL PROTECTION CONCEPTUAL MODEL DEVELOPMENT IN THE REPUBLIC OF SRPSKA

The methodological framework for designing (designing and developing) the conceptual model of the civil protection system in the RS consists of several phases, as follows:

1. Adoption of system theory as an infrastructural method and system approach as a way of thinking in the design and development of the conceptual model of civil protection system of the RS;

2. Design and development of the zero conceptual model of civil protection system in the RS using the modeling method;

3. Realization of expert evaluation of the civil protection system zero conceptual model in the RS using the modified Delphi method;
   
   3.1. Design of questionnaires and instructions for experts, based on the zero conceptual model of civil protection system in the RS;
   
   3.2. Realization of expert evaluation of the civil protection system zero conceptual model in the RS;
   
   3.3. Processing and analysis of the results, with conclusions, of the expert zero conceptual model evaluation;

4. Design of the final conceptual civil protection system model in the RS. Here we will describe each of these research phases and give a theoretical basis for each of the methods applied in empirical research-design.

Table 1. Represents the adopted structure of the regional organization level of the civil protection system in the Republic of Srpska. The structure does not differ from the one adopted
at the level of Republika Srpska. The same applies to the local level (municipality or city). Deviations exist in local communities that have a smaller number of inhabitants.

Figure 1. Represents the adopted structure of the regional organization level of the civil protection system in the Republic of Srpska. The structure does not differ from the one adopted at the level of Republika Srpska. The same applies to the local level (municipality or city). Deviations exist in local communities that have a smaller number of inhabitants.

Source: (processing by the author)

6. TESTING THE CONCEPTUAL CIVIL PROTECTION MODEL IN THE REPUBLIC OF SRPSKA

Table 1. Review - Education level and scientific fields of the engaged experts (Transformed and adapted by the author)

<table>
<thead>
<tr>
<th>No.</th>
<th>Education level</th>
<th>Total</th>
<th>Scientific field</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>PhD.</td>
<td>10</td>
<td>Security sciences</td>
<td>8</td>
</tr>
<tr>
<td>2.</td>
<td>MSc</td>
<td>2</td>
<td>Military sciences</td>
<td>4</td>
</tr>
<tr>
<td>3.</td>
<td>BSc</td>
<td>2</td>
<td>Technical sciences</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>14</td>
<td></td>
<td>14</td>
</tr>
</tbody>
</table>

Expert assessment of the structure and elements of the civil protection system conceptual model in the RS

Based on the expert assessment of the structure and elements of the civil protection system conceptual model, the modules of the civil protection system conceptual model are accepted. There are differences between the experts’ opinions when it comes to the composition of the Strategic headquarters, which does not affect its essence, which is why the proposed model is adopted. The proposed model of the civil protection system strategic-executive headquarters with the head and 16 assistants who are also the heads of certain sectors is adopted. The emphasis here is not on assistants but on tasks performed by sectors, which means that the number of assistants can be reduced, but sectoral tasks cannot be reduced. It is concluded that the majority of experts (85.14%) believe that the offered modules can be the basis of the civil protection system model in the RS. If the implicit culture related to the application of system theory is taken into account, this result shows that there is a high level of experts’ agreement on the need to apply system theory and civil protection system conceptual modeling in the RS.
That is, it says that it is necessary to design and implement civil protection system in the RS as a system with all the attributes of the system. Additional argumentation for a systematic approach to the design and implementation of civil protection system in the RS is provided by the analysis of expert comments. Apart from certain dilemmas and slight disagreements, the experts support the design of the structure and elements of civil protection system conceptual model. The specifics are the answer to the question 24: Do you agree that within the civil protection system conceptual model there is Sector 16: Multimedia activity with seven units, as follows: 1. Civil protection system magazines, 2. Civil protection system textbooks, 3. Civil protection system monographs, 4. E-civil protection system algorithms, 5. E-civil protection system-citizens, 6. Multimedia education, 7. Multimedia competitions? All experts fully agree that this sector exists. It follows from experts’ comments that it is necessary to consider including a more detailed specification in the final model that improves citizen education and multimedia communication with citizens.

Conclusion: This organizational structure of Sector 16: Multimedia activity with seven elements is accepted, which along with Sector 2: Information system, demonstrates the realization of the needs for the so-called society digitalization (Zoric, 2021).

7. CONCLUSION

From the paper presented, it can be concluded that civil protection system can be adopted only by applying scientific methods, which find their basis in the common-sense experts’ thinking, as well as in the real need of the Republic of Srpska. Also, to conclude that the civil protection system can function successfully only if it is hierarchically arranged both horizontally and vertically. The key to success lies in the connection between different levels, which consist of people. The paper clearly points out a shortcoming of the existing “implicit” civil protection system, which ultimately has a crucial role in the (non)acceptance of the system, primarily in our region, and which is a consequence of the existing laws incompatibility with EU directives and recommendations. If you want to develop a system that is generally accepted and accepted in our region as such, primarily through its compatibility, it is necessary to comply the laws with the above-mentioned directives and recommendations. The experts’ opinions proved to be crucial for the adoption of the civil protection system at all levels, which is shown in the regional civil protection system in the Republic of Srpska.

REFERENCES


Sluzbeni glasnik Republike Srpske, br. 121/12

Treaty on the functioning of the European Union (consolidated version), Part Three, Title XXIII, Civil Protection, Article 196, Official Journal of the European Union, 2010/C 83, 30.03.2010

Zoric, Z., (2021), Konceptualni model civilne zastite u Republici Srpskoj, Fakultet za studije bezbednosti, Univerzitet Edukons u Sremskoj Kamenici
FUTUROLOGY OF THE PRIVATE SECURITY SECTOR IN BOSNIA AND HERZEGOVINA

Sinisa Djukic¹, Zeljko Zoric²

¹ Faculty of Security and protection, Brace Podgornika 8, Banja Luka, Republic of Srpska, Bosnia and Herzegovina, djukic-bs@blic.net
² Faculty of Security and Protection, Brace Podgornika Street 8, Banja Luka, Republic of Srpska, Bosnia and Herzegovina, zeljko.zoric@sectorsecurity.org

Received: 5th July 2022
Accepted: 4th August 2022

Abstract: The disintegration processes of the countries with socialist socio-political, economic, social and security structure from the beginning of the 1990s, have left significant consequences on the security sector as well. This is due to the fact that a previously unknown entity – private security – appeared in the security sphere, exposed through detective activity and physical and technical people and facility protection. The changes that have occurred in terms of property ownership, the disappearance of state property through the privatization process and the like, among other things, are factors that have affected the new security entity development embodied in the private security sector. The current situation of the private security sector in Bosnia and Herzegovina is at a satisfactory level, but some legal solutions have proved to be impractical and inefficient, so they should be further improved in accordance with modern security standards. The analysis of content documents which regulate this sector, led to certain conclusions that may affect the further course of private security development. This paper also elaborates on the segment of competencies over this sector’s work control, which is directly related to the specific structure of Bosnia and Herzegovina.

Key words: private security, detective activity, people and property protection

1. INTRODUCTION

There is no complete agreement in theory on the content of private security concept. Thus, private security was defined in 1976 in the US Government report as an activity of privately funded business-entities and organizations and self-employed persons, who provide services related to security, to the specified clients on a part-time basis, persons or entities who hire or employ them, or work alone for themselves, with the aim of protecting people, private property or interests from various risks (US National Advisory Committee on Criminal Justice Standards and Goals. Task Force on Private Security, 1976).

Private security is also defined as a security subsystem in the national security system, the basis of which is mainly contracts concluded between entities that perform these activities and their clients (Bajagic, 2007). The phrase “private security sector” also refers to commercial
security services provided by legal entities that are registered for that activity, as well as private companies that have legal obligations regarding compliance with certain security and protection standards and procedures (Kekovic, 2004).

Basically, two main approaches to defining private security concept can be observed – wide and narrow one. According to the wider approach, private security implies a set of organized forms of voluntary action and commercially oriented non-state personnel, whose primary activities include confronting various forms of criminal behavior. Defined in this manner, private security includes: citizens’ voluntary engagement, private security activities and private detective, i.e., investigative activity. The narrow approach defines private security as a set of legally based activities of the professional type, outside the competence of state bodies, organized for the purpose of providing certain services for the protection of citizens’ personal and property security and collecting information when it is ordered. Defined in this manner, private security includes: contracted security (activities of private companies and agencies specialized in providing physical and technical security services on a contractual basis), personal internal security and private detective activity (Kesic, 2009). Based on the above, it can be concluded that the notion of private security has double meaning. On the one hand, it may refer to security services provided by privately owned companies or to those services themselves, or security services performed upon the request of private persons or business entities. Also, it is allowed for a state body to hire a private company to provide certain security services, which inevitably expands the very concept of private security (Mitrovic & Pavlovic, 2012).

The activities of private security entities cover a wide area of security and protection of persons, property and business, which in scope and quality exceeds the basic security standards that the state guarantees to every citizen. It should be borne in mind that in the second half of the twentieth century, at the global level, there was a rapid growth and diversification of work performed by private security entities. These activities can be classified into the following basic groups:

- Private companies for physical and technical security and protection;
- Detective agencies (private investigator activities);
- Agencies for security consulting, marketing and engineering; business entities and individuals who provide certain security services (detectives, consultants, bodyguards) as a registered activity.

In regards to this, the most common actions and measures that are applied in modern conditions in the protection of persons, facilities and businesses are: measures of physical and technical protection (exceptionally, anti-intrusion protection measures), and sanitary-technical, biological, chemical and health protection measures (Danicic & Filipovic, 2015).

2. PRIVATE SECURITY SYSTEM

Private security system is a subsystem in the internal security system, which includes forces, resources, their organization and function, as well as actions and measures within physical and technical protection, to prevent various criminal and other forms of endangerment of persons, property and business, clear protection of certain facilities and other legal and natural persons who work or reside in them, and who are not under the exclusive protection of state bodies (Danicic & Filipovic, 2015).

Entities involved in private security system can be divided into internal and external. Internal entities include: managers of all levels, in a wider sense, while in a narrower sense, the internal entity consists only of employees in the field of protection. External entities are: police, courts,
prosecutor’s office, inspection bodies, communal police, local self-government bodies, public companies, as well as other legal entities that affect private security. Legal entities and businesspersons for private security, under the conditions prescribed by law, may have a license for the following activities:

- Risk assessment in the protection of persons, property and business
- Protection of persons and property by physical and technical means
- Maintaining order at public gatherings, sports events or other citizens’ gathering places in the part that is not under the jurisdiction of Ministry of the Interior
- Technical protection system implementation planning, design and supervision, installation, commissioning, maintenance of technical protection systems and user training
- Ensuring a secure money transport and transfer and other valuable shipments in a part that is not under the jurisdiction of Ministry of the Interior.

The representation of the private security sector in achieving security largely depends on the readiness of other security entities, primarily the police, to recognize the private sector’s role in achieving security. Another, not less important segment is the private sector’s legal regulation, and finally, the awareness of citizens who should recognize in this sector.

Cooperation between the private and public sectors should take place within the limits of competencies and authorities that are clearly defined by laws and bylaws. In this way, any abuse of the private security sector is prevented, that is, the state body has a control apparatus that can gain insight into the activities of the private sector at any time. Relations between the private and public sectors are based on the following models:

a. Independence

Independence represents a model that implies that private and public security entities have their own specially defined tasks, and these entities almost never make contact.

b. Competitiveness

Under competition is meant a model of the relationship between private security and the police in which there is a lack of mutual trust. According to this model, the relations of these security entities are characterized by competitive bidding for jobs, which most often makes their cooperation difficult and even impossible.

c. Complementarity

Complementarity is a model of the relationship between private security and the police in which private security and the police exist on the market side by side, with clear precise boundaries and demarcations in the division of tasks, along with mutual complementation in their activities’ implementation.

d. Cooperativeness

Cooperativeness implies a model of the relationship between private security and the police based on mutual cooperation, expressed through giving mutual support, with the aim of empowering each of the participants.

1 Private security activities can also have certain specificities that are defined by law and are the product of assessed needs in the middle of operations. This paper indicates those that are common in almost all countries where private security exists. Author’s remark.
c. Partnership

Partnership is a model of the relationship between private security and the police, where both security entities achieve the highest level of cooperation in action and complete equality between the participants whose activities are aimed at achieving a common goal (Danicic & Filipovic, 2015).

3. PRIVATE SECURITY SECTOR IN BOSNIA AND HERZEGOVINA

Providing security for persons and property and private detective activities were only regulated in detail in BiH in the beginning of the 21st century, i.e., by laws and bylaws for the first time, the conditions for the establishment and operation of companies-agencies for the security of persons and property and private detective activities are defined. Also, the conditions that must be met by persons who will perform physical and technical protection activities are elaborated more precisely, and besides that, the direct supervision of competent state authorities, primarily the Ministry of the Interior, over the entire activity of the mentioned companies is prescribed. The law also establishes the standards that must be met by persons who found security agencies, as well as by persons – security members and private detectives (Jovicic, 2012).

Private security in BiH was formally and legally established in 2002 by the adoption of legal regulations on the territory of the entities (the Republic of Srpska and the Federation of Bosnia and Herzegovina) and Brcko District2 in BiH (Danicic, Pilipovic, 2015). In this context, in the Republic of Srpska the Law on agencies for the personal and property security and private detective activities (Zakon o zaštiti ljudi i imovine u Federaciji BiH, Sluzbene novine FBiH, br. 50/02) was enacted, in the Federation of BiH the Law on People and Property Protection in the Federation of BiH was enacted (Zakon o zaštiti ljudi i imovine u Federaciji BiH, Sluzbene novine FBiH, br. 50/02), and in Brcko District, in 2004, a law similar to the aforementioned law in the Republic of Srpska was passed (Zakon o agencijama za obezbjedjene lica i imovine i privatnoj detektivskoj djelatnosti Brcko distrikta, 2004). The above-mentioned legal regulations regulate the private security sector activity, determine the conditions for establishing companies for the security of persons and property, rights and obligations of physical security members and private detectives, as well as the supervision of the companies’ work for the security of persons and property and private detective activities. Detective activity in the Republic of Srpska and Brcko District is provided for by law, but in the Federation of BiH this is not the case. The aforementioned solutions highlight the unevenness of legal regulations in this area. In particular, it is necessary to emphasize the possibilities offered by detective work in the private security sector, which is significantly neglected in BiH in comparison with the countries of the European Union. Private security in BiH should be developed and complied with the best practices in the European Union and the world. “This sector can have positive impact on society as a whole, and contribute with its professional integrity to the control of crime, citizens’ safety, capital and foreign investments, which are necessary preconditions for the European future of BiH” (Vejnovic, 2008).

According to normatively determined standards, companies for people and property security and detective agencies are encouraged to professionalize and specialize their personnel, standardize and modernize the means and devices used to secure people and facilities. However, over a period of time, certain legal solutions have proven to be impractical and ineffective, especially in the segment of limiting and complicating the work of private agencies.

---

2 In the period from 1996 to 2002, the concept of organized and legal participation of all security entities in state and social property was abandoned, with the transition to a market economy and the legitimate appearance of several types of property: state, social, private, etc.
in the licensing of legal and natural persons for performing private security services, the precise definition of facilities that are monitored by private security, the inability of members of physical security to work in civilian clothes, with the mandatory possession of a certificate and a work order, which would be shown upon the request of an authorized person, issuing the necessary, legally prescribed, authorization for the use of sprays based on approved chemical compounds, as well as electric stun gun in self-defense, the use of rotating or flashing lights on official vehicles of the agency during the task performance (ensuring the transport of money and valuable shipments, performing intervention tasks, securing VIPs,...), a more precise explanation of the use of specially trained dogs (detection dogs, attack dogs, dogs trained to detect drugs and explosives) in public space, outside the fenced area that is secured, prescribing appropriate provisions according to which a person with a degree in not only technical, but also social vocation, could assess the facility threats. As it was already pointed out, the Law on agencies for people and property security and private detective activities regulates the activity of people and property security, it establishes also the conditions for founding a company and the performance of people and property security. This law also regulates detective activity, the performance of detective work, the rights and obligations of private detectives, as well as the supervision of companies’ activities that perform people and property security and private agencies. Also, after a certain period of time, there was a need to consider the special legal treatment of the private detective activity issue in relation to physical and technical protection. Namely, the specificity of the private detectives’ activity in terms of their power aimed at collecting data, information and material evidence led some countries of the EU to regulate detective activity separately by law, taking into account, among other things, the adequate supervision and protection of citizens’ privacy. Detective activity, although it has existed for twenty years, has not been developed to the extent it could/should be. Namely, the possibilities of detective activity in the modern world are many, as evidenced by the examples from the countries of the region, where this activity has a far greater application. Accordingly, two recommendations can be made. The first is addressed to the legislator, and the second to the scientific and professional public. In this respect:

- There is an obvious justification for considering the existing and proposing the new provisions on detective work. They should be in accordance with the modern standards of detective activity, which will enable the development of this type of activity in our country to a considerable extent. As it is a complex matter that includes issues of detective work, that is, the organization of detective work, the power of private detectives, the data that is collected, data collection methods, private detectives’ training, record keeping, and others, then it is quite justified to separate these provisions and their systematization into a separate law, e.g., the Law on detective activity. It goes without saying that this framework would be elaborated with bylaws that would be passed based on the law;

- Further research into detective work in our country is necessary. It is evident that at the beginning of current legal framework implementation in 2002, there were several scientific and professional discussions and that the interest in detective work has declined over time. Therefore, it is necessary to additionally affirm scientific and professional workers, in order to contribute to the development in this field (DJukic, 2021).

As for the professional and social-economic aspects of private security in BiH, in the researches that have been carried out so far, it is stated that they are not fully aligned with the proposed European model of private security (Vejnovic et al, 2010). Namely, as stated by the authors of the aforementioned research (Vejnovic et al, 2010): “We believe that it is not enough to invest only in the material and technical potential of private security agencies, but it is necessary to invest much more in human potential. In this sense, the agencies for people and property security should pay much more attention to issues such as the selection and method
of engaging private security members, their training, especially specialist training, improving working conditions, increasing salaries and contributions for them, keeping track of the private security members’ health care, etc. We also consider it very important and useful to organize members of private security in a union, where it is necessary to look at this type of organization positively and to encourage this type of association. We would like to especially emphasize the need to develop wider and more useful mutual relations between private agencies for people and property security and police agencies, as well as other law enforcement agencies. This can be achieved in different ways, and one of them is the cooperation memorandum establishment, but also the development of partnership awareness and joint action with the same goal – increasing the citizens’ safety (Vejnović et al, 2010). In this way, the private security system in BiH would be significantly improved.

Private security in BiH, in general, is burdened by law and bylaws enacted at the level of BiH, entities, cantons and districts, which ultimately brings confusion to the establishment of the companies’ organizational structure, that want to engage in private security business, especially in procurement and use of material-technical resources. It is not a rare phenomenon that what is allowed in one entity is prohibited in another, or what is allowed in one canton is prohibited in another.

4. CONCLUSION

In the surrounding countries, modern legislation is in force when it comes to private security. By that we mean that legal solutions correspond to practice and enable this activity’s development in those countries. On the other hand, such a statement could not be made for Bosnia and Herzegovina. It is clear that the normative private security framework is the key basis for the legal and formal regulations of this field in the social sphere, which has a decisive effect on its practical manifestation. Specifically, if these norms do not reflect the modern understanding of private security, the development of this security entity in practice cannot be expected either. In this regard, it is necessary:

- To establish a special teaching-scientific discipline whose subject of research would be private security;
- The current private security development in BiH is not at a satisfactory level, it can merely provide a basis for further development;
- Private security can be improved by creating a favorable business environment, on the one hand, and improving legal framework, on the other;
- It is necessary to further improve the legal framework that regulates the private security issue;
- The best legal solution is reflected in the adoption of a special legal regulation that would regulate private security, which is also the case in comparative legislation.

REFERENCES


Zakon o agencijama za obezbijedjenje lica i imovine i privatnoj detektivskoj djelatnosti, Službeni glasnik Republike Srpske, br. 50/02, izmjene i dopune 92/05.

Zakon o agencijama za obezbijedjenje lica i imovine i privatnoj detektivskoj djelatnosti Brcko distriktla, 2004.

Zakon o zastiti ljudi i imovine u Federaciji BiH, Sluzbene novine FBiH, br. 50/02.
Rights and obligations of the citizens in emergencies

Sladjana Eric

1 Human Resources Sector Ministry of defence, Beograd, Republic of Serbia, eric.sladja@gmail.com

Received: 22nd August 2022
Accepted: 1st September 2022

Abstract: The regulation of the rights and obligations of citizens towards the system of defense and protection of national security is tied to the beginning of the creation of a modern state. Nevertheless, forms of organizing society to defend against various types of plagues are present in the early stages of development of human civilization. Disasters of hydrological, meteorological, geological or biological origin, as well as accidents caused by human factors are inevitable companions of human development. Therefore, acquiring and developing awareness of the importance of providing self-help and helping others in crisis situations, then acquiring knowledge and skills applicable in disasters, but also adequate action in emergencies become an imperative of modern society. The preparation of the population for the defense of the country, although primarily focused on responding to state of emergency and war, does not neglect the training of citizens to act in emergencies.

Key words: national security, defense, emergencies, rights, obligations

1. INTRODUCTION

In the present, through the formation of rights and obligations, society prepares for the future. As Walter states, bearing in mind that risk is a social construction, the variants of sensitivity to what bears that name deserve full attention, because it reveals to what extent it, in the field of empirical observation, can be considered a given or understood as constructed. In the first case, risks exist independently of our perception, which corresponds to the concept of coincidence. Coincidence is a possible event, with a greater or lesser probability of actualization. In the second case, the risk is much more the result of the evaluation process and does not depend only on the reality as it is outside our perception (Valter, 2012). Risks are always future events, which may be ahead of us, which threaten us. But as this constant threat shapes our expectations, engages us mentally, and guides our actions, it becomes a political force that changes the world (Bek, 2011).

In the study case of the Republic of Serbia, the development of the rights and obligations of citizens in the wider context of preserving national security, with a foothold in the defense system, was reviewed. Recognizing the many elements of society in the implementation of competent measures to enable the normal functioning of the population in the event of disasters
is impossible without a clearly defined place and role of each individual. Certain authors state that it is no longer up to society to protect citizens, but up to each individual to accept probable risks, taking care not to allow himself to be drawn into the process of vulnerability, which, due to constant flexibility, affects a non-negligible part of the population of most European countries. Vulnerability and precarity have replaced pauperization. The only certainty is the constant threat that manifests a kind of new relationship with the world (Valter, 2012).

2. RIGHTS AND OBLIGATIONS OF THE CITIZENS OF THE REPUBLIC OF SERBIA IN DEFENSE OF THE COUNTRY

At the beginning of the 20th century, many countries implemented the transformation of the national security and defense system, so that they could respond adequately to security challenges, risks and threats in accordance with the available resources and potential. In order to preserve the sovereignty, independence and territorial integrity of the Republic of Serbia, the goal of deterring armed threats and effective defense will be realized. Also, work will be done to create the necessary conditions for the integral engagement of all subjects of the defense system. In this sense, the concept of total defense will be elaborated and implemented and the number of citizens trained for the defense of the country will be significantly increased (Strategija nacionalne bezbednosti Republike Srbije 2019).

Natural disasters have a significant impact on the security situation, which in a very short period of time can cause significant consequences and make life impossible in certain parts or in the entire country. The Republic of Serbia is exposed to the risk of floods, and droughts, fires, earthquakes, technical-technological and other accidents are also possible. The executive part of the national security system performs tasks depending on the type and manner of manifestation of challenges, risks and threats to security, by engaging: military and police forces, security services, fire and rescue units, civil protection units, communal militia, customs, security services in institutions for the execution of criminal sanctions, judicial guards, services and agencies for the security of persons and facilities, large technical and technological systems, companies, other legal entities, associations, entrepreneurs and citizens (Strategija nacionalne bezbednosti Republike Srbije 2019). Unlike the executive part of the national security system, the executive defense system consists of the entire potential and resources of a society, i.e. the Serbian Army and other defense forces (state bodies, state administration bodies, bodies of autonomous provinces, bodies of local self-government units, business companies, other legal entities, entrepreneurs and citizens). The executive system of defense prepares for the defense of the country in peace, and engages in conditions of state of emergency and war.

In the defense of the country citizens have the right and duty to perform military, labor and material obligations and participate in civil protection and training for defense, in accordance with the law, decisions of competent authorities and defense plans. Citizens who have been determined to have a military, work or material obligation, i.e. an obligation to participate in civil protection, are obliged to act according to the orders of the competent authorities (Zakon o odbrani 2018).

Civil protection is an organized system whose main activity is the protection, rescue and removal of the consequences of natural disasters, technical-technological accidents and other major dangers that can threaten the population, material and cultural goods and the environment in peace and in a state of emergency and war (Zakon o smanjenju rizika od katastrofa i upravljanju vanrednim situacijama 2018). From the aspect of the defense system, the obligation of citizens to participate in civil protection is activated by state of emergency and war. In order for citizens to represent an adequate, efficient and usable human resource in
defense, it is not enough that they are subject to the duty of defense, but it is also important that they are capable and trained for inclusion in the defense system. In peacetime, citizens trained to participate in civil protection will make their contribution within the defense system in state of emergency and war, but also within the system of disaster protection and emergency management when emergencies are declared, mainly caused by natural disasters.

In the Republic of Serbia, male and female citizens can be invited to civil protection exercises and training for a maximum of 90 days in one year. The goal of organized exercises and training is to acquire the necessary knowledge for assigned duties in civil protection.

Protecting the security of the Republic of Serbia and its citizens is one of the strategic defense interests of the Republic of Serbia. Effective protection and rescue of the population in peace, state of emergency and war contributes to the realization of this strategic interest. Therefore, special attention is paid to improving the abilities and capacities of fire-rescue units and civil protection units. Citizens who have an obligation to participate in civil protection are actually men and women who have served military service and men who have completed civil service (alternative model of military service) and who make up the reserve composition of civil protection. Reserve composition of civil protection refers to civil protection units. Citizens assigned duties in civil protection units are obliged to respond to calls from competent territorial authorities of the Ministry of Defense, for training in National Training Centers and Regional Training Centers or for the performance of assigned duties under state of emergency and war. For citizens who, without justifiable reason, do not respond to the call of the competent territorial body of the Ministry of Defense in order to participate in civil protection, fines and even prison sentences are prescribed for the offense committed.

3. MODELS OF PARTICIPATION OF THE CITIZENS OF THE REPUBLIC OF SERBIA IN THE DISASTER RISK REDUCTION AND EMERGENCY MANAGEMENT SYSTEM

The population's basic need for protection is reflected in a two-way relationship, that is, accepting protection and providing protection in emergencies. Voluntary and generally accepted involvement of citizens in the process of training and participation in emergencies certainly gives greater results than when it is forced. In order for the population to understand the place and role in the implementation of protection and rescue measures, normative legal and institutional regulation of emergency management is important. In November 2018, at the session of the National Assembly of the Republic of Serbia, the Law on Disaster Risk Reduction and Emergency Management was adopted, and in this way, the normative-legal basis for managing emergencies was created. Within the Ministry of Interior, a special organizational unit, the Department for Emergencies, was established to perform tasks in the area of disaster risk reduction and emergency management.

The disaster risk reduction and emergency management system is part of the national security system and represents an integrated form of management and organization of the subjects of this system for the implementation of preventive and operational measures and the execution of the tasks of protecting and rescuing people and goods from the consequences of disasters, including recovery measures from those consequences (Zakon o smanjenju rizika od katastrofa i upravljanju vanrednim situacijama 2018). This part of the national security system is activated in the conditions of emergencies, which represent the situation created by the declaration by the competent authority when the risks and threats or the resulting consequences for the population, the environment and material and cultural assets are of such scope and intensity that their occurrence or consequences cannot be prevented or to be removed by regular action of the competent authorities and services, which is why it is necessary to use
special measures, forces and means in order to mitigate and eliminate them with an enhanced work regime.

The Law on Disaster Risk Reduction and Emergency Management regulates the strengthening of individual readiness to respond to the consequences of disasters, as well as the rights and obligations of citizens. Citizens have the right to be informed about the risks of disasters, measures and activities undertaken to reduce them, threats and possible consequences of disasters, as well as about all necessary information of importance for protection and rescue (Zakon o smanjenju rizika od katastrofa i upravljanju vanrednim situacijama, 2018). It is prescribed that information and notices of importance for protection and rescue are given to citizens in sign and Braille.

In accordance with the principle of participation and solidarity, vulnerable citizens have the right to participate in designing the content and implementation of disaster risk reduction activities, as well as the right to participate in proposing, undertaking and executing certain measures, tasks and activities in the protection and rescue and expressing their the need for aid. Citizens affected by the consequences of disasters have the right to help in accordance with their needs and priorities provided by humanitarian and other registered organizations, and if they have suffered greater material damage, they also have the right to state aid.

Citizens are part of the disaster risk reduction and emergency management system forces. Therefore, all capable citizens, including foreign citizens and persons without citizenship who, in accordance with the law, have permission for temporary residence or permanent residence in the Republic of Serbia, between the ages of 18 and 60, are obliged to participate in the execution of protection and rescue tasks. The following are not required to participate in the execution of protection and rescue tasks: 1) pregnant women and mothers with children up to ten years of age and single parents or guardians with children up to 15 years of age; 2) persons with disabilities, as well as persons who care for persons with disabilities; 3) persons who take care of and live in the same household with elderly persons who are not capable of taking care of themselves (Zakon o smanjenju rizika od katastrofa i upravljanju vanrednim situacijama, 2018).

Civil protection units, the Red Cross of Serbia, the Mountain Rescue Service, the Fire Brigade of Serbia, the Association of Radio Amateurs of Serbia, commissioners and deputy commissioners of civil protection and others are part of the forces of the disaster risk reduction and emergency management system. Citizens enjoy the rights and obligations arising from such membership.

The models of participation of citizens of the Republic of Serbia in the system of disaster risk reduction and emergency management can be classified in relation to the membership of citizens in the forces of the system of disaster risk reduction and emergency management. Citizens of the Republic of Serbia can participate in the disaster risk reduction and emergency management system as follows:

a) members of civil protection units,
b) members of the Red Cross of Serbia,
c) members of the Mountain Rescue Service,
d) members of the Fire Brigade Association of Serbia,
e) members of the Association of Radio Amateurs of Serbia,
f) commissioners and deputy commissioners of civil protection.
**Members of civil protection units** can be adult citizens of the Republic of Serbia who have not been determined to have a military or work obligation. Specialized civil protection units for firefighting, water and underwater rescue, care, first aid, first aid and care, radiological, chemical and biological, and rescue from ruins are established by the Ministry of Interior. General-purpose civil protection units and specialized warning units are formed by local self-government units, i.e. municipalities, cities and the City of Belgrade. Citizens are assigned to civil protection units on a voluntary basis, but also on a mandatory basis. Citizens, in order to be assigned to duties in civil protection units, need to meet special requirements in terms of knowledge and abilities acquired during military service or special requirements in terms of professional qualifications and occupations acquired during secondary and higher education. Also, for certain duties, citizens need to have completed certain courses and trainings. The Ministry of Interior is establishing a National Training Center and regional training centers for the training and development of members of civil protection units.

and that are required to maintain elevated operational and functional ability, as well as engagement in international assistance missions, are filled by the active reserve. A member of the active reserve is selected through a public competition, and the rights and obligations are regulated by a contract with the Ministry of Interior (Zakon o smanjenju rizika od katastrofa i upravljanju vanrednim situacijama 2018).

**Members of the Red Cross of Serbia** are qualified citizens to perform civil protection duties on the territory of the Republic of Serbia, to provide first aid in the event of natural, environmental and other disasters, as well as armed conflicts. Members of the Red Cross of Serbia perform humanitarian activities throughout the territory of the Republic of Serbia, as prescribed by the Statute of this organization. The Serbian Red Cross is also responsible for training citizens and civil protection units in providing first aid, and it can also train units that have the status of civil protection units in terms of staffing.

**Members of the Mountain Rescue Service** have the right and obligation to acquire mountaineering knowledge and to train in mountaineering technical skills (Statut Planinarskog saveza Srbije 2020). Members of the Mountain Rescue Service can go through four levels of training: 1) basic mountaineering training and obtaining the title of trainee, 2) initial mountaineering training and obtaining the title of trainee, 3) advanced mountaineering training and obtaining the title of junior rescuer and 4) professional training to perform certain professional jobs in mountaineering and obtain the title of rescuer.

**Members of the Firefighters Association of Serbia** are freely associated citizens for the purpose of organized voluntary participation in the implementation of fire protection, extinguishing fires, rescuing people and property and implementing projects and programs in this area that are of public interest (Statut Vatrogasnog saveza Srbije 2020).

**Members of the Association of Radio Amateurs of Serbia** are radio amateurs, amateur radio goniometers and members who deal with other fields of electronics and telecommunications, as well as members who are training for radio amateur professions and specialties. Some of the objectives of the Association of Radio Amateurs of Serbia are the organization, training and participation of radio clubs and radio amateurs in activities in areas of importance for defense and in cases of emergencies and humanitarian actions. The Union of Radio Amateurs of Serbia achieves its goals in cooperation with state institutions in the implementation of programs and obligations in the field of defense and emergencies (Statut Saveza radio amatera Srbije 2010).

**Commissioners and deputy commissioners of civil protection** have the status of members of civil protection. Commissioners and deputy commissioners of civil protection are appointed...
for the purpose of carrying out tasks of civil protection in populated areas, part of settlements, residential buildings, companies and other legal entities and state administration bodies. The commissioner or deputy commissioner of civil protection can be an adult, who has not been sentenced to an unconditional prison sentence of at least six months, as well as against whom no criminal proceedings are being conducted for a criminal offense prosecuted ex officio. Commissioners and deputy commissioners of civil protection participate in the preparations of citizens and employees for personal and mutual protection, inform citizens and employees about general mobilization in order to participate in the protection and rescue of people and material goods in emergencies, carry out coordination and implementation of evacuation, disposal, sheltering and other measures of civil protection and carry out verification of the posting of notices on signs for alerting citizens in buildings in the area of their responsibility (Zakon o smanjenju rizika od katastrofa i upravljanju vanrednim situacijama, 2018).

The participation of citizens in the system of disaster risk reduction and emergency management by performing assigned tasks and activities within the emergency headquarters, fire and rescue units, Police and the Serbian Army stems from the employment relationship in the mentioned forces of the system of disaster risk reduction and emergency management.

The models of participation of the citizens of the Republic of Serbia in the disaster risk reduction and emergency management system can be classified in relation to their involvement. Citizens can participate in the disaster risk reduction and emergency management system:

a) engaging in the execution of civil protection tasks and
b) by providing things and material resources for use.

Members of civil protection units and commissioners and deputy commissioners of civil protection are engaged in the execution of civil protection tasks.

Providing for the use of things and material resources is the duty of citizens, which is reflected in enabling the necessary works for the protection and rescue of their immovable property, as well as the assignment of the use of immovable things, vehicles, machines, equipment, material and technical and other material resources (water, food, medicine, clothing, footwear, construction and other products).

Citizens in the system of disaster risk reduction and emergency management, and in order to protect and save people, material and cultural assets from the dangers caused by the disaster, actually participate in the implementation of the following civil protection measures: raising the alarm; evacuation; hiding; taking care of the vulnerable and injured; radiological, chemical and biological protection; protection from technical-technological accidents; protection and rescue from ruins; protection and rescue from floods and accidents on and under water; protection and rescue in inaccessible areas; protection and rescue from fire and explosions; protect against explosive remnants of war; first and medical aid; and field sanitation.

In the Republic of Serbia, civil protection consists of personal and mutual protection, civil protection measures, commissioners, deputy commissioners and civil protection units. Personal and mutual protection is a form of organizing citizens for personal protection and self-help and providing assistance to other persons who need this assistance. In order to achieve personal and mutual protection, state authorities, autonomous province authorities and local self-government unit authorities, companies and other legal entities provide and keep in proper condition the necessary means and equipment for personal and mutual protection and train employees. Citizens, owners of buildings and owners of separate and independent parts of residential buildings and buildings of any other purpose are obliged to provide and keep in
Modern society cannot completely avoid the impact of natural disasters and technical-technological accidents on people's lives and health, on material and cultural assets or on the environment. The core of the system of protection and rescue and management of emergencies is the individual, that is, the human resource who is trained and qualified to implement measures and tasks of civil protection, to contribute to the stability and development of security and defense potential of society in the long term.

4. CONCLUSION

Military and armed training is related to the genesis of the rights and obligations of each individual towards the preservation and improvement of security. Modern civilizational achievements, taught by the experiences of past plagues, emphasize the development of the population's awareness of safe living and human treatment of other members of the social community. Adaptation of the individual to obligations towards the defense system and awareness of the importance of responsible and adequate behavior in risky situations affects the development and strengthening of awareness of the importance of acquiring applicable and useful knowledge and skills. Contribution to national security in peacetime conditions and conditions of declaration of emergency, as well as contribution to the defense of the country in a state of emergency and war, is also reflected in engagement in the execution of unarmed tasks, measures and activities, such as participation in civil protection.

However, in order to properly and completely understand the importance of preventive action and adequate response in the event of disasters, it is necessary to provide the population with elementary and appropriate knowledge in this context, primarily through the primary and secondary education system. Starting work on preparing the population for emergencies, first of all, through the education system of the younger generation, will allow us to get the expected (Bostovana, 2022).

In the Republic of Serbia, it is regulated that citizens who are not covered by training within primary and secondary education can acquire basic knowledge in the field of disaster risk reduction and emergency management within the activities of entities of special importance for protection and rescue, in accordance with a special law and program activities. Citizens are obliged: to train for protection and rescue and to take measures for personal and mutual protection; to accept assignment to civil protection units and to respond in case of mobilization of those units; to respond to the call of the competent headquarters for emergencies in order to participate in protection and rescue actions; to inform the operation center 112 without delay about the occurrence of danger and; to carry out prescribed and ordered protection and rescue measures (Zakon o smanjenju rizika od katastrofa i upravljanju vanrednim situacijama, 2018).

Due to the Covid-19 pandemic caused by a viral infection, a state of emergency was in effect in the Republic of Serbia in the period from March 15 to May 6, 2020. Due to the Covid-19 pandemic, most countries have declared a state of emergency during which deviations from human and minority rights guaranteed by the Constitution are permitted to the extent necessary.

After the lifting of the state of emergency, both due to the Covid-19 pandemic and due to natural disasters, the consequences of which could not be eliminated by the regular action of the competent authorities and services, in some cities and municipalities of the Republic of Serbia, a state of emergency was declared in the course of 2020.
The well-known tradition and decades-long orderliness of fulfilling obligations towards the defense system, which in this case we can recognize in the participation of citizens in civil protection, i.e. protection and rescue in emergencies, facilitates the establishment of mechanisms for preserving national security, i.e. defense and protection and rescue by unarmed means. The achievements of democratic societies are reflected in enabling an individual to contribute to the security of the society in which he lives, according to his knowledge, skills and abilities, as well as his personal affinities.

REFERENCES


Strategija nacionalne bezbednosti Republike Srbije „Sluzbeni glasnik RS broj 94 od 27. decembra 2019. godine“

Strategija odbrane Republike Srbije “Sluzbeni glasnik RS broj 94 od 27. decembra 2019. godine”

Uredba o jedinicama civilne zastite, nameni, zadacima, mobilizaciji i nacini upotrebe Sluzbeni glasnik RS broj 84 od 12. juna 2020. godine”


Zakon o smanjenju rizika od katastrofa i upravljanju vanrednim situacijama „Sluzbeni glasnik RS broj 87 od 13. novembra 2018. godine”

Zakon o vojnoj, radnoj i materijalnoj obavezi „Sluzbeni glasnik RS br. 88 od 28. oktobra 2009, 95 od 17. decembra 2010, 36 od 10. maja 2018”
THE STRENGTH OF RESILIENT CITIES AND THEIR CHALLENGES

Jasmina Gacic

1 University of Belgrade, Faculty of Security Studies, Gospodara Vucica 50, Belgrade, Republic of Serbia, jasmina.gacic@fb.bg.ac.rs

Received: 5th July 2022
Accepted: 15th August 2022

Abstract: The city is a complex and dynamic system which is constantly growing and evolving. A large number of dangers with catastrophic consequences that have befallen cities around the world, significantly disrupt this development. At the same time, they contribute to a modern approach to resilience planning and have become a priority for city administrations, planners, managers, architects, designers, sociologists, environmentalists and international organizations advocating for a new resilience agenda. Anticipating and planning the resilience of cities is a demanding process and involves assessing the vulnerable components of cities, understanding the key processes, procedures and interactions that affect these components. Urbanization and growing megacities point to the need for more resilient cities that have the capacity to withstand shocks to population growth, global economic crises, rapid population demographic changes, and environmental disasters. In such circumstances, cities must dedicate themselves not only to efforts to develop their own resilience capacities, but also to cooperation with neighboring cities, countries and regions in facing new challenges.

Key words: city, disasters, vulnerability, resilience

1. INTRODUCTION

Cities are often described as complex and dynamic systems that represent a specific mixture of different peoples, with different cultures, social norms of behaviour and lifestyle as well as various significant social functions. Because of all this, modern cities represent "globalization destinations" that have outgrown local boundaries, have new strength and require a completely new approach to development and protection. Favourable economic, social and infrastructural elements have fuelled the growth of the urban population, from less than 1 billion in 1950 to a predicted number of approximately 8 billion in 2050. People are moving to cities in greater numbers than at any given moment throughout history, driven by the hope of better opportunities or pushed out of rural areas by poverty, environmental degradation, conflict or natural disasters. Rapid urbanization has brought apparent prosperity and opportunities to many people. On the other hand, cities face numerous challenges and problems - the increase in population increases the pressure on the existing capacities in those cities and causes problems such as unemployment, social exclusion, poverty, inability to ensure affordable housing. Moreover, cities are generators of new risks: urban degradation of the environment,
increasingly specific microclimate, the spread of illegal construction, failed critical infrastructure, and more recently, the concentration of a large number of forced migrants. In addition, a large number of risks with catastrophic consequences that have befallen cities around the world, present new challenges, significantly disrupt this development and contribute to its unsustainability and reduced resilience.

Anticipating and planning the resilience of cities is a demanding process and involves assessing the vulnerable components of cities, understanding the key processes, procedures and interactions that affect these components. Sustainable and resilient cities have become a priority of city administrations, planners, managers, architects, designers, sociologists, ecologists, as well as international organizations that advocate for a new resilience agenda.

2. FACE AND STRENGTH OF THE CITY

The city in its full meaning implies a geographical hub, an economic organization, an institutional process, as well as a field for social action. According to Mumford (2010), the city is a related collection of primary groups and purposive associations: the first, like family and neighbourhood, are common to all communities, while the second are especially characteristic of city life. These diverse groups are self-sustaining through economic organizations that are similarly more or less corporate in nature, or at least publicly regulated, and all of them are housed in permanent structures, in relatively limited space. Zlatar (2013) in the analysis of urban transformations of the modern city quotes the thoughts of K. Lynch. In the book "The Image of the City", this author explains how the concrete elements of the city, i.e. people with their activities, are just as important as its physical parts, and how they constantly influence the city space through their actions. Also, the growth of a city, as well as its shape, can never be fully controlled. This means that change is its natural state that needs to be accepted, and, even more, the planned process of change is at the same time an autonomous process (Zlatar 2013,10 according to Lynch 1960).

Significant changes in modern cities are recorded and announced by databases of international organizations. These data show that in the second half of the twentieth century, a significant economic transformation was accompanied by a rapid growth of the urban population and an increase in the level of urbanization. According to the reports of the United Nations (UN-ESA, 1999) at the end of the 20th century, there is a significant shift in the share of non-urban (rural) population, urban population and population of megacities. Between 1950 and 2000, the share of the world's rural population fell from 70% to 53%, and in more developed regions of the world, even to 24% (Stiperski; Fuerst Bjelis 2003,1054). The urban population is expected to continue to grow, so that in 2050 one third will be rural (34%) and two thirds urban (66%) (World Urbanization Prospects, 2014). Most existing cities became overpopulated because they had real advantages of international communication; they are places where transcontinental and transatlantic routes meet, they often possess a superior legacy of cultural institutions that reach far into a unique historical past.

Today, in addition to the rapid increase in population, cities around the world are beginning to merge, creating integrated settlements that have been called "mega-cities", "mega-regions" or "endless cities". They can stretch for hundreds of kilometres and be home to over 100 million people, according to the United Nations report - "State of the World's Cities” 2008/2009 - Harmonious Cities, UN Habitat agency. It is estimated that by 2030 there will be 41 "megacity" with over 10 million inhabitants (https://esa.un.org). There are predictions that the population in such environments will consume about 81% of the world's resources (https://www.mckinsey.com). The Intergovernmental Panel on Climate Change (IPCC) report indicates that cities consume up to 70% of the world's energy and generate about 80% of global carbon dioxide emissions (Climate Change 2014).
Analyzing the most important economic characteristics of the modern city, Majetic (2014) cites the thoughts of Florida and Gertler (2003) that the city represents a place of optimal development of "new industry" companies. He also cites the claims of Sassen (2001; 2006), which explains how smaller, highly profitable and highly specialized service companies "grow" in more developed cities. According to Graham and Marvin (2000, 78) "the small creative companies that dominate Internet software development, digital design and WWW services... are concentrated in a small number of metropolises", and according to O'Connor (2004, 2) a significant majority of companies from the cultural industry sector is located in the city centres and, as it seems now, will remain there.

It is evident that the city is becoming a "synthesis of everything that is progressive, i.e. the city produces innovations, knowledge, trade, an increase in living standards, a rich and complex social and cultural environment" but it also produces "urban problems such as population segregation, urban poverty and crime" (Simunovic 2007,18). For these reasons, the models and concepts of a sustainable city, a responsible city, a livable city, and a participatory city are increasingly discussed.

In the last few decades, an additional threat is posed by natural hazards. They affect cities in different ways, but the potential for disaster is constantly present as city governments face overpopulation, rapid urbanization, and environmental degradation. For example, earthquakes affect cities because many densely built and populated cities lie on seismic activity belts. Poorly designed and poorly constructed or poorly maintained buildings cannot withstand the force of seismic shocks, so collapse is more likely. Most of the deaths due to the earthquake occurred due to the collapse of buildings. The growing number of poorly constructed or improvised homes built on or under steep slopes, on cliffs or at river mouths, in mountain valleys, combined with poor drainage or slope protection, results in more people being exposed to catastrophic landslides. Many cities are built along coastlines that are often hit by tsunamis. Adequate construction, early warning, notification and alarm system and evacuation plans represent the primary measures to solve this problem. Urban areas are exposed to cyclones, strong winds and heavy rains. The primary measures are wind-resistant construction, an early warning system with advice for households to close windows and protect property, and if necessary, evacuation. Overflowing of major rivers and flash floods are the most common and most dangerous risks in most cities around the world, with statistics showing that over 40% of all natural disasters involve floods. Floods are a growing danger for cities because forests as connective tissue are overexploited and destroyed, concrete and compacted soil do not absorb water, open spaces are populated, river flows are diverted due to construction, and also city drainage systems are inadequate. Drought is also a growing natural disaster hazard, slowly emerging and causing migration to urban areas, putting additional pressure on housing policy, employment and basic services.

---

1The sustainable city model, apart from its strictly physical boundaries, also reflects the social matrix of the city. It manifests itself through countless different forms, depending on the historical heritage, culture, economic base, climate, geographical and geopolitical characteristics, so that all these forms can ultimately be reduced to just a few variables that determine it. Sustainability, first of all, should be reflected in human intentions as part of any city development strategy. The term responsible city refers to responsibility in the management of flows within and outside the city. The basic issue of responsibility boils down to the fact that problems in functioning are transferred to the future or to other locations. The vision of a livable city focuses on the built environment and its management, as well as creating a healthy environment. Participatory city implies the harmonization of different interests of the business sector, environmental protection and community development requires the creation of partnership (Milutinovic 2004).
The aforementioned characteristics of natural hazards point to the fact that regardless of how well prepared a country is and how solid its policy frameworks are, it will often face disasters with inevitable and highly devastating consequences, especially in megacities. If recovery processes are only partially implemented and are not aimed at strengthening resilience, the consequences of disasters can last for a very long time and affect the lives of entire generations.

3. CITY CHALLENGES IN APPROACHING AND BUILDING DISASTER RESILIENCE

Resilience in terms of cities mainly refers to the ability to absorb, adapt and respond to changes in the urban system. However, resilience shares much with other key contemporary urban goals such as sustainability, governance and economic development (Tompkins and Hurlston 2012). The concept of resilience has only recently attracted more attention at the global level, primarily due to the increase in the risk of natural disasters in general, and in particular the risks associated with climate change. Spreading the concept of resilience as a way of thinking in interdisciplinary scientific approaches highlights the property of resilience as "the ability of human communities to withstand external shocks to their social infrastructure and to recover from such disruptions" (Adger 2000). Shocks and pressures refer to environmental variability (climate extremes, epidemics, natural disasters, reduction of available natural resources), as well as changes in the social environment (economic and political upheavals such as rapid changes in world markets or migration flows, tourism, development infrastructure, social-spatial transformations, economic crises and uncertainty, health risks) (Pavicic, 2016). Resilience can be broadly defined as "the ability of a system, community or society exposed to risk to resist, absorb, adapt and recover from the effects of risk in a timely and effective manner, including the preservation and restoration of the most important basic structures and functions." (UNISDR 2009, 2015) The components of resilience therefore include the ability of the social system to learn, to consider available options and to act flexibly (Schipper and Langston, 2015).

A developed awareness of possible risks and the ability to learn from events with unintended consequences are important elements of preparedness and recovery. The concept of resilience today is directly related to vulnerability and global framework of disaster risk reduction policy. In addition to the fact that improving the condition of vulnerable urban areas has become one of the key Millennium Development Goals, it is extremely important that the

---

3 Social resilience is defined as the capacity of social entities (individuals, groups, communities, organizations) to respond positively to adversity. A capacity that includes components of resilience, recovery and creativity. Resilience refers to the efforts of a community to withstand a disaster and its consequences, recovery refers to the community's ability to overcome disasters, and creativity is the ability to speed up and optimize recovery at all levels of the community from multiple aspects and reach the level of functioning before the disaster (Pavicic 2016).

4 At the Council of Ministers of the OECD members in Paris in 2014, the overview document OECD - Overview Paper on resilient Economies and Societies was adopted. Four pillars of resilience are clearly delineated in this document: resilience of the economy (economic resilience, as a narrower term), resilience of society, resilience of institutions, ecological resilience.

4 Vulnerability is a product of physical exposure to natural hazards as well as human capacities to prepare, respond and mitigate their negative consequences (Pelling and Uitto 2001). Vulnerability represents a social, political-ecological concept, that is, it is conceptually located in the interaction of nature and culture. According to Oliver-Smith, vulnerability connects social and economic structures, cultural values, norms and environmental hazards (Oliver-Smith 2004). Vulnerability can be seen as the knowledge that some citizens face a greater risk of injury, death or property loss due to their social and economic circumstances (Phillips and Morrow 2007)
United Nations International Strategy for Disaster Reduction (UNISDR) works together with its partners to raise awareness and commitment to sustainable development practices that will reduce the risk of disasters and increase the well-being and safety of citizens - investing today for a better tomorrow. International Strategy for Disaster Risk Reduction (United Nations International Strategy for Disaster Reduction UNISDR) reformulated in 2009 the definition of disaster risk reduction in a way that aligns and more closely links resilience and disaster risk reduction: *The concept and practice of reducing disaster risks through systematic efforts to analyse and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse effects* (UNISDR, 2009). In contrast to the traditional approach to disaster management that focused on emergency preparedness and disaster response, the new paradigm of disaster risk reduction shifts the focus to risk prevention and mitigation. Building on previous campaigns focusing on education and safety in schools and hospitals, UNISDR partners launched a new campaign in 2010: “Making cities resilient”. This international campaign sought to convince city leaders and local governments to commit to the List of Ten Essentials for Making a City Resilient, as well as to work together with local activists, social networks and national authorities. UNISDR, in cooperation with partners, developed this List as a starting point for all those who want to join the campaign. The important fact is that the commitment to these ten essentials has strengthened local governments and numerous agencies for the implementation of the Hyogo Framework for Action 2005-2015: Building the resilience of countries and communities to disasters, which was adopted by 168 governments in 2005. The Hyogo Framework had certain gaps that needed to be filled, but the idea of resilience was reiterated in the Sendai Framework for Disaster Risk Reduction as: strengthening preparedness for effective response, recovery, rehabilitation and reconstruction in line with the "build back better" philosophy, which together strengthens disaster resilience.

The international campaign proposes a list of Ten Essentials for a Disaster Resilient City, which can be implemented by mayors and local governments. This list emerged from the five priorities of the Hyogo Framework for Action 2005-2015: Building the resilience of states and communities to disasters, a key instrument for implementing disaster risk reduction. Achieving all, or even some, of the ten essentials will help cities become more resilient: 1) To establish organization and coordination, in order to reduce the risk of disasters, based on the participation of civil associations and civil society. Build local alliances. Ensure that all competent authorities understand their role in reducing disaster risk and creating preparedness for these risks; 2) Establish a disaster risk reduction budget and provide incentives to homeowners, low-income families, communities, businesses, and the public sector to invest in reducing the risks they face; 3) Maintain updated hazard and exposure data, prepare a risk assessment and use it as a basis for urban plans and decisions. Ensure the availability of this information and plans to the public, allow the public to discuss them; 4) Invest in, and maintain, critical risk-reducing infrastructure, such as flood sewers, adapted as needed to cope with climate change; 5) Assess the security of all schools and health institutions, improve and upgrade them as needed; 6) Apply and enforce realistic, risk-adjusted building regulations and spatial planning principles. Identify safe spaces for low-income citizens and develop a system of improvements and upgrades; 7) Ensure that schools and local communities adopt disaster risk reduction education and training programs; 8) Protect ecosystems and natural barriers to mitigate floods, storm surges and other hazards that your city may be exposed to. Adapt to climate change, relying on good risk reduction practices; 9) Introduce the structure of early warning and emergency (crisis) management capacities in your city, as well as maintain regular public preparedness exercises; 10) After any disaster, ensure that the needs of survivors, and centres of activity are restored and reconstructed, by supporting them and their
communities in designing and implementing mechanisms, economic growth and employment, as safer and well-run cities attract more investment. Bearing in mind the above analysis, the recent UN-Habitat agenda is also important, according to which: “Safer and more resilient cities are based on local government instruments that promote good governance, adequate urban planning and governance as a means to resolve crime, violence, conflict and insecurity in cities and human settlements. It is a multi-sector and multi-disciplinary approach that is applied at the local community-based level, focused on the inclusion of all stakeholders and cooperation in order to achieve safety and security for all.” (UN-Habitat, 2016). Also, as Pusic states, if we want "our city" to be a "good city" in the future, it is necessary for all stakeholders to advocate for: 1. non-exploitative attitude towards nature; 2. responsibility of city administrations and leaders towards public goods; 3. a developing city economy that is able to respond to all people's needs; 4. adequate protection and education; 5. open, tolerant, stimulating and egalitarian social structure; 6. citizens who are identified with a positive city life and devote themselves to such a life and 7. the relatively small size of the settlement, so as to facilitate all positive efforts and mutual balancing of the indicated conditions (Pusic, 1997, 398).

The new 2017 Disaster Resilience Scorecard for Cities contains a set of assessments that will enable local governments to monitor and review progress and challenges in implementing the Sendai Framework for Disaster Risk Reduction 2015-2030, as well as to assess their resilience to disasters. The Scorecard is organized by area that follows UNDRR's Ten Essentials to Make Cities Resilient. Disaster resilience, and therefore this Scorecard, covers a city's ability to understand the disaster risks it may face, to mitigate those risks and to respond to disasters that may occur in order to minimize immediate and long-term casualties and damage to sources of income/livelihood, property, infrastructure, economic activities and the environment. However, it also means that those who manage and plan must consider chronic pressures that can affect livelihoods or the severity of a disaster that has caused an acute shock, as they can undermine a city's ability to respond and adapt to a disaster. For example, deforestation can increase the risk of flash floods, and disadvantaged communities (who typically lack insurance) may not be able to rebuild their homes and businesses after a major earthquake. The Scorecard is organized by area following the "Ten Essentials to Make Cities Resilient", which were first compiled in the Hyogo Framework for Action in 2005, then updated to support the implementation of the Sendai Framework for Disaster Risk Reduction for period 2015-2030. The Ten Essentials for Making Cities Resilient broadly cover a number of issues that cities must address in order to become disaster resilient: 1) Organize themselves for disaster resilience, 2) Identify, understand and use current and future risk scenarios, 3) Strengthen financial capacity for resilience, 4) Achieve resilient urban development and design 5) Preserve natural shock absorbers to improve the protective functions of natural capital 6) Strengthen institutional capacity for resilience, 7) Understand and strengthen social capacity for resilience, 8) Increase infrastructure resilience, 9) Ensure effective disaster response, 10) Speed up recovery and build a better system than before a disaster.

Resilience of cities is the current topic of the global document of the UN Agenda 2030 entitled "Transforming our world: the 2030 Agenda for Sustainable Development. Within the 17 new goals of sustainable development, goal 11 is defined as - Make cities and settlements inclusive, safe, adaptable and sustainable, in which it is emphasized that cities are incubators of ideas, centres of trade, culture, science, productivity, social development and much more. In all countries, inclusive and sustainable urbanization and capacities for participatory, integrated and sustainable planning and management of settlements should be improved. The sub-goals also mention the need to protect the world's cultural and natural heritage; protection against natural disasters, aimed especially at poor and vulnerable groups; enabling access to green and
public areas, especially for women and children, the elderly and people with disabilities. The negative impact of cities on the environment should be reduced, with special attention to air quality and waste management at local and other levels. Also, positive economic, social and ecological links between urban, peri-urban and rural areas should be supported, by strengthening national and regional development planning. Cities and other settlements should implement integrated policies and plans in terms of inclusion, resource efficiency, mitigation and adaptation to climate change and resilience to natural disasters (2030 Agenda for Sustainable Development). Making Cities Resilient 2030 or MDG2030 is a new, unique initiative that reaches out to different stakeholders to improve local resilience by advocating, sharing knowledge and experiences, strengthening networks for mutual learning of cities, providing access to technical expertise, connecting multiple levels of government and building partnerships. By providing a clear roadmap for urban resilience, access to knowledge, monitoring and reporting tools, MDG2030 will support cities on their journey to reduce risk and build resilience. Building on the successes and lessons learned from the implementation of the previous decade-long MDG Campaign, the MDG2030 initiative was co-created by Major Partners, including the C40 Cities; ICLEI - Local Authorities for Sustainability, International Federation of Red Cross and Red Crescent Societies (IFRC); Japan International Cooperation Agency (JICA), Resilient Cities Network (R-Cities), United Cities and Local Governments (UCLG), United Nations Habitat Program (UN-HABITAT), United Nations Office for Project Services (UNOPS), World Bank Group and World Council on Cities Data (WCCD), whereby the United Nations Office for Disaster Risk Reduction (UNDRR) acts as the Secretariat. The MDG2030 initiative was launched in October 2020 and will be active from January 2021 until the end of 2030.

4. CONCLUSION

As centres of all innovation and complex systems, megacities can usually offer people the best opportunities for fulfilling and satisfying lives. If they are not managed well, productivity and quality of life are exposed to adverse effects. Introducing the topics of resilient cities and disasters into the domain of politics is the first but very important step, as most political leaders have become aware of the risks that climate change and natural disasters bring and the need to respond to them. It is also necessary to point out an equally important fact - that the topic of global changes, which include the area of natural disasters, must become part of the concerns of institutions and citizens. A sound urban and local administration, as the institutional level closest to citizens, is the key to creating such resilience. The role of civil society, planners and experts in the field of urban planning from different sectors, as well as social groups, is also essential to help develop innovative solutions and to get involved in the activities of local authorities, in order to reduce hazards and encourage good governance through joint work. Numerous international institutions, campaigns, global and regional projects continuously monitor high risks of different origins in cities and agree that the solution lies in well-planned and resilient cities, not only for reducing infrastructural, economic, social and environmental issues, but also for generating creative solutions to improve the environment. Through the latest participation in the MDG2030 initiative, cities and local governments are expected to commit to building their resilience. MDG2030 expects: 1) an increasing number of cities and local governments that are committed to understanding resilience and risk reduction, 2) an increasing number of cities and local governments that are committed to developing strategies for disaster risk reduction or resilience, 3) an increase in the number of cities that are committed to the implementation of actions of resilience and disaster risk reduction and the introduction of resilience and disaster risk reduction into the mainstream of sustainable urban development, 4) cities progressing from awareness to planning for resilience/disaster risk
reduction, 5) an increasing number of cities progressing from planning to implementation disaster risk reduction action.

REFERENCES


Pavicevic, O., (2016). Koncept otpornosti u sociologiji. Sociologija 58, no.3


CHALLENGES, RISKS AND THREATS TO THE SECURITY OF THE REPUBLIC OF SERBIA

Nenad Kovacevic¹, Antonio Mak², Branko Teodorovic³

1 University of Defence in Belgrade, National Defense School, Veljka Lukica-Kurjaka Street No. 33, Belgrade, Republic of Serbia, inz.84kula@gmail.com
2 University of Defence in Belgrade, Military Academy, Veljka Lukica-Kurjaka Street No. 33, Belgrade, Republic of Serbia, antoniomak3@gmail.com
3 University of Defence in Belgrade, National Defense School, Veljka Lukica-Kurjaka Street No. 33, Belgrade, Republic of Serbia teodorovic.b@gmail.com

Abstract: Security is a function of the development of society, and observed from the aspect of modern international relations, it is one of the most important, because everyday the conditions for preserving human existence become more complex, and thus the fear of uncertainty and uninterrupted functioning of the constituents of society increases. Depending on the severity of the consequences for the values of the society, certain dangers to the security of the constituents of the society can be determined as a challenge, risk or threat. The paper presents a conceptual and categorical distinction between security challenges, risks and threats. The aim of this paper is to determine the list of challenges, risks and threats to the security of the Republic of Serbia, as well as to define the most dominant ones. The list has been made based on the results of the research. Due to the length of the paper, only a brief overview of the methodology and results of the research is given.

Key words: challenges, risks, threats, national security

1. INTRODUCTION

Considering security in the context of the determinants of the modern environment is a complex and demanding task. The basis of the solution to this problem lies in the understanding of the concepts such as: the state, functions of the state and security system, but also in the concepts that correlate with those listed, and which are often mistakenly used as synonyms.

The focus of the paper is on the etymology of the concept of security, because the proper understanding of this concept can be considered the core (nucleus) of the understanding of the concepts of challenge, risk and threat to the security of the state. The paper presents the results of the research conducted with the aim of obtaining the answer to the research question: "Defining the list of the most significant challenges, risks and threats to the security of the Republic of Serbia." The aforementioned research was conducted in order to confirm/refute
the views regarding the challenges, risks and threats presented in the National Security Strategy of the Republic of Serbia.

The paper consists of three parts that form the list of the most significant challenges, risks and threats to the security of the Republic of Serbia. The first part of the paper is dedicated to the etymology of the concept security; the second part of the paper presents the conceptual definition of challenges, risks and security threats, while the research protocol and results are presented in the third part of the paper.

2. ETYMOLOGY OF THE CONCEPT OF SECURITY

Throughout history, the concept of "security" has changed its meaning depending on the context in which this concept has been used. Security represents an extremely complex social phenomenon. Etymologically, the word security comes from the Latin word *securitas*, which means certainty, absence of danger, protection, fearlessness and the like. The above-mentioned served as a foundation for use in other languages, that is, countries. However, in modern literature, the primacy is given to the English language, in which two terms are used: *security*, which is used in the sense of "national security", which implies the achievement and safeguarding of the national interest of a state, and *safety*, which means the ability to act in order to prevent undesirable security situations or such occasions that may cause security implications. It is based on the assumption that the concept of security refers to a certain condition, organisation, function or system, or all of them together.

In order to be able to say that we are safe, the absence of someone or something that endangers us is not enough, but one must live in a society that abounds in justice, morality, and culture; in a society that constantly improves its values. Security, in this sense, should also be understood as a condition for survival and development (of a state, society, nation, people and the living world on the planet).

"Security is a property of a real social, natural or technical subject (being, creation or thing) manifested as an established, maintained and improved state and/or value, which is expressed through the fulfilment of the minimum of certain (security) standards specific to that subject, which allows it a realistic basis for survival, work, growth and development regardless of the bearers, forms, time and place of endangerment." (Stajic, 2013)

According to Ljubomir Stajic, security includes the entire protection of the state from all types of subversive (destructive, devastating) activities of external and internal enemies and other harmful activities and influences. In political sciences, especially in the science of international relations, security is one of the key concepts that occupies a central place in political discourse. Decision-makers in politics, wanting to highlight the existential importance of a particular problem and thus put it at the top of the agenda, say that it is of importance for national, regional or global security. Security as a protection mechanism has different models of organisational forms (social and state bodies and organisations) and different characteristics that are based and regulated by constitutional and other legal acts or decisions of political authorities. "Security in the broadest political and legal sense includes measures and activities to safeguard and protect against threats to the independence and integrity of a country and the internal constitutional and legal system." (Stajic, 2013)

Here, it is important to point out that it is often the case that in practice and theory concepts that correlate with the concept of security are mixed up: safety and protection. *Safety* is a narrower concept and primarily it refers to personal safety, which consists of political, legal, social and economic safety, while *security* is a concept that encompasses the widest range, that is, from personal to state and integral security. *Protection* is the narrowest term that refers only to the passive component of security. (Mak & Kovacevic, 2022).
3. CONCEPTUAL DEFINITION OF CHALLENGES, RISKS AND THREATS TO THE SECURITY

The concept *challenge* includes phenomena whose harmfulness and certainty are the least likely, existence is destructive, but within the limits of tolerant acceptability, because it does not seriously threaten vital values. In the future, the challenge may cause a threat to security with more serious consequences. It represents the least harmful form of danger in terms of content and consequences, and in terms of time it is the farthest danger from the protected value. It is about the apparent phase of the danger which may or may not be realised and which is incorporated in the possible intention of its bearer. (Bajagic, 2007)

*Risk* is defined as a set of different processes, factors and relations that independently or in interaction may or may not lead to the consequences of endangering security. A risk contains a higher degree of danger compared to a challenge, a higher probability of causing some damage, its untimely detection very quickly turns into a clear threat. Security risk can be viewed as: "a specific form of danger since it is inherent to both the subject of security and the subject of danger. The two-sidedness of a security risk is that both subjects exist in an uncertain security environment and continuously make decisions about their own engagement, and each decision is accompanied by a certain risk." (Mijalkovski & Djordjevic, 2007)

A *threat* is a conscious intention to cause harm to a person, property or right in order to force the object of the threat to comply with the imposed behaviour. A security threat is a synonym for a form of jeopardizing security. A more concrete phenomenon is the one whose occurrence is the least uncertain, while the harmful effects are the greatest and indisputable. (Lazic, 2014)

In modern countries, at the beginning of the 21st century, the change in the global security environment led to an increase in threats such as: international terrorism and organised crime, the proliferation of weapons of mass destruction, mass immigration, money laundering, illicit trafficking in persons and goods which are liable to control, and the like. The mentioned threats also bring changes in the functioning of the national security system, which naturally complicates the mechanisms for their control. In such circumstances, security and intelligence systems should adapt to the new situation and improve their efficiency. On the other hand, it also creates potential threats to the balance between the effectiveness of the national security system and its democratic and civil control.

The National Security Strategy of the Republic of Serbia (hereinafter: the Strategy) contains the list of the most significant challenges, risks and threats to the security of the Republic of Serbia: armed aggression, separatist aspirations, illegally unilaterally declared independence of the territory administratively included in the Autonomous Province of Kosovo and Metohija, armed rebellion, terrorism, proliferation of weapons of mass destruction, ethnic and religious extremism, intelligence activities, organised crime, drug addiction, mass illegal migrations, problems of economic development, problems of demographic development, epidemics and pandemics of infectious diseases, energy security, the unfinished process of demarcation of the countries of the former SFRY, natural disasters and technical and technological accidents, climate change, and the rise of high-tech crime and threats to information and communication systems. (Strategija nacionalne bezbednosti, 2020)

Also, the Strategy recognises other challenges, risks and security threats, such as: "corruption, misuse of new technologies and scientific achievements, genetic engineering, medicine, meteorology and other scientific fields. They often do not exert an open influence on the security of the Republic of Serbia, so it is difficult to detect them and recognise the patterns of their activity." (Strategija nacionalne bezbednosti, 2020).
4. REVIEW OF RESEARCH

The research method used in the paper is a combination of several methods, namely the interview method and the statistical method, even though it was inevitable to implement the methods of expert evaluations, analysis and synthesis, and induction and deduction in the research process. The entire research process is intertwined with these five methods, and the basic question is the confirmation of the statement from the Strategy regarding the defining of the list of challenges, risks and threats to the security of the Republic of Serbia. The goal of applying the interview method and the statistical method is to determine the dominant views on the subject of the research paper, as well as to summarise the existing information on the subject of the research, while at the same time avoiding discrepancies in the opinions of experts. The research approach applied in the paper includes three phases: (1) research planning, (2) research implementation and (3) analysis of research results. The following stages of the research process are elaborated on in the remainder of the paper.

4.1. Research planning

In order to implement research planning, a research protocol has been defined, and it contains the following elements: research aim; research question; formation of an expert group; defining the research tool – survey questionnaire; data extraction and the synthesis of the extracted data.

The aim of the research has been to perform, at the level of scientific description, an analysis of the opinions received by experts concerning the defining of the list of challenges, risks and threats to the security of the Republic of Serbia. The realisation of the defined research aim is achieved by answering the research question:

RQ: "Defining the list of the most significant challenges, risks and threats to the security of the Republic of Serbia?"

The formation of the expert group was carried out through several stages: determination of the size of the expert group, selection and assessment of the competence of experts and definition of agreement of expert evaluations. Due to the extensiveness of the procedure for the formation of the expert group, only a brief overview of the implementation of the previously mentioned phases will be presented here. For the purposes of the research, the following experts were selected: retired and active members of the military and civilian security agencies, as well as the members of the academic community whose sphere of interest is organised crime. Since this is the population of unknown size, the size of the expert group was determined according to the previously published model (Kovacevic, 2021). According to the aforesaid model, the minimum size of the expert group is 16. The selection of experts was made using the “snow avalanche” method (Kovacevic, 2021). By applying this method, a potential group of 34 experts was determined. The assessment of experts' competence was carried out using the Dobrov's method and the Russian method. (Kovacevic, 2021) By applying the aforementioned methods, out of 34 potential experts, 18 people were selected as experts by competence assessment.

The survey questionnaire consisted of two parts, in the first part the experts entered their personal data, which were necessary for evaluating their competence (according to the combined method that includes the Russian method and the Dobrov's method); while in the second part the questions related to challenges, risks and threats to the security of the Republic of Serbia were formulated.

Data extraction was performed on the basis of the answers to the questions from the survey questionnaire, and the synthesis of the extracted data was performed using the statistical
method, more specifically positional average values, with a previous analysis of the agreement of expert evaluations (opinions).

### 4.2. Research implementation

After defining the expert group (size and competence) and creating the survey questionnaire, the survey was conducted. The survey was conducted electronically in such a way that the experts received the questionnaire via e-mail and returned it to the researcher. After receiving expert evaluations, their agreement was analysed using the chi-square test ($\chi^2$). Here it is important to point out that the chi-square test does not measure the size of the correlation, but only the probability of the correlation of expert evaluations, that is, if the chi-square test is statistically significant, the correlation is statistically significant. Given that the calculated value of the chi-square is less than the threshold value, the null hypothesis is confirmed, that is, that there is no statistically significant deviation of the theoretical from the actual frequencies of the expert evaluations. (Petz, 1997: 369) Since it was established that there is a correlation of expert evaluations, there was no need to conduct interviews with individual experts, that is, there were no drastic deviations of experts' opinions (differences in expert evaluations) within the group. The above represents a quantitative processing of expert evaluations. After receiving the expert evaluations, their analysis was performed using the positional average value - mode, and then a conclusion was drawn, which is a qualitative analysis of the expert evaluations.

### 4.3. Analysis of the research results

After the quantitative, a qualitative analysis of the research results was performed. In the survey questionnaire itself, the experts were first offered nineteen challenges, risks and threats to the security of the Republic of Serbia (taken from the Strategy), as well as the possibility of adding new ones, in the form of a question: "Do you agree with the stated challenges, risks and threats to the security of the Republic of Serbia?" (If you think that some of the challenges, risks and threats have been omitted, please add the answer.) All the experts agreed with the offered answers, which shows a high level of agreement between the expert evaluations.

Then the experts were asked to evaluate the level of significance of the defined challenges, risks and threats. The processing of the received expert evaluations was carried out using the positional average value - mode, and the results are shown in Table 1.

**Table 1: Results of expert evaluations**

<table>
<thead>
<tr>
<th>Name of the challenge, risk and threat</th>
<th>Evaluation of the significance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Armed aggression</td>
<td>3</td>
</tr>
<tr>
<td>Separatist aspirations</td>
<td>3</td>
</tr>
<tr>
<td>Illegally unilaterally declared independence of the territory administratively included in the Autonomous Province of Kosovo and Metohija</td>
<td>5</td>
</tr>
<tr>
<td>Armed rebellion</td>
<td>3</td>
</tr>
<tr>
<td>Terrorism</td>
<td>6</td>
</tr>
<tr>
<td>Proliferation of weapons of mass destruction</td>
<td>2</td>
</tr>
<tr>
<td>Ethnic and religious extremism</td>
<td>3</td>
</tr>
<tr>
<td>Intelligence activities</td>
<td>1</td>
</tr>
<tr>
<td>Organised crime</td>
<td>5</td>
</tr>
<tr>
<td>Drug addiction</td>
<td></td>
</tr>
<tr>
<td>Mass illegal migrations</td>
<td>2</td>
</tr>
<tr>
<td>Name of the challenge, risk and threat</td>
<td>Evaluation of the significance</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td>Problems of economic development</td>
<td>7 8 3</td>
</tr>
<tr>
<td>Problems of demographic development</td>
<td>7 9 1 1</td>
</tr>
<tr>
<td>Epidemics and pandemics of infectious diseases</td>
<td>8 9 1</td>
</tr>
<tr>
<td>Energy security</td>
<td>10 7 1</td>
</tr>
<tr>
<td>The unfinished process of demarcation of the countries of the former SFRY</td>
<td></td>
</tr>
<tr>
<td>Natural disasters and technical and technological accidents</td>
<td>1 4 10 2 1</td>
</tr>
<tr>
<td>Climate change</td>
<td>5 7 3 3</td>
</tr>
<tr>
<td>The rise of high-tech crime and threats to information and communication systems</td>
<td>4 10 2 2</td>
</tr>
</tbody>
</table>

Evaluations of the significance of the challenges, risks and threats are: insignificant (1), less significant (2), significant (3), more significant (4) and the most significant (5). The number in certain columns of "evaluation of the significance" represents the number of experts who have declared themselves in favour of a certain challenge, risk and threat. The significance of a certain challenge, risk and threat is determined by the largest number of experts who opted for a certain evaluation of the significance. To form the list of the most significant challenges, risks and threats, those challenges, risks and threats that were evaluated 5 and 4 by the experts are considered.

5. CONCLUSION

Questions of the place and role of security have been raised since the oldest states as one of the central and most important questions for the survival and development of states. (Dragisic, 2020: 14-15) From the fact that the state has always been an important factor in organising security, it is clear that security is a constitutional institution, which is determined by the socio-political organisation of the state, and consequently by legislative solutions to security issues. The paper reviews the legislative determinants of the national security of the Republic of Serbia, i.e. the challenges, risks and threats to the security of the Republic of Serbia.

The paper presents the results of research aimed at answering the research question: "Defining the list of the most significant challenges, risks and threats to the security of the Republic of Serbia." The research results are significant in two aspects. Firstly, they have confirmed the statements from the Strategy regarding the defining of security challenges, risks and threats. Secondly, they have formed the list of challenges, risks and threats according to the level of significance. According to the previously defined criterion for forming the list of the most significant challenges, risks and threats to the security of the Republic of Serbia, the list consists of: energy security, armed aggression, the increase in high-tech crime and threats to information and communication systems, mass illegal migrations, epidemics and pandemics of infectious diseases, problems of economic development, organised crime and intelligence activity.

REFERENCES


USE OF UNMANNED AERIAL VEHICLES INTEGRATED INTO THE C4IRS SYSTEM IN MODERN COMBAT OPERATIONS

Marko Radovanovic¹, Aleksandar Petrovski², Zeljko Jokic³, Aleksandar Aleksi⁴

¹ University of Defence in Belgrade, Military Academy, Veljka Lukica-Kurjaka Street No. 33, Belgrade, Republic of Serbia, markoradovanovicgdb@yahoo.com
² University „Goce Delcev“, Military Academy „General Mihailo Apostolski“ Skopje, North Macedonia, aleksopetrovski@gmail.com
³ University of Defence in Belgrade, Military Academy, Veljka Lukica-Kurjaka Street No. 33, Belgrade, Republic of Serbia, antras1209@gmail.com
⁴ University of Defence in Belgrade, Military Academy, Veljka Lukica-Kurjaka Street No. 33, Belgrade, Republic of Serbia, aleksic.aleksandar1004@gmail.com

Received: 12th July 2022
Accepted: 20th July 2022

Abstract: The development of weapons and military equipment conditioned the new model of conducting modern combat operations. The manner of conducting modern combat operations is characterized by the increasingly frequent and diverse use of unmanned aerial vehicles integrated into the C4IRS system in combat operations of the army. These aircraft are one of the most important types of weapons in modern combat operations. Anyone that has the technology can process the latest information from the field and safely passes that information to the command centre has a great advantage and a chance to cause great damage to units whose goal is to prevent further operational work. What is important is that UAVs must have some degree of self-protection through site selection action to reconnaissance and retreat routes. In case anyone is knocked down it would be acceptable to have the option to self-destruct vital and dataset parts, for technology and information protection.

The paper presents the possibility of using unmanned aerial vehicles for various missions in combat operations, as well as a case study of their use in previous modern armed conflicts.

Key words: UAV, UCAV, C4IRS, combat operation, command center

1. INTRODUCTION

Modern combat operations require the use of the most sophisticated combat means in order to efficiently perform the assigned tasks. The use of unmanned aerial vehicles is an indispensable segment of modern combat operations. Due to its versatile use and different capabilities, it provides a wide range of capabilities to units equipped with this type of combat equipment. By applying unmanned aerial vehicles integrated into the C4IRS (Command, Control,
Communications, Computers (C4) Intelligence, Reconnaissance and Surveillance (IRS)) system, it is possible to have a real-time image from the battlefield, which gives the decision maker the possibility of timely and efficient command of forces in the operation. Modern types of unmanned aerial vehicles are used in modern combat operations, from commercial to armed unmanned aerial vehicles. Both foreign and domestic authors have dealt with this topic. Milic et al. (2019) analyze the possibility of using drones in operations in urban environments. Radovanovic et al. (2020) shows the possibility of using civilian drones in the protection and monitoring of the land security zone. Adamski (2020) analyzes the effectiveness of UCAVs (unmanned combat aerial vehicles) used in modern armed conflicts. Jovic (2016) analyzes the combat use of drones in a counter-terrorist operation. Petrovski and Radovanovic (2021) analyze the use of drones in cooperation with the C4IRS system for the needs of the army. Ilic and Tomasevic (2021) analyze the impact of the Nagorno-Krabah conflict on the perception of combat drones. Radovanovic et al. (2021) analyzes the possibility of implementing drones in mortar units in order to increase the efficiency of fire support units by applying a fire management system in cooperation with the C4IRS system. Bares performs interoperability modeling for the C4IRS system in a collective security system. Petrovski et al. (2019) analyzes the application of GIS in cooperation with the C4IRS system in geography for the needs of the military. Petrovski et al. (2021) analyzes the selection of UAVs for the needs of military and police tactical units using the fuzzy AHP - VIKOR model of multicriteria decision making. Znidarsic et al. shows several types of drones and anti-drone means for implementation in the units of the Serbian Army. Petrovski and Toshevski (2016) present the application of GIS in geo-reconnaissance and C4IS for military purposes.

2. DEFINITION AND CLASSIFICATION OF UNMANNED AIRCRAFT

So far, there is no generally accepted definition of unmanned aerial vehicles as well as their classification, so the European Association of Unmanned Vehicles Systems - EUROUVS has defined the classification of unmanned aerial vehicles in relation to purpose (Bares, 2001; German, 2012), flight altitude, flight duration, speed, Maximum takeoff weight - MTOW, aircraft dimensions, signal range, etc. (Arjomandi et al., 2006).

According to the model of control and management of unmanned aerial vehicles, they are divided into autonomous systems, self-control systems, radar or radio beam control systems, telecommand control systems and combined systems (autonomous, non-autonomous). In relation to flight altitude, take-off weight and maximum range, drones are divided into four categories (Agbeyangi et al., 2016):

- Category 1 (weight up to 1 kg, flight altitude up to 50 m, AGL - Above Ground Level, range up to 150 m);
- Category 2 (mass greater than 1 kg to 5 kg, flight altitude up to 150 m AGL, range up to 500 m);
- Category 3 (mass greater than 5 kg to 20 kg, flight altitude up to 300 m AGL, range up to 2500 m);
- Category 4 (mass greater than 20 kg, flight altitude greater than 300 m AGL, range greater than 2500 m).

Petrovski and Radovanovic defined the terms drone and UAV and their classification (figure 1). The term UAV has a broad meaning, it means with a motor that is remotely controlled by the operator or it is a means that has a certain level of autonomy (control is done using communication software, and often uses artificial intelligence and different types of sensors), which they can be used once or repeatedly and can carry deadly or non-lethal cargo, transmit data in real time, using as a WiFi station and ect. It is a synthesis of the means and devices
necessary to manage it. They differ in purpose, construction characteristics (shape, dimensions, weight, payload, maximum flight altitude, maximum range, flight time, speed, etc.) of the environment in which they are used, the energy source with which they are driven. Depending on the purpose, they can be used in different environments such as land, water, air and space, and a wide range of possibilities has created a condition for application in defense and security (for the needs of the army and police - original purpose). agriculture, construction, traffic, trade, communication, science, medicine, research, architecture, video and photography, geology, forestry, mining, oceanography, environmental management, sports, mapping, etc. The term drone is more general than the term unmanned aerial vehicle, because all unmanned aerial vehicles can be called drones, while a drone does not necessarily have to be an unmanned aerial vehicle. (Petrovski and Radovanovic, 2021).

Figure 1. Classification of drones
Source: (Petrovski and Radovanovic, 2021.)

Based on the classification of unmanned aerial vehicles, it is concluded that the characteristics of unmanned aerial vehicles usually depend on their purpose. It is necessary to analyze the tactical and technical characteristics of unmanned aerial vehicles in order to consider their possibility of use in modern combat operations.

Military use of unmanned aerial vehicles can be classified into three groups: naval, land and air use, while for civilian purposes it can be used in various areas of human activity, such as. in geodesy (photogrammetry), agriculture, industrial production, civil protection, disaster management, critical infrastructure surveillance, environmental protection, police surveillance, protection and rescue of people, intelligence and security services, journalism, commercial activities and leisure.
3. COMBAT OPERATIONS

The planning and organization of any operation cannot be well done without information about the enemy, which can be collected using drones. The use of drones contributes to the successful performance of operations in the urban environment. The possibility of using drones in operations in urban environments is as follows: detection of nuclear, chemical and biological weapons; mine detection; electronic reconnaissance; anti-electronic action; communication relay; hyperspectral scanning, radar imaging, laser target marking, radar jamming, use of drones as combat stations and anti-drone systems, logistics stations, transport support, support to medical teams.

An operation is defined as a set of combat and/or non-combat activities, movements and other actions taken with a single idea, either alone or in cooperation with other defense forces, to achieve a general goal of varying importance.

In order to successfully perform the analysis of the use of unmanned aerial vehicles in modern combat operations, it is necessary to consider the characteristics and factors of modern combat operations, which directly or indirectly affect the use of unmanned aerial vehicles.

Significant use of drones in combat operations began in the late twentieth century, so the NATO aggression on the FRY used different types of drones, while their more significant use was in the conflicts in Libya and Syria. The Nagorno-Karabakh conflict in 2020 (German, 2021) was one of the turning points in the application of this destructive technology for combat purposes. As never before, the mass use of combat drones has decisively influenced the outcome of an armed conflict. Unmanned aerial vehicles determine the strategy and tactics of military operations. (Ilic and Tomasevic, 2021) The following BPLs were used in this conflict: Krunk-25-1, Aerostar, Hermes, kamikaze-drone Heron, Harop, Orbiter 2M and Bajraktar TB2. The Turkish Bajraktar TB2 UCAV showed exceptional versatility during the conflict. In addition to target identification, tracking, and guidance, TB2s were armed combat systems capable of independently destroying targets (Shaikh and Rumbaugh, 2020).

The Nagorno-Karabakh conflict has clearly shown the effectiveness of the use of drones, which once again indicates a change in the tactics of armed conflicts as such. The airspace is completely dominated by unmanned aerial vehicles and we see that they underline the "line" to which armored vehicles can be "safely" used. In front of them, armored vehicles are absolutely undefended, even with built-in dynamic protection.

When armored vehicles fight an almost equivalent battle with ATGMs (anti-tank guided missiles), artillery and other anti-tank weapons, then they become powerless against UAVs attacks. First, because the UAVs hit from above on the most unprotected places of the tanks - in the thin upper armor of the turret and the engine compartment. Second, an unmanned aerial vehicle, especially if it is controlled remotely, has a certain degree of "artificial intelligence", which enables the identification of the target, the ability to maneuver and a high probability of destroying the target.

The drone itself is quite vulnerable to anti-aircraft protection systems due to its low speed and limited maneuverability. It can easily be shot down by portable anti-aircraft missile systems or even a large-caliber tank machine gun. Unmanned aerial vehicles capable of carrying out long-range attacks, such as the Turkish Bajraktar TB2, have a degree of protection, but even then there is the possibility of counter-action in the form of electronic warfare systems or other systems against unmanned aerial vehicles (C-UAV).

Russian troops in Syria thwarted attempts to attack the "Khmeimim" air base by efficient use of air defense systems and means specialized in the fight against UAVs and electronic warfare.
systems. In particular, the "Pantsir S1" and "Tor-M2" systems are mostly used for the destruction of unmanned aerial vehicles, other tasks are performed with electronic anti-drone rifles.

Among the most effective Russian electronic countermeasures against small BPLs, the Repellent, Sapsan-Bekas, Kupol, Rubezh-Avtomatika, Luch and Pishchal systems can be mentioned. The Repellent-1 anti-drone system is able to suppress or destroy swarms of reconnaissance, unmanned aerial vehicles, with very small surfaces and dimensions. The system is able to automatically detect and neutralize enemy reconnaissance drones at distances of 30 km, performing strong electronic interference with their control sensors or satellite navigation links. The system is able to detect drones via their control command transceiver signals, in all weather conditions.

The armed conflict on the territory of Ukraine is also characterized by the massive use of unmanned aerial vehicles by both the Russian armed forces and the Ukrainian army. Ukrainian forces mostly use the "Bajraktar TB2" unmanned aerial vehicle, while Russian forces most often use "outpost", "eagle-10" and "zala" unmanned aerial vehicles.

Unmanned aerial vehicles can be used to gather information by reconnaissance and aerial photography and to attack by destroying assigned targets with guided or unguided missiles in integration with the C4IRS system. The information obtained should be forwarded to the Force Command Center in a timely manner. The use of drones in combat operations provides a wide range of capabilities to the units that use them, by adding a wide range of accessories. Unmanned aerial vehicles provide an advantage during combat operations, because they provide support for making a quick decision to the field manager and the possibility of controlling a larger area of combat operations in the operation zone.

4. INTEGRATION OF C4IRS SYSTEM ON UNMANNED AIRCRAFT

C4IRS defines a Command, Control, Communication, Computer, Information, Reconnaissance and Surveillance system. The Arc-GIS platform is an enterprise information technology infrastructure, and as such, provides a horizontal, crosscutting technology that is very different from GIS technologies past niche usage (ESRI, 2005). One concept made a big step up in the usage of GIS for military purposes, especially military affairs. That is NCO which represents concept of Network-Centric Operations i.e., the use of the network to connect decision making across multiple defense domains and beyond. Therefore, NCO is about far more than war fighting. It connects war fighting to strategic intelligence, and with that to installation management. This frame is way beyond from the traditional defense and intelligence domain. Arc-GIS has a critical impact in each of the three concepts of NCO:
- Intelligence, Surveillance, Reconnaissance - ISR
- Command, Control, Communications, Computers, and Intelligence - C4I
- Precision engagement – PE.

The C4IRS domain supports timelier and better decisions by using a variety of tools to analyze, assess, and plan actions. Arc-GIS bolsters C4IRS capabilities by providing a common spatial context and the tools to provide decision makers, commanders, and war fighters with a distributed, scalable, decision support environment (Nagy, 2004).

The development of military commanding and management technique systems seen in recent years has been made possible primarily by the development of microelectronics, the rapid decrease in size of IT tools, the enormous increase of their capacity, and the integration of their capabilities into a single system. This is applied by maneuvering robot aircrafts, unmanned flying devices and by all other armament managing, deployment managing systems, which are, on the one hand in an interactive contact with the environment, and direct interactively the
given object, on the other (Nagy, 2004). Nowadays all elements of managing systems are integrated into a combat vehicle, which forward commands to the managing staff of the vehicle and send back reports. Based on reports, a close to real-time combat value can be worked out, which in the case of traditional tools would be slow, cumbersome procedure full of uncertainties, requiring human resource.

In the many armies, the Commercial Joint Mapping Toolkit (C/JMTK) provides the Mapping, Charting, Geodesy, and Imagery (MCG&I) functionality for C4IRS mission applications. The toolkit is being deployed to support both legacy mission applications and new systems being developed throughout the Department of Defense (DoD) Command, Control, and Intelligence (C2I) Community (Thomas and Jonnson, 2007; ESRI, 2006).

Figure 2. Model of Geo-reconnaissance and commanding (GRC) information system in UAV
Source: (Petrovski A. and Mihajlo T. defined this model - figure 2)

5. THE IMPORTANCE OF THE INTEGRATED C4IRS SYSTEM FOR PERFORMING MODERN COMBAT OPERATIONS

The importance of C4ISR has grown as global economic, territorial, and resource competition has increased. Its importance to mission success today lies in C4ISR’s function as a technological and strategic nerve center that integrates the operational side of military forces – platforms, troops, weaponry, and other assets – with intelligence, tactical networks, and analytical tools to provide command and control leaders with situational awareness and predictive analytics for effective decision making. Understanding the environment and making good decisions quicker than an adversary is the fundamental capability that C4ISR provides (http://defense-update.com/events/2005/summary/LIC-c4sec.htm).

C4ISR systems are becoming increasingly important for mission success. Read on to learn how the changing nature of warfare is informing the DoD’s overarching strategy for maintaining military dominance on today’s battlefield. Today’s environment also requires the collective capabilities and efforts of multiple organizations. Unfortunately, traditional C4ISR systems weren’t built with interoperability in mind—in the past, they were designed to meet
mission-specific requirements and to solve a particular set of problems facing an organization. This specialized functionality limited the DoD’s ability to communicate from one system or platform to another, and information remained stovepiped within missions (https://www.baesystems.com/en/productfamily/c4isr-systems).

The increasing breadth and depth of information, the accelerating speed with which information flows and weapons can be deployed, and the proliferation of interoperable digital devices have driven home the need for the DoD to develop and deploy more modern C4ISR capabilities. The “nervous system” of the military, the collection of subsystems used to maximize situational awareness, is referred to as C4ISR—command, control, communications, computers, intelligence, surveillance, and reconnaissance. C4ISR technologies are the bedrock of any mission, and the components must work in tandem to effectively enable the “muscle” side of the military—weapons, platforms, and troops. C4ISR networks collect massive amounts of data from multiple sensors, databases, and other sources worldwide. The data is fused, processed into usable information, and shared securely among authorized users.

Advancements in C4ISR capabilities are changing the nature of defense systems, battlefield strategies, and communications security worldwide, requiring innovative thinking and agile, expeditious development capabilities among USDOD partners and contractors. Maintaining the military dominance necessary to defeat adversaries and support allies across every domain – on the ground, at sea, in the air, and in space – demands a commitment to advancing C4ISR priorities within each branch of the DoD and across the integrated frameworks necessary to deliver the most pertinent capabilities effectively (https://www.defenseone.com/insights/cards/c4isr-military-nervous-system/).

While the DoD has signaled the development of C4ISR capabilities as a top priority, a number of obstacles must be overcome in the years ahead if it hopes to maximize innovation. C4ISR plays a key role in the military defense and operational stability of governments, businesses, and societies worldwide today, and indications are that it will only become more important moving forward, given its growing role in how decisions are made, threats are addressed, and agreements are enforced. The world’s nations are in a race for C4ISR superiority – a significant national advantage – and the ability to lead through innovation could determine who wins.

The C4ISR Solutions teams at BAE Systems are conquering the complex emerging mission challenges across all domains – around the globe, below the sea, and out in space. From innovative command and control technologies and secure, adaptable communications systems to extended-range ISR sensors, high-velocity data analysis systems, cyber resilience solutions, and more, BAE Systems has developed proven C4ISR technologies for information dominance that will help secure an aware, protected, and resilient future.

The defense space often refers to these systems as either C4ISR or C5ISR. The difference between the two terms reflects advancing needs in military communication efforts. Effective communication systems are crucial to military operations across every branch, mission, and training regimen. Success is driven not only by combat and force but through the gathering and dissemination of intel across military personnel.

Beijing’s determination to dominate in the information warfare arena has led to the country’s fast adoption of C4ISR technologies. In fact, this rapid procurement and development are predicted to make the Asia Pacific region the largest market for C4ISR tools by 2025. C5ISR includes those 7 components in addition to an 8th element and 5th “C”--cyber-defense (https://www.adsinc.com/news/c4isr-vs-c5isr-what-is-the-difference). Without this element, C4ISR did not address the threat of cyber security risks. Today, an effective C5ISR system
must protect against threats related to intelligence and information warfare, as well as sensitive data leaks and breaches.

The benefits of C5ISR systems are becoming increasingly important for mission success. Read on to learn how the changing nature of warfare is informing the DoD’s overarching strategy for maintaining military dominance on today’s battlefield. The key to effective C5ISR is optimizing the functionality and interoperability of land, sea, air and space systems to rapidly turn data and intelligence into mission-winning action.

How Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR) solutions are simplifying the complex—turning data into knowledge? And knowledge into action. Today’s environment also requires the collective capabilities and efforts of multiple organizations. Unfortunately, traditional C4ISR systems weren’t built with interoperability in mind—in the past, they were designed to meet mission-specific requirements and to solve a particular set of problems facing an organization. This specialized functionality limited the DoD’s ability to communicate from one system or platform to another, and information remained stovepiped within missions (https://www.northropgrumman.com/c4isr/).

Adversaries are highly adaptive and threat environments are becoming increasingly complex. Fifth Generation C5ISR is a joint battle management system that can gather data, understand it, and communicate freely with each and all of its components. The “nervous system” of the military, the collection of subsystems used to maximize situational awareness, is referred to as C5ISR—command, control, communications, computers, cyber, intelligence, surveillance, and reconnaissance. C5ISR technologies are the bedrock of any mission, and the components must work in tandem to effectively enable the “muscle” side of the military—weapons, platforms, and troops. C5ISR networks collect massive amounts of data from multiple sensors, databases, and other sources worldwide. The data is fused, processed into usable information, and shared securely among authorized users.

As discussed in Chapter 4, previously clear distinctions between C4ISR and combat systems are blurring; this trend is likely to increase with the advent of network-centric operations. Sensors onboard on UAV’s are often integral parts of combat systems, but data shared with other units can cue other sensors and can fuse with other data to create a more complete picture or add to a commander’s situational awareness.

While the DoD has signaled development of C4ISR capabilities as a top priority, a number of obstacles must be overcome in the years ahead if it hopes to maximize innovation. The army has put forth a new construct for its strike forces that enables more effective forward deterrence and rapid response. A key aspect of this construct is the need for flexible, adaptive command, control, communications, computers, intelligence, surveillance, and reconnaissance (C4ISR) systems (https://www.northropgrumman.com/c4isr/). To assist development of this capability, the Army started to examine C4ISR for carrier, expeditionary, and strike and missile defense strike groups, and for expeditionary strike forces. This report provides an assessment of C4ISR capabilities for each type of strike group; recommendations for C5ISR architecture for use in major combat operations; promising technology trends; and an examination of organizational improvements that can enable the recommended architecture.

Effective communication systems are crucial to military operations across every branch, mission, and training regimen. Success is driven not only by combat and force but through the gathering and dissemination of intel across military personnel. These new systems will significantly improve tactical operations. On the battlefield, nine times out of 10 we have to
improvise our plan and we need to move, and move quickly. If we can get the network up in minutes [versus hours], it enables us to move that much faster.

Beijing’s determination to dominate in the information warfare arena has led to the country’s fast adoption of C4ISR technologies. In fact, this rapid procurement and development is predicted to make the Asia Pacific region the largest market for C4ISR tools by 2025 (https://www.nap.edu/read/11605/chapter/9). This systems can show us volumes of data on fires, logistics, or friendly and enemy force locations, yet we don’t have one system that brings the entire picture together. We have constantly evolving software, but some tools require too many clicks or permission levels for warfighters to actually find their best features. We have great communications inside combat and tactical vehicles, but they each come with their own monitors and other hardware, creating a challenge for operators in tight quarters.

C4ISR is a terrific example of where an acronym helps avoid repetition. After all, who wants to say Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance more times that you must? ‘C4ISR’ helps us put together arguably the most important elements of the infrastructure of global national security into a single, memorable term. Supported by “Cyber Defense” elements in future events this system will be a leader in getting information in the world and the future creation of new perspectives of living.

6. CONCLUSION

The use of unmanned aerial vehicles equipped with modern technical devices (high resolution cameras, infrared and thermal cameras, microphones, various types of sensors, guided and non-guided missiles and other accessories) integrated into the C4IRS system significantly increases the efficiency of units engaged in combat operations. The use of this sophisticated technology enables timely and accurate information about the event in real time, as well as the destruction of the target without risk to humanity, while transmitting the situation to the battlefield command center. Unmanned aerial vehicles can still be used to deliver medical supplies and other necessary combat and non-combat equipment to units in the area of operation.

The use of unmanned aerial vehicles in combat operations, regardless of limitations, increases the efficiency and effectiveness of the units engaged in the operation, and also increases the protection and reduces the risk to the engaged personnel. Based on the tactical and technical characteristics of unmanned aerial vehicles, it is possible to realize various tasks.

Today’s environment also requires the collective capabilities and efforts of multiple organizations. Unfortunately, traditional C4ISR systems weren’t built with interoperability in mind—in the past, they were designed to meet mission-specific requirements and to solve a particular set of problems facing an organization.

Further research should be focused on the integration of the modern C5ISR system to the combat systems of the army and the advantages that the mentioned system provides to units during the execution of a modern combat operation in a different environment.

ACKNOWLEDGEMENTS

This paper was written as part of the scientific research project funded by the Military Academy of the University of Defence in Belgrade, number: VA-DH/1/21-23 “Uticaj savremenog okruženja na izvođenje borbenih dejstava u urbanim sredinama” (“Influence of contemporary environment on the conduct of combat activities in urbanspaces”)
REFERENCES


ESRI (2005) GIS for Defense and Intelligence.


Radovanovic M., Samopjan M. and Petrovski A., (2021), Possibility of Implementation of Drons in Mortar Units in Order to Increase the Efficiency of Fire Support Units, 24.


Thomas, S. and Johnson, K. (2007). GIS enabled modeling and simulation (GEMS), MAK TECHNOLOGIES INC CAMBRIDGE MA,

Vanya L. (2000). Military GIS and Their Application During Training and Education. Presentation material, Budapest ZMNE.

Znidarsic V., Radovanovic M., Stevanovic D. (2020) Modeling the organisational implementation of a drone and counter-drone operator into the Serbian Armed Forces rifle section, Vojno delo, Vol. 72, No. 3.

https://www.defenseone.com/insights/cards/c4isr-military-nervous-system/
https://www.northropgrumman.com/c4isr/
https://www.nap.edu/read/11605/chapter/9
ORGANIZATIONAL MEASURES TO RAISE THE CAPACITY OF LOCAL SELF-GOVERNMENTS IN EMERGENCIES

Samed Karovic¹

¹ University of Educons, Faculty of security studies, Vojvode Putnika 67, Sremska Kamenica, Republic of Serbia, karovic.samed@gmail.com

Received: 24th May 2022
Accepted: 11th July 2022

Abstract: Emergencies cause major disruption in the functioning of the community. A significant role in solving emergencies is played by local governments. The work explains the necessary elements of raising the capacity of local self-governments to function efficiently and manage emergencies. In particular, it highlights ongoing problems in the area of functioning of local self-governments in the autonomous province of Vojvodina. The emphasis is placed on organizational measures and the work of authorities at the local level and concrete solutions for the successful functioning of local self-governments and effective management of emergencies. The proposals for the measures are based on the data collected in the field and cover the area of the Autonomous Province of Vojvodina.

Key words: security, local self-government, emergencies, capacities

1. INTRODUCTION

Emergency situations, due to their characteristics and causes, cause various consequences. Usually, these consequences are losses of a material nature, the suffering of human lives and endangering the environment. The current state of the community and the environment of the Republic of Serbia makes it clear that the Republic of Serbia is exposed to the actions of various security challenges that can cause emergencies.

Successfully managing these emergency situations implies an efficient and swift response of authorities at all levels, from local self-government, to the Republic of Serbia. This means that there must be sufficient capacity to respond at all stages, from prevention to recovery and restore. It is a complex process and requires the efforts of all structures. The basics of successful action are the Protection and Rescue Plan, which is preceded by many activities and should be functional.

The paper deals with the problems of local communities and raising their capacities for successful emergency management. The data analyzed are the result of real research in local communities in the area of AP Vojvodina, covering 30% of local communities with key elements relevant for assessing the state and capacity of local self-governments.
The paper covers the units that deal with the security of local self-government and its basic elements, the current situation within local communities for successful emergency management and raising the capacity of local self-government for successful emergency management.

The analyzed data served to look at the state of local self-governments and to look at the most important activities dealt with by local governments in the previous year. The focus was on the necessary and key elements of raising the capacity to successfully manage emergencies and the needs of resolving the issue.

2. SECURITY OF LOCAL SELF-GOVERNMENT IN EMERGENCIES

The issue of security in society is a fundamental element of its successful functioning and development. There are many influential factors that put security in the sphere of interest of society as a whole. This is especially pronounced in modern conditions and will all be more pronounced in the times to come. There have never been more security challenges before the social community, and the trend is especially relevant at the level of local self-governments that represent the basic organizational whole in the social system.

In this sense, local self-governments gain importance, roles and responsibilities for working and functioning in emergency conditions. It should be noted in particular that there are many different events that can cause emergencies (Karovic, Domazet, Jesic, 2021), thereby incorporating the scope of work and capacities of local self-governments to successfully act in such a situation. Organizing local self-government, defining tasks and turning them into action is a very complex process that has direct consequences for citizens, their life and health. If local governments prepare plans in a timely manner, define capacities and adapt organizationally to the situation they will create conditions (Karovic, 2014) for successful emergency management and prevent many negative occurrences and crises. This means accepting reality and adapting to the current development trends of modern society.

2.1. Basic elements of local government security in emergencies

Local governments within their jurisdiction to reduce disaster risk and manage emergencies, according to the Law on Disaster Risk Reduction and Emergency Management (Law), ("Official Gazette of RS", 8/2018), have many jurisdictions prescribing their competencies. If you look closely at the Art. 29 of the aforementioned Law, it is observed that local self-government, among other things, enacts an act on the organization and functioning of civil protection on the territory of a local self-government unit, drafts and enacts a risk assessment, a local disaster risk reduction plan, a protection and rescue plan, and an external plan for protection against a major accident if the SEVESO complex of higher order is on its territory, etc.

In a specific case, the competencies and activities prescribed by law include a complex of tasks imposed by an emergency and create the basis for successful emergency management. The organization of local self-government to act in emergencies depends on the elaboration of each element within the legal regulation. This conditions all bodies and holders of functions at the local self-government level to actively engage in the process of implementing legal solutions and realistically anticipating security challenges and risks, in order to make the plans in a way that is realistic in relation to the events foreseen.

Local self-governments are the foundation of the functioning of the entire emergency management system on the territory of the Republic of Serbia and their continuous and efficient upgrading and improvement increases the capacity of successful emergency management.
Observing the elements of the security of local self-governments in emergencies, it follows that in these extreme conditions there are elements of the conditions for the life and work of the population in the area of local self-government. Emergencies can be conditional on different events, but in the context of the assessment, the holders of the functions must realistically assume possible risks and in this sense orient their protection and rescue plans.

When we talk about the elements of security of local self-government in emergency situations, we primarily mean the protection of life and health of the population, protection of animals, environment, security of water and food supply, energy and functioning of traffic, communications and basic sanitary conditions. These are the elemental conditions necessary to function within the emergency-affected local self-government. Holders of government functions and management bodies at the local self-government level should always take into account the above-mentioned elements and assess whether they can ensure the implementation of the specified facilities within the framework of emergency management as part of the protection and rescue plan.

In particular, it should be noted that the concept of security and emergency management within local governments is limited and incomplete without the introduction of information support and access to the concept of smart cities. This is why legally defined activities, as pointed out by Karovic et al. (Karovic, Rankov, Domazet, Jesic, 2021), should be aimed at strengthening human resources and information support in order to effectively manage emergencies. The same authors noted that the organization of work at the level in the context of emergency management covers various fields, including sociology, economics, physiology and psychology, etc., reflecting different aspects of emergency work. The success of working in such conditions is measured by different parameters and criteria. Therefore, in the process of work and good organization of various processes of work, it is necessary to identify these criteria and parameters, in order to achieve the necessary efficiency. This is a basic condition without which it is impossible to act effectively in modern and complex conditions.

2.2. The current state of functioning and implementation of security measures in local self-governments

As part of the research conducted in local self-governments in the area of the Autonomous Province of Vojvodina and a defined project called "Strengthening the Capacity of Local Self-Governments in Emergency Prevention", basic problems and conditions in local self-governments were noted. The survey covers 30% of local self-governments in the area of AP Vojvodina. When it comes to the elements related to the capacities of local self-government in the context of the activities that were most often carried out in the previous year on the prevention of emergency situations, it was pointed out that the orientation was mainly on:
- developing disaster risk reduction assessment;
- drafting of a Protection and Rescue Plan;
- preparation of the Acoustics Study for the territory of the municipality;
- implementation of the project for replacing siren programmers and electrical installations;
- realization of the project of servicing an automatic weather station;
- drafting of proposals of documents from the competences of the Assembly and the Municipal Council (Decision on organization and functioning of civil protection, Decision on education of civil protection units; initiate the drafting of the Assessment and Plan for Protection and Rescue in the jurisdiction of public enterprises founded by municipalities;
- elaboration of the necessary number of shelters for the territory of the municipality (at the initiative of the Defense Obligations Administration), etc.
- activities carried out to prevent the spread of the COVID-19 virus;
- Establishment of a call center at the municipal level to receive calls from citizens who need help or delivery of life supplies, medicines, etc.;
- protection against COVID-19;
- setting up vaccination checkpoints;
- assistance to the elderly;
- engagement of call center for vaccination;
- distribution of quarantine solutions in home conditions.

If we look at the most significant activities conducted during the last year at the local self-government level, it can be noted that the orientation was directly aimed at fighting the COVID-19 pandemic and implementing recommendations by the co-ordination national body. However, there are also activities that show that the process of work and legislation has not been implemented in all local governments and that the process is ongoing.

The duration of the process of implementation of legal solutions is slow, and it is conditioned by various factors. They are also expressed in incompetent staff, partly by the inertia of office holders at the level of the Republic of Serbia and the very nature of emergency situations.

It is not ensured that systematic action and assessment of events and risks that may cause an emergency situation is enabled at the level of local self-governments. These are key elements and such a situation continues and will continue. The main sources of endangering society and the state at the moment and in the long run are various natural events and technical-technological accidents. In this segment, local governments lack resources and organized action in such situations. This is a key problem that needs to be solved and which was especially highlighted during the research.

The legitimacy of local self-governments and efficient management of emergency situations is given by the citizens and the media. These are questions that can be heard and that need to be analyzed. Of course, when it comes to the media, one should be objective and realistic, as research has shown. All this shows the level of trust in political actors and holders of public functions and authorities at the level of local self-government and beyond.

3. RAISING THE CAPACITY OF LOCAL SELF-GOVERNMENT SECURITY

As a key element of research and realization of the project, it is necessary to define and determine how to implement measures to increase the capacity of local self-government in emergency management. Given the current state of local self-governments in the area of AP Vojvodina, they crystallized with different problems and issues that were hidden and did not initially come to the fore.

Table 1 shows the results of certain issues that partially touch on the issue of local government capacity.

Based on the results of the survey and the issues included in the survey questionnaire, it can be noted that local governments have qualified staff for managing emergency situations in the situation, and in practice there is a situation that the system at the local self-government level does not work and has not survived in practice. Yet one local government has expressed the view that it is not a cadre that is qualified in practice and proves correct. It also raises questions about the number of personnel dealing with the problem of protection and rescue in emergencies and again the qualifications and commitment to solving and functioning this area.
Table 1: Local Government Capacities

<table>
<thead>
<tr>
<th>Red. br.</th>
<th>Questions</th>
<th>∑</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Does your local government have qualified emergency prevention personnel?</td>
<td></td>
<td>12</td>
<td>1</td>
</tr>
<tr>
<td>2.</td>
<td>Has the current state of emergency been analyzed at the level of your local self-government?</td>
<td></td>
<td>13</td>
<td>/</td>
</tr>
<tr>
<td>3.</td>
<td>Have you identified at the level of your local self-government that would affect the area of local self-government?</td>
<td></td>
<td>13</td>
<td>/</td>
</tr>
<tr>
<td>4.</td>
<td>At the level of your local self-government, have realistic assessments of the scale of certain emergencies been made?</td>
<td></td>
<td>13</td>
<td>/</td>
</tr>
<tr>
<td>5.</td>
<td>Is there a database of emergencies and damage sustained at the level of your local government?</td>
<td></td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>6.</td>
<td>At the level of your local self-government, is work organized and detailed activities specified in emergencies?</td>
<td></td>
<td>12</td>
<td>1</td>
</tr>
<tr>
<td>7.</td>
<td>Is the planned use of information technology and data a preventive form of emergency?</td>
<td></td>
<td>7</td>
<td>6</td>
</tr>
</tbody>
</table>

Also, questions on the next number 2, 3 and 4 were unanimously positively evaluated. However, if you look through the analysis of other issues, it does impose the problem of full insight into certain emergency processes and drawing from such a question. The effects of certain measures are not being considered, and there are not enough indicators, ie they have not been identified. The problem is measures that are not in the sphere of measurable nature to perceive effects.

It should be noted, as pointed out by Karovic and Domazet [4], emergency management, at any level, is an inherent aspect of risk management and poses a significant challenge. It continually questions the effectiveness of the measures taken to minimize the risks. There is no single and effective governance mechanism that "drives" activities in depth, which effectively prevents an integral approach to controlling a particular situation or pandemic, and therefore crises as a whole.

When asked directly about the existence of a database of data within local self-government about the damage caused by the emergency, the condition is of such a nature that more than half have declared that the base does not exist. This is very concerning and demonstrates the need for information support at the local government level to manage databases of such a condition. This includes equipping local governments with information technologies and the need to enable staff to use these tools. The problem is complex and requires deeper analysis and solution proposals in a more complex project that will specifically cover this dimension.

The question on number six indicates that attitudes are not unanimous that there are problems within the process of organizing work and is partly about drafting a Protection and Rescue Plan. Such plans that are not concreted and in which not every activity and carrier is defined, with elements of network planning, do not ensure its effectiveness.

Finally, in the question of plans to use information technology and data as a preventive form of emergencies, there is a problem at all that this is planned to be introduced. Research has shown that nearly 50% are not in the projection of the introduction of such technologies. Due to the scope of emergency jobs, monitoring of the condition and processes, it is inconceivable that in the information era this is not on the agenda. Such an approach must be eliminated,
information support well and realistically and rationally designed and placed in the function of managing emergencies at the level of local self-governments.

A key problem for raising the capacity of security in local self-governments is the people and the inability of the persons in charge of emergencies. This leads to the initiative, positive solutions and improvement of the system only coming down to the survival of some archaic solutions in the previous period. There is simply no development or improvement of the system at the level of local self-governments.

Therefore, emergency tasks and managed security in emergencies in certain local self-governments in the area of AP Vojvodina are performed by persons who do not have adequate education to do the job. It is also present that in addition to the work for which they were educated, they perform a whole range of other jobs, thus preventing their absence for professional training.

Ultimately, overcoming this problem is a key element in ensuring effective management of security in emergencies. This means that emergency personnel must have a clear projection of the development of emergency protection and rescue systems. They should have a clear vision of equipping it with information support in managing emergencies. It is a process that needs to be directed by the holders of power at every level. Of course it's not a simple question and it should be dealt with phased with a clear goal.

4. CONCLUSION

Taking organizational measures to increase the security capacity of local governments in emergency situations is an important process and element of successful emergency management. In order to be able to propose key organizational measures for raising the security capacity of local self-governments, it was necessary to record the current situation in local self-governments and identify the basic problems. Accordingly, based on the collected and processed data, it was concluded that at the level of local self-governments, activities aimed at resolving the COVID-19 pandemic were mainly carried out.

It was also determined that, in most local self-governments, the process of implementing the legal solution for drafting the Protection and Rescue Plan in emergency situations is slow. A comprehensive and systematic approach in defining the competencies and implementation of the Protection and Rescue Plan is particularly characteristic in the field of risk assessment of local self-government.

In the sphere of activities and work at the level of local self-government, only current issues are the current response to the state of the pandemic and the measures determined by the coordinating body at the level of the Republic of Serbia. There were no more concrete examples of work at the local self-government level that could improve the quality and capacity of the functioning of security and emergency management. A climate of passivity has been created and only instructions and concrete solutions of higher instances are expected. This is a problem that puts local government in a position of waiting and passivity in concrete conditions.

The poor equipment and the lack of a projection of equipping local self-governments with informational support for acting in emergency situations were especially pointed out. And informational support should have clear elements of work. This also requires changes in the structure of human resources in emergency affairs at the local self-government level. The issue of human resources is always ongoing and that's what Karovic and Domazet talked about (Karovic, Domazet, 2019). They emphasized that it is necessary to adapt and train people with modern requirements and organization of work in the jobs of protection and rescue and
emergency management. All elements of work and functioning within the management of emergencies must be implemented in the Protection and Rescue Plan in the form that ensures the involvement of the management staff and other holders of protection and rescue in mitigating the consequences of the emergency situation.

It is important to note that the issue of local self-governments, putting them at the center of emergencies, in future research should be looked at through measurable values and clearly determine the local self-government safety index and the value of local self-government's ability to act in emergencies. To especially update the issue of emergency situations, primarily with an adequate assessment of the overall security of the Republic of Serbia and those elements that bring climate change. These are the basic questions that society will also face in the future and seek concrete answers to the security challenges of all levels.

**ACKNOWLEDGEMENTS**

The work was created as a result of project no. 142-451-2031/2201-01, titled Strengthening the Capacity of Local Self-Governments in Emergency Prevention, approved and funded by the Provincial Secretariat for Higher Education and Scientific Research activities of AP Vojvodina.

**REFERENCES**


ORGANIZATIONAL MEASURES TO RAISE THE CAPACITY OF LOCAL SELF-GOVERNMENTS IN EMERGENCIES

Sinisa Domazet¹

¹ University of Educons, Faculty of security studies Vojvode Putnika 67, Sremska Kamenica, Republic of Serbia, sdomazetns@gmail.com

Received: 27th May 2022
Accepted: 20th August 2022

Abstract: Local governments in the area of AP Vojvodina are facing various security challenges. The research conducted in selected local governments in the area of AP Vojvodina enabled a clearer view of the situation and preparedness of local governments in response to emergencies. The paper analyzes the legal aspects of raising the security capacity of local governments in emergency situations. It was determined that the analyzed local self-governments have relatively modest possibilities for responding to emergency situations and that the legal framework of emergency situations is not fully harmonized with other institutional documents at the level of local self-government. It was also established that in some of the analyzed municipalities, civil protection units have not been formed, nor have Protection and Rescue Plans been prepared. The normative method was used in the paper, as well as the legal-logical methods of induction and deduction.

Key words: law, security, emergency situation, local self-governments, Republic of Serbia

1. INTRODUCTION

Emergencies cause a number of negative consequences for economy, affecting considerably all its sectors. Emergencies involve disruption of normal livelihood and economic activity, destruction of property, housing and public services; breakdown of industrial, commercial and communications infrastructure; human displacement and loss of life (African Development Fund, 2008). Emergencies represent a constant combination of different events and testing the ability of society and the state to successfully manage emergencies in such a situation and provide assistance to the population in a given situation. It can be stated that emergencies have become more frequent lately, more diverse and caused by various events. Sources of emergencies have become more frequent and cause increasing consequences for people, material goods and the environment on a daily basis. It should be especially noted that the different definitions of emergencies are oriented to the sources of threats and the ways in which society operates (Tosic, et al., 2021). According to the positive legal regulations, emergencies are a challenge that shows when, how much, and in what way the society is ready to react to them (Karovic, et al., 2021). Crisis communication is a great issue discussed and explained
differently in the works of numerous scientists and practitioners all over the world (Radovic & Domazet, 2016).

Emergencies are a real challenge for the economy as well. There is no industry in which they do not cause serious problems in functioning, or in some cases cessation of economic activity (Domazet, 2015). Doing business in any emergency is very risky for an organisation because it might have long term consequences in the case that something goes wrong (Domazet & Radovic, 2016). At this point, the importance of government bodies in local self-governments and their ability to adequately respond to emergencies should be pointed out. This is understandable, because the decisions made at this, in the hierarchical sense, the lowest level of government, most directly affect the daily life of citizens in their territories (Karovic, et al., 2022). Strengthening the disaster risk management system through research, development, and the implementation of innovative solutions in this area can reduce disaster risk, which will directly affect the level of safety of citizens and their resilience to the consequences of disasters (Cvetkovic, et. al., 2021).

Taking this into account, the question arises as to the capacities of local self-governments in relation to emergencies, with an emphasis on local self-governments on the territory of Autonomous Province Vojvodina (Republic of Serbia).

2. THE AIM OF THE RESEARCH

The aim of the research was to find and clearly measurable comparison of adopted measures and actions to increase the capacity of local governments to prevent emergencies in the field of education of protection and rescue officials in emergencies and management actions to reduce risks to the local community. Special measures and actions universally applicable to all local governments in the area of Autonomous Province Vojvodina (hereinafter: AP Vojvodina) and cooperation with the bodies of the Ministry of Interior, the Ministry of Defense, medical centers and the business sector were especially included.

The research is conducted in 3 phases:

I Phase - preliminary research, involves activities to create a material and theoretical basis. The first activity in this phase is defining the objectives of the research, conceptualization, and analysis of legal regulations, economic analysis, and decomposition of the problem. In addition, at this stage, relevant literature, available sources from the country and abroad will be collected and methods and techniques will be applied that will be applied in the research. Within that, the current state of functioning of local self-government in the conditions of emergencies was analyzed, with special emphasis on the issue of risk assessment and response within the assessment, ie the method of risk management. The research was primarily related to the quality and reality of the assessment of the threat to local self-government, the method of assessment and risk evaluation. Protection and rescue plans, with a focus on prevention measures, and the ability and expertise of plan holders and their implementation in the protection and rescue of the population in emergencies were also discussed.

II Phase - development and implementation, implied the implementation of the project in the direction of assessing and raising the capacity of local self-government to prevent emergencies and organizational forms of work of local self-government in such a situation.

III Phase - presentation of results referred to the implementation of solutions and the implementation of specific measures with a clear comparison of raising and strengthening the capacity of local governments on specific preventive measures and actions that are an integral part of protection and rescue plans in emergencies.
An appropriate checklist was created, consisting of relevant questions relevant to all local governments in the area of AP Vojvodina, in order to identify key elements for raising the security capacity of local governments in emergencies.

Analysis was conducted using responses of 14 local self-government authorities (Stara Pazova, Kikinda, Plandiste, Sremska Mitrovica, Backa Topola, Opovo, Sremski Karlovci, Subotica, Odzaci, Beocin, Zrenjanin, Pecinci, Backa Palanka, Zitiste) which makes approximately 30% of the total number of local self-governments in the area of Autonomous Province (AP) Vojvodina. At this point in the research, there have been 14 surveys completed from which we can draw major conclusions, according to the research divided into 4 parts: 1) Capacities of local self-government; 2) Emergencies; 3) Forms of emergency prevention; 4) Capacity building.

One of the important results and effects of this research is the basis for activating existing multi-level coordination bodies of local self-government that bring together subnational government representatives to minimize the risk of fragmented crisis response (Karovic et al., 2022).

The paper analyzes the legal aspects of raising the security capacity of local governments in emergencies.

3. HARMONIZATION AND IMPLEMENTATION OF LEGAL REGULATIONS AND PRACTICAL PROTOCOLS OF LOCAL SELF-GOVERNMENTS IN AP VOJVODINA

When it comes to the capacities of local self-governments in order to prevent emergencies, the analysis of responses by the surveyed local self-governments of AP Vojvodina showed that local self-governments did not update systemic documents related to emergency management. In this sense, it is noticeable that it is necessary to innovate the relevant acts on the organization and functioning of civil protection, as well as the formation of civil protection units. Furthermore, the analyzed local governments did not adopt or innovate existing acts on risk assessment or protection and rescue plans under the jurisdiction of public companies founded by municipalities, i.e., they did not create a normative framework for the use of all material and human resources.

Also, it was shown that the analyzed local governments did not train and train staff in charge of emergency management, which is a consequence of lack of financial resources, or lack of municipal budget lines for these purposes. In general, there was a lower intensity of activities aimed at preventing emergencies in the analyzed local governments, and the legal framework of emergencies is partially harmonized with other institutional documents at the level of local self-government.

In Table 1 we can see the answers to the second part of subgroups of questions related to legal regulation in and practical protocols (emergencies), collected from 14 LSGs located in Autonomous Province Vojvodina.

In the local self-governments in which the research was conducted, it can be stated that local self-governments have qualified personnel for emergencies prevention planning, while one local self-government has a different attitude. It was determined that at the level of all local self-governments, the current situation was analyzed in terms of the possibility of emergencies, the extent of emergencies, and identified types of emergencies that would affect the area of local self-government. Almost all local self-governments have organized their work and specified detailed activities in emergencies, and the documents related to emergencies (Protection and Rescue Plan), clearly define all the dangers that could lead to an emergencies.
In addition, the local self-governments have developed a system of warning the population about the possible danger that may cause a state of emergencies.

At the same time, the analysis showed that in almost all local self-governments (except two) the Protection and Rescue Plan envisages the evacuation of the population in case of disasters. The fact that in all analyzed local self-governments companies are involved in the activities of preventive measures of emergencies can be positively assessed, as well as that in the vast majority of local self-governments transport capacities at the local self-government level provide relocation of public office holders. Also, the places of relocation of public office holders at the level of local self-government in case of disasters are clearly defined.

Table 1: Legal regulation related to the the activities of LSG in AP Vojvodina (source: author’s own work)

<table>
<thead>
<tr>
<th>Ser. No.</th>
<th>Claims (sub-groups of conditions)</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Does your local government have qualified personnel for emergency prevention planning?</td>
<td>13 1</td>
</tr>
<tr>
<td>2.</td>
<td>To what extent is the legal framework of emergencies harmonized with other institutional documents at the level of local self-government?</td>
<td>9 5</td>
</tr>
<tr>
<td>3.</td>
<td>Has the current situation regarding the possibility of emergencies been analyzed at the level of your local self-government?</td>
<td>14 /</td>
</tr>
<tr>
<td>4.</td>
<td>Have the types of emergencies that would affect the area of local self-government been identified at the level of your local self-government?</td>
<td>14 /</td>
</tr>
<tr>
<td>5.</td>
<td>Have realistic assessments of the scale of certain emergencies been made at the level of your local self-government?</td>
<td>14 /</td>
</tr>
<tr>
<td>6.</td>
<td>Is there a database at the level of your local self-government on emergencies and the damage caused by emergencies?</td>
<td>7 7</td>
</tr>
<tr>
<td>7.</td>
<td>Has work been organized at the level of your local self-government and detailed activities in emergencies have been specified?</td>
<td>13 1</td>
</tr>
<tr>
<td>8.</td>
<td>Are all hazards that could lead to an emergencies clearly defined in the emergency documents (Protection and Rescue Plan)?</td>
<td>14 /</td>
</tr>
<tr>
<td>9.</td>
<td>Is there enough attention paid to emergencies management in your local government?</td>
<td>11 3</td>
</tr>
<tr>
<td>10.</td>
<td>At the level of your local self-government, does the Protection and Rescue Plan envisage the evacuation of the population in case of disasters?</td>
<td>13 1</td>
</tr>
<tr>
<td>11.</td>
<td>At the level of your local self-government, are companies involved in the activities of preventive measures of emergencies?</td>
<td>14 /</td>
</tr>
<tr>
<td>12.</td>
<td>Do transport capacities at the level of local self-government ensure the relocation of public office holders to temporary places in case of disasters?</td>
<td>12 2</td>
</tr>
<tr>
<td>13.</td>
<td>Are the places of relocation of public office holders at the level of local self-government in case of disasters clearly defined?</td>
<td>12 2</td>
</tr>
</tbody>
</table>
The research established that in most of the analyzed local self-governments, the legal framework of emergencies is not harmonized with other institutional documents at the level of local self-government. Unsatisfactory results were also noted in terms of the existence of databases on emergencies and the damage caused by the emergencies, with more than half of the analyzed local governments finding the lack of an adequate database. A slightly weaker result was also recorded in terms of emergency management, with three local governments reporting a negative result. It is important to emphasize that a negative result was also noted in relation to civil protection. In this regard, most of the analyzed local governments found that civil protection at the local government level is not sufficiently developed to be able to act effectively in emergencies, and in most local governments there is no Civil Protection Unit Use Plan or clearly established system of command for such units.

4. CONCLUSION

Having in mind the results of the research, it can be concluded that the legal framework of emergencies in most of the analyzed local self-governments is not harmonized with other institutional documents at the level of local self-government. Therefore, in the coming period, local self-governments where this shortcoming has been noticed must make additional efforts in overcoming such a situation, primarily through the finalisation of systemic documents related to emergency management. Second, local self-governments need to form appropriate databases on emergencies and damage caused by emergencies. Third, problems were also detected with regard to emergency management, especially with regard to civil protection. It can be stated that civil protection in most of the analysed local governments is not at a satisfactory level, and in many local self-governments there is no plan for the use of civil protection units, nor is there a clearly established system of command of civil protection units. There are many reasons for that. They are not only organizational or financial in nature, but such a situation is often a consequence of insufficient engagement of responsible persons.

In the coming period, it is very necessary to educate civil protection units in all local self-governments where this has not been done, ie to fill the general purpose civil protection units and alert units with manpower, to allocate adequate budget funds at the local level, which would be intended for emergency prevention and elimination of consequences after natural disasters and other accidents. It is necessary to allocate significantly larger financial resources for protection and rescue, procurement of missing equipment and funds, as well as for training of members of civil protection and persons employed in local self-governments in civil protection and tasks determined by the protection and rescue plan. It is especially important to train and educate managers in local self-governments in the field of emergency management, including the training of civil protection commissioners, as well as members of municipal emergencies headquarters. At the level of local self-governments, it is necessary to prepare protection and rescue plans that will anticipate different types of crises, but also clearly define
the strategy and program for the development of local self-government units in the next ten years. Of course, this activity should be accompanied by appropriate financial support. Local self-governments must achieve a stronger organisational connection with higher levels of government, in order to overcome future crises more easily. It would be of great importance for local governments to study the experiences of other local governments throughout Europe and the world, in order to see good examples of response to emergency situations, which could be applied in the Republic of Serbia. It is necessary to create databases and networks of contacts and responsible persons in the Crisis Headquarters of all local governments, with the aim of coordinated action, information and communication, especially with the help of appropriate information portals. Finally, all local self-governments must make great efforts to educate the population and raise awareness about the effects of emergencies, as well as the importance of prevention.

ACKNOWLEDGEMENTS

The work was created as a result of project no. 142-451-2031/2201-01, titled Strengthening the Capacity of Local Self-Governments in Emergency Prevention, approved and funded by the Provincial Secretariat for Higher Education and Scientific Research activities of AP Vojvodina.

REFERENCES


EMERGENCY SITUATIONS CAUSED BY BIOTERRORIST ACTS AND LARGE PANDEMICS IN THE MIRROR OF THE COVID-19 PANDEMIC

Jovanka Tosic¹, Zorana Ivetic²

¹ University of Educons, Faculty of security studies, Vojvode Putnika 67, Sremska Kamenica, Republic of Serbia, tosicjovanka@gmail.com
² University of Educons, Faculty of security studies, Vojvode Putnika 67, Sremska Kamenica, Republic of Serbia, zoranaivetic@yahoo.com

Received: 14th July 2022
Accepted: 21st August 2022

Abstract: Emergency situations arise as a result of various events. The paper analyzes the relationship between bioterrorism and the pandemic of infectious diseases, with special emphasis on KOVID-19.

Infectious diseases are understood as one of the leading safety risks, due to the consequences they can cause. The most serious consequence of a bioterrorist attack is a globally distributed infectious disease that would cause massive human diseases and numerous disorders in the health, economic, cultural and every other segment of the functioning of society.

Research has shown that since the early stages of the KOVID-19 pandemic, there have been various theories about the origin of the virus. With the development of modern terrorism, the probability that a terrorist group will decide to use biological weapons is growing day by day. The inductive-deductive method was used in the paper, as well as the method of content analysis.

Key words: emergency situations, bioterrorism, pandemic, COVID-19

1. INTRODUCTION

Emergency situations represent a constant combination of different events and testing the ability of society and the state to successfully manage and provide assistance to the population in such a situation. It can be stated that emergencies have become more frequent in recent times, and are caused by various events, while their consequences for man, material goods and the environment are becoming more severe. It should be especially noted that different definitions of emergency situations are oriented to the sources of threats and the ways in which society operates.

Terrorist acts and threats have become everyday and a serious way of endangering the state, the individual and society. Advances in technological development indirectly affect the advancement of technology used by terrorist groups in their actions. The current threat of terrorism differs from that of the past in changing tactics, increasing activity, strengthening
destructiveness. There is more and more talk about the concepts of postmodern terrorism, which aims to draw attention to the use of weapons of mass destruction in terrorist attacks, including biological.

In the conditions of modern conflicts, biological warfare is also possible. Biological agents, intentionally or unintentionally used, are silent weapons, which are used to wage war without destruction, with pronounced side effects and severe consequences for the population. What is characteristic of this type of warfare is the fact that they harm not only man, but also his environment, flora and fauna. The abuse of science (genetic engineering, bio and nanotechnology) will make these threats even more intense. The basic premise of the paper is the current state of the pandemic that has occupied the world and caused the declaration of a global state of emergency. This declaration of a state of emergency as well as new perspectives on bioterrorism were the motives for drafting this paper.

2. EMERGENCY SITUATIONS

Frequent natural disasters in recent years, with the consequences they cause, significantly endanger the social community, human lives, material goods and the environment. The topicality of emergency situations induces the constant need of the social community to find an adequate response to the security threats. By declaring a state of emergency, the social community creates a specific legal framework that enables the engagement and use of all available resources of the society in protection and rescue (Krsljanić, Karović, 2015).

In 2018, the National Assembly of the Republic of Serbia passed the Law on Disaster Risk Reduction and Emergency Management. Earlier, this area was regulated by the Law on Emergency Situations, which was passed in 2009, with amendments from 2011 and 2012. Article 2, paragraph 7 of the Law on Risk and Disaster Reduction and Emergency Management defines the meaning of the term "emergency", which means a situation that arises from a declaration by the competent authority when risks and threats or consequences for the population, life environment and material and cultural goods of such scope and intensity that their occurrence or consequences cannot be prevented or eliminated by regular action of competent bodies and services, therefore for their mitigation and elimination it is necessary to use special measures, forces and means with intensified regime (Law on Disaster Risk Reduction and Emergency Management, Sl. RS Gazette, no. 87/2018.).

Emergencies are caused by a certain development scenario, the impact on humans and the environment, and the scale and effects of the phenomenon. Having in mind the above, emergency situations are most often classified according to the cause, speed of development and the extent of the effects of the emergency situation (Savić, Stanković, 2012). It should be especially noted that emergencies, caused by natural disasters or human activities, take many human lives every day and destroy and degrade the environment in various ways, causing great material damage and losses. Bioterrorist acts are one of the most dangerous causes of emergencies, where the consequences are not limited to one country, but also to the rest of the world.

3. BIOTERRORISM IN THE MODERN WORLD

The term bioterrorism implies the misuse of biological agents for terrorist purposes, for political, economic, religious, ideological reasons. In order to complete the conceptual definition of bioterrorism, we must not skip the concept of biocrime act, which means any possible abuse of biological agents, i.e. criminal acts of illegal production, theft, resale and use of biological agents from purely material motives (Ristanović, 2016).
Bioterrorism involves the use of biological agents (weapons) with the intention of causing death or serious infectious diseases in unprotected human populations, plants and animals, and in order to achieve certain political, religious, socio-economic or criminal goals. It includes: the use of biological agents (causes of vicious diseases) for terrorist purposes and as weapons of mass destruction of enemy armed forces and resistance forces in local and regional wars, then scientific research of biological weapons and misuse of scientific knowledge in the field of genetic engineering super germ-killer of innocent people, in the end it means all forms of (quasi) scientific experimentation with germs on animals and humans, because they have so far endangered humanity (eg experimentation with HIV and Ebola), as well as production and smuggling of biological weapons and illegal sale of special samples of dangerous strains of bacteria, viruses and their toxins, etc. (Jovic, Savic, 2004).

Considering bioterrorism as a modern security threat and the probability of the use of biological agents by a terrorist organization, it must be emphasized that the security and academic communities that deal with this phenomenon are divided. As according to Leitenberg Milton, who is the leader of those bioterrorism theorists who firmly believe that "the risk of the use of biological weapons by terrorists is systematically and intentionally exaggerated" (Leitenberg, 2006). Clark William goes a step further and argues that "it is almost inconceivable that even one terrorist organization we know is capable of developing biological weapons and deploying them in the United States" (Clark, 2008).

According to the author Cvetkovic, quoting Chris Hawley, Gregory Noll and Michael Hildebrand, there is a large selection of biological agents that can be used to carry out terrorist acts (Cvetkovic, 2013). He states that legitimate biomedical and biotechnological institutions use various microorganisms on a daily basis, which, even without special modifications, are very effective biological agents that can be used for terrorist purposes. Also, the prominent author states, quoting Bruce Alberts, that terrorist groups can come into possession of biological agents in different ways: by stealing from official institutions; buying on the black market; by obtaining from friendly governments and own production in equipped or improvised laboratories (Cvetkovic, 2013).

The use of biological weapons by terrorists is affected by its availability, primarily in clinical and microbiological laboratories, then in government institutions, certain schools and the like. In addition, biological weapons make attractive and simple and cheap production, covert and efficient use, specific action, causing mass disease, causing panic, problems, inability to fully control, dependence on various conditions, experts and lack of information (Cvetkovic, 2013).

It is unlikely that states are ready to use biological weapons, and if they do, they will use them more in war conflicts to control political crises.

4. PANDEMIC OF INFECTIOUS DISEASES AS A FORM OF BIOTERRORISM

In the changed global security structure of the modern world, infectious diseases are recognized as one of the leading security risks, precisely because of the dimensions of possible consequences they can cause, as evidenced by epidemics that changed human history in the past (plague, smallpox, Spanish flu) and its consequences. left behind by the Ebola or AIDS epidemic as an interplanetary plague of the new age. The misuse of microorganisms and their products for terrorist purposes - bioterrorism, today represents a great security risk and a real danger, especially due to the possibility of misuse of genetic engineering and biotechnology (Mudrinic, 2021).

Throughout history, pandemics of diseases such as cholera, plague and influenza have played a major role in shaping human civilizations. Although pandemics are usually characterized by
occurring in a short period of time, today several infectious diseases survive at high incidence rates, occur globally, and can be transmitted between people directly or indirectly (https://www.britannica.com/science/pandemic).

People realized early on that some diseases are transmitted by contact with sick people and animals or their secretions, which they used to deliberately cause disease and weaken the war potential of the enemy. That is why it can rightly be said that biological weapons represent a danger as old as human society and civilization as a whole (Ristanovic, 2016).

In the short and fortunately not so rich history of bioterrorism, we can say that the international community has experienced only a few verified bioterrorist attacks. In a study conducted by Seth Carus, who covered the period from 1900 to 1998 through a unique and comprehensive study, year and described 180 cases of targeted malicious use of biological agents by various non-state endangered entities. However, only five are qualified as a terrorist attack with successful realization and fulfilled goals. Referring to a study by the University of Maryland that dealt with the application of chemical, biological, radiological and nuclear (HBRN) agents in the activities of non-state actors in the period 1996-2016, year, Ackerman Gary and Michelle Jacome point out that in 4 years (2012–2016) there were only 11 incidents in which non-state actors prone to violence used biological agents. These are incidents of small scale and without significant consequences. The Japanese apocalyptic sect Aum Shinrikyo occupies the most important place in the history of bioterrorism. The sect became known to the general public after the sarin attack in the Tokyo subway in 1993. Aum was in the period 1990-1995. carried out several bioterrorist attacks on various targets in Tokyo, using botulinum and anthrax. However, due to technical shortcomings in the dissemination of agents and the use of the pathogenic anthrax strain, these attacks did not have the planned effects and went completely unnoticed by the security authorities (Kokoskov, Trbojevic, 2020).

Protection against biological weapons has little in common with protection against chemical and nuclear weapons due to the great differences between them, but some procedures and principles can be used for biological protection. Also, it can be said that a big problem is the answer to the question - is it a natural disease or bioterrorism. If it is suspected that it is bioterrorism, it is first necessary to conduct a field epidemiological investigation in order to collect all relevant data that will enable the suspicion to be confirmed or rejected. Also, it is necessary to determine as soon as possible the possible way and path that led to the disease, in order to take effective control measures (Cvetkovic, 2013).

5. COVID-19 PANDEMIC AS A FORM OF BIOTERRORISM

For the health systems of the state, it is completely irrelevant whether the pandemic disease arose as a natural process or as a consequence of the destructive one. Their task is to save the lives of sick people and prevent further spread of the infection. If the mass illness of people is viewed from the point of view of national security as a possible consequence of someone's actions, then it is also a topic for the security structures of the state, with bioterrorism emerging as a possible cause of such an event (Kokoskov, Trbojevic, 2020).

Probably, the most serious consequence of a bioterrorist attack is a pandemic, ie. globally distributed infectious disease that would cause massive human diseases and numerous disorders in health, economic, cultural and any other segment of the functioning of society. In that sense, the current pandemic KOVIDA-19 is a very convincing and well-argued example of the extent to which the global medical crisis is becoming a geopolitical, but also a security problem. Based on previous experiences in preventing the spread and eliminating the consequences of KOVIDA-19, we can say that most countries have shown insufficient
efficiency of national health systems in terms of shortage of doctors, specialist equipment and medicines, hospital facilities and others. (Kokoskov, Trbojevic, 2020).

At the end of 2019, a virus closely related to the SARS coronavirus appeared in Wuhan, China. The virus, later called severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), caused a disease known as KOVID-19, which was similar to SARS and was primarily characterized by fever and respiratory symptoms. The virus was also highly contagious, spreading across regions of China, the United States and Europe in early 2020, and was transmitted by travelers from the affected regions. In March 2020, the World Health Organization declared the epidemic a pandemic, and travel to, from, and within many countries was severely restricted in an effort to control its spread (https://www.britannica.com/science/coronavirus-virus-group).

The pandemic caused by the coronavirus in 2020 (KOVID-19) affected all segments of social life and the health, political, economic and cultural plan. At the time of writing, the total number of patients in the Republic of Serbia was 2,018,890, the total number of tested was 9,750,019, the total number of deaths was 16,091 and the mortality rate was 0.80%. Worldwide, 410,565,868 people became ill with the coronavirus and 5,810,880 people died (https://covid19.rs/).

The consequences of the pandemic have affected, in addition to the danger to human health, also limited or conditioned freedom of movement, reduced physical contacts, cancellation of travel and other plans. The consequences of the pandemic disease caused by the coronavirus are of unprecedented proportions. The spread of the virus takes lives and livelihoods. It will take the world a long time to overcome the consequences of the pandemic and return to the normal state it was before the pandemic.

From the early stages of the KOVID-19 pandemic, there have been theories about the origin of the virus. In March 2020, the US State Department called on the Chinese ambassador to protest the statements of a Chinese spokesman, who suggested that the virus was brought to Wuhan by the US military, allegedly as a biological weapon (https://www.reuters.com/article/us-health-coronavirus-china-diplomacidUSKBN2102XW). The US senator then suggested that the virus was the result of a failed Chinese biological weapons program (https://www.nytimes.com/2020/02/17/business/media/coronavirus-tom-cotton-china.html). Of course, the Chinese authorities have strongly denied such allegations. A kind of information war between the great powers on this issue is being waged to this day.

Given the different views on the origin of the Corona virus, unknowns and dilemmas in the scientific and professional public, the cause-and-effect relationship between the Corona virus and bioterrorism at this time, in the author's opinion, can neither be confirmed nor denied. What cannot be denied is that during the pandemic, the problem of crisis communication was noticed, which was expressed through many different, often diametrically opposed attitudes of different actors, which led to a number of harmful consequences during the fight against the pandemic.

6. CONCLUSION

Emergency situations, which are defined in the legal framework of the Republic of Serbia, cause various damages to the social community. The legal framework of emergency situations in the Republic of Serbia defines the key elements and competencies in such a situation. A state of emergency can be caused by various events. All this conditions that the society, ie the state, should be prepared to be able to react in such a situation and to be organized so that it can manage an emergency situation. This means that it is capable of enabling the protection and rescue of the population and material goods in such conditions.
It has been stated that bioterrorism has so far been perceived as unlikely, but potentially very harmful to the world. But with the development of modern terrorism, the likelihood that a terrorist group will decide to use biological weapons is growing day by day.

It has been determined that infectious diseases are perceived as one of the leading security risks, due to the consequences they can cause, which can be seen from the epidemics that have befallen humanity in the past.

It was pointed out that, as far as the use of the pandemic virus for bioterrorist purposes is concerned, in the short and fortunately not so rich history of bioterrorism, the security community has experienced only a few verified bioterrorist attacks.

It was pointed out that for the health systems of the state, it is completely irrelevant whether the pandemic disease arose as a natural process or as a consequence of a destructive act, their task is to save the lives of sick people and prevent further spread of the infection.

REFERENCES


Law on Disaster Risk Reduction and Emergency Management, Sl. RS Gazette, no. 87/2018.


https://covid19.rs/

https://www.britannica.com/science/coronavirus-virus-group
THE EFFECT OF BIOTERRORISM TO THE ENVIRONMENT

Zorana Ivetic¹, Jovanka Tosic²
¹ University of Educons, Faculty of security studies, Vojvode Putnika 67, Sremska Kamenica, Republic of Serbia, zoranaivetic@yahoo.com
² University of Educons, Faculty of security studies, Vojvode Putnika 67, Sremska Kamenica, Republic of Serbia, tosicjovanka@gmail.com

Received: 20th July 2022
Accepted: 15th August 2022

Abstract: The situation in which the world found itself at the beginning of 2020 is one of the examples of how infectious diseases can become a global problem. An even bigger problem arises in recognizing the ways and causes of occurrence. Timely recognition of the disease is one of the most effective ways for the adequate response of health institutions. If the mass illness of people is viewed from the point of view of health security, it is irrelevant how the disease originated, but from the point of view of state security, it is very important to reveal the history of the infection, with special emphasis on the possibility of bioterrorist action. The use of biological agents is classified as a bioterrorist attack, as well as the use of chemical, radiological and nuclear weapons. Biological agents are most often used, because they are cheaper than radiological and nuclear weapons. There is a real danger of bioterrorist attacks in the 21st century, and the question is no longer whether a bioterrorist attack will occur, but when biological agents will be attacked by terrorist groups.

Key words: security, bioterrorism, environment, biological agents, contamination

1. INTRODUCTION

The modern world has brought with it progress in armaments, and thus the number of possibilities and opportunities for the choice of weapons, which can be used by terrorist organizations to achieve their goals, has increased. Terrorist organizations make enormous efforts aimed at increasing the consequences of attacks and do not hesitate to use all available scientific discoveries for their purpose.

Bioterrorism is one of the more brutal forms of terrorism, as well as a form of political violence. It is an unpredictable, increasingly likely and highly damaging event that has a huge impact on the environment. Contamination of the environment can be done through a different spectrum of negative phenomena and agents. The most dangerous contamination of the environment certainly comes from the use of weapons of mass destruction. Knowing the basic characteristics of weapons of mass destruction is an essential element for undertaking adequate environmental protection measures. In a large number of cases, timely response is difficult, and sometimes even impossible, due to the characteristics of the biological, chemical and
radiological weapons themselves. Rapid identification of agents is one of the biggest problems, because they are agents that cannot be detected by the senses.

The problem of pollution and destruction of the environment is increasingly given importance, because it goes beyond the borders of one country and becomes a global problem. Any negative impact on the environment leaves an indelible mark. The damage caused by a bioterrorist attack can sometimes never be compensated. Extinction of plant and animal species, pollution of water, air and soil directly affect human life and health.

The work covers the entire concept and characteristics of bioterrorism, forms of manifestation and methods of action, as well as protection against the action of biological agents, environmental contamination, radioactivity, chemical weapons and biological agents.

2. THE TERM AND CHARACTERISTICS OF BIOTERRORISM

Terrorism is defined as a method of deliberate and systematic use of violence with the aim of instilling fear in people and representatives of the government, all in order to achieve personal, political and other ideological goals. (Mijalkovic, 2018) Terrorist organizations have at their disposal weapons that can be classified into four categories: conventional weapons and explosives, nuclear and radioactive weapons, chemical weapons and biological weapons. (Heyer, 2001)

The term bioterrorism can be defined as the deliberate use of biological agents (viruses, bacteria, fungi or toxins of living organisms), which lead to the death or illness of people, animals or plants, for the sake of the manifestation of ideological discontent directed towards a certain government or population, which is done through attacks on civilians and resources. Bioterrorism means: the use of biological agents that cause diseases, the use of weapons of mass destruction, scientific research into biological weapons and the misuse of scientific knowledge in the field of genetic engineering, with the aim of producing germs that kill innocent people, the production and smuggling of biological weapons and the illegal sale of dangerous strains. (Talijan, 2016) Like classical terrorism, bioterrorism is characterized by a politically motivated target and a large number of innocent victims. With the help of bioterrorism, various goals can be achieved: psychological pressure, mass death, endangering the environment, the death of animal and plant life, as well as enormous economic damage.

Bioterrorism can be seen as one of the more brutal forms of terrorism, as well as a form of political violence that has been resorted to throughout history. In the modern world, the use of biological weapons is considered an inappropriate means of warfare, but terrorists have become aware that by using deadly viruses and other forms of biological weapons, they can threaten national and international security in the most effective way. (Cvetkovic, Popovic, 2011)

Bioterrorism theorist Jeffery Simon points to a number of reasons that could motivate terrorists to use biological weapons, namely: the need for new and more aggressive forms of action, while causing mass casualties, the influence of state entities on overcoming obstacles in the development and application of biological weapons, as well as the availability of information, knowledge and people. (Jeffrey, 1989) The use of biological weapons favors terrorist organizations, due to the easy discovery of biological agents in laboratories, a short incubation period, strong virulence and contagiousness, and as a result, mass illness and death, which leads to the creation of panic and fear. Biological agents work even in small doses and require smaller amounts of money, and have a specific effect on humans, plants and animals. Today, the production of biological weapons is even simpler than before, the necessary knowledge is more accessible, as is the equipment. It is very difficult to detect a bioterrorist attack in a timely
and efficient manner, which leads to difficulties in establishing adequate measures to neutralize the attack and adequate and quick treatment of the sick. (Cvetkovic, Popovic, 2011)

2.1. Forms of manifestation and methods of action of bioterrorism

The use of biological agents for bioterrorist purposes differs from the use of other instruments of warfare because it consists predominantly of living organisms. A bioterrorist attack manifests itself in the form of disease. Depending on which biological agent is used, it differs: bacterial, viral, fungal and rickettsia diseases of humans, animals and plants. (Stojanovic, Ristanovic, 2010)

Bioterrorists have a wide range of options available to them when it comes to their operations. The characteristics of biological agents, which are reflected in the absence of odor, taste and color, provide many avenues for easy expansion of the agent. Biological agents can spread through contaminated food, water, infected contacts and objects, infected substances and insects, through an aerosol cloud containing infected particles, infected shipments and in many other ways. (Ristanovic, 2016) The most common way of infection is through the air, i.e., aerosols, using aerial spray, explosive bombs and rockets with infectious materials. (Ristanovic, 2016) Aerosols have several characteristics that favor bioterrorists, namely: length of functionality, which increases the chance for a larger area where the infection will spread; by inhaling contaminated air, the agent remains in the lungs deeper and longer, and the result of the disease is greater, when the agent is deposited in the lungs. (Ristanovic, 2016) The problem with this type of infection is the impossibility of controlling the area that will be infected, because wind, rain, temperature and other climatic factors affect the speed and surface of the contamination.

2.2. Protection against the action of biological agents

Biological defense against the action of biological agents includes methods, plans and procedures that establish and implement defense measures against attacks by biological weapons. (Ristanovic, 2016) One of the problems when it comes to protection against the action of biological agents is that a large number of biological agents are found in nature, so it is very difficult to distinguish in a timely manner in which situations the infection was intentionally spread, and when it occurred naturally via. For this reason, there is a need for constant epidemiological surveillance of infectious diseases, regular monitoring of seasonal diseases and unusual manifestations of known diseases, monitoring of morbidity and mortality of animals and other phenomena that may possibly be an indication of unnatural changes. The occurrence of a bioterrorist attack can be indicated by a sudden and unexpected occurrence of illness and death, simultaneous infection with two or more pathogens, as well as when a disease appears in a geographical area for which it is not characteristic (for example, the appearance of tropical diseases in Europe). When a bioterrorist attack is suspected, it is necessary to conduct a field epidemiological investigation in order to gather all the data that will confirm or refute the suspicion of a bioterrorist attack. The detection of biological agents can be done through samples of water, air, food, through blood, urine, stool, from samples of various tissues and organs of people, animals and plants. (Ristanovic, 2016) If it is determined that it is a bioterrorist attack, it is necessary to implement biological decontamination measures. It is necessary to coordinate and synchronize the police services, as well as the controlled and efficient activity of all other services, which are involved in emergency situations, such as firefighters, emergency medical assistance, civil organizations and others. Effective protection also requires the cooperation of states. This is very important in all forms of terrorist activity, including in the case of a bioterrorist attack.
3. ENVIRONMENTAL CONTAMINATION

The term environment means all natural and work-created values. (Djordjevic, 2014) Environmental contamination is a consequence of the action of a different spectrum of negative phenomena and agents. In recent years, the problem of environmental pollution has been increasingly given importance, because this problem goes beyond the borders of one country and becomes a global problem. There are no boundaries in the environment and consequently, the contamination of one element of the environment has the potential to affect a large part of the planet. The most dangerous environmental contamination comes from the use of weapons of mass destruction (radiological, chemical and biological weapons).

3.1. Radioactivity

A radiological weapon is a weapon that distributes radioactive materials through an uncontrolled fission reaction. The effect of radiological weapons is delayed. Radioactivity can be defined as the energy that is released from radioactive materials during a nuclear reaction, and consists of unstable and radioactive atoms that emit radiation in the process of decay, that is, splitting. (Cvetkovic, Popovic, 2011) Artificial sources of radiation come from atomic weapons, ammunition with depleted uranium, radioactive waste disposal, etc. Radiation to the human body causes damage to individual cells. The same radiation does not cause the same effect on all cells, but it depends on the types of cells and their sensitivity. The largest number of diseases caused by radiation originates from tissues that divide rapidly, so the consequences of damage to the bone marrow, gastrointestinal tract and damage to the central nervous system can be observed first. Harmful consequences manifest themselves in different time intervals, and they leave a mark both on the person they affect and on the offspring.

The likelihood of misuse of radiological weapons has increased in recent years. In support of this, data show that criminal activities related to theft and smuggling of radioactive material are on the rise. An attack with radiological weapons is more attractive to terrorist groups than an attack with nuclear weapons. The reason for this is that radiological weapons are not as demanding as nuclear ones, and they cause a reaction. A bioterrorist attack can be carried out using a dirty bomb. A dirty bomb is a low-power explosive device that disperses radioactive material into the environment by means of an uncontrolled fission reaction using a classic explosive. (Cvetkovic, Popovic, 2011) At the moment when detonation occurs, radioactive material spreads into the environment. The effect of a dirty bomb is determined by the intensity of the initial impact caused by the explosion, the action of ionizing radiation and contamination. Urban places with a high population density are especially suitable, because panic is caused among the population. An attack with this weapon can be carried out almost unnoticed, for example by leaving a small suitcase at a train station, where there is a lot of traffic.

Radioactive materials that can be used for production are relatively available, such as cesium nucleotides, depleted uranium, radioisotopes of iodine, americium, cobalt, radium and others. Cesium is stored in the body of humans and animals, mostly in muscle tissue. Depleted uranium means uranium with a content of the isotope 235-U below 0.7% (most often the content is around 0.2%) and isotope 237-U in the amount of 99%. (Bakrac, Klem, Milanovic, 2018) It is a toxic, by-product of the uranium enrichment process and is a very dangerous radioactive waste. The entire living world is destroyed at the sites of the explosion of depleted uranium missiles. When this weapon is used at the moment of pollination of plants, spawning of fish and mating of terrestrial animals, it disrupts the population structure of species and leaves permanent consequences for the number of species, and also creates gene mutations.
The main threats of the use of radiological weapons are economic, social and psychological in nature. When radioactive material is dispersed, it causes great economic consequences, because the decontamination process is very expensive. The contaminated area must be closed, the population evacuated, and thus the normal functioning of people's lives is disrupted. In addition to these consequences, a mark is left on the environment, the functioning of the plant and animal life is disrupted.

3.2. Chemical weapons

harm in some other way. Chemical weapons act through chemical reactions and leave effects on objects, and survivors usually have permanent health effects. (Indjic, Terzic, Andric, 2019)

Characteristic features that favor terrorist organizations are: high toxicity, different effects on organs, hidden initial effect, impossibility of perception by the senses, weak possibility of detection and quick identification. The impossibility of quick identification of the agent means that its recognition is based on the symptoms it cause (Gary, Jeremy, 1999).

Chemical means can be used for terrorist purposes, by chemically contaminating a certain space, water, air and food. Chemical contamination means the presence of chemical agents in dangerous concentrations in the form of droplets, vapors, fumes or gases. (Rutic, 2016) Chemical weapons are considered a silent and invisible killer, because the absence of smell, color and any other properties that would allow the abuse of chemical weapons to be noticed in time, can lead to major consequences for the environment. There is almost no safe protection. Toxic chemical agents are able to disturb, incapacitate or kill the population, animal and plant life, contaminate the soil and everything found in the area affected by the agents. They can cover an area of several tens to several hundreds of hectares, and carried by air currents, they can spread over several square kilometers (Gacinovic, 2012).

3.3. Biological agents

Biological weapons are not a characteristic of the 20th and 21st centuries, but their use has roots in the distant past. As proof of this claim, an example from the 4th century BC can be cited, when the Scythians used arrows unmelted with the blood of those suffering and dying from infectious diseases, in order to achieve victory in the fight against their enemies. (Ristanovic, 2016) The 2001 anthrax letter attack is one of the more famous bioterrorist attacks in recent history. Namely, at that time, 5 letters with high purity anthrax spores were sent through the postal system of the United States of America. The consequences of this attack are reflected in the death of five people, 22 infected persons and over 30,000 citizens who were exposed to risk and were treated preventively. The material costs of decontamination are measured in billions of dollars (Kokoskov, Trbojevic, 2020).

Biological weapons are one type of weapon of mass destruction. For the first time, the concepts of biological weapons and biological warfare officially appear after the Second World War, after the session of the General Assembly of the United Nations (Cvetkovic, Popovic, 2011). Biological agents, according to the definition of the Resolution of the General Assembly of the United Nations: "are living organisms that are used in war to cause infection or death of people, animals and plants, either due to their nature or the infectious substances they release, and whose actions in the attacked organism are based on the process of reproduction." (Resolution 2603 (XXIV), 1969) According to the Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological and Toxic Weapons and on the Obligation to Destroy Them, biological weapons are understood as microbiological or other biological agents or toxins, regardless of their origin or method of production, which by type and quantity are not intended for use for prophylactic, protective, or other peaceful purposes and weapons, or equipment intended for the use of such agents or toxins for hostile purposes.
or in armed conflict. This Convention on the international level legally regulates the prohibition of storage and development of biological materials, and it was supplemented by the Geneva Protocol, which obliges the signatory states to provide the United Nations with all data on research, findings and the existence of biological weapons (Raicevic, 2010).

Understanding the process of transforming biological agents into biological weapons is essential to understanding bioterrorism. Milton Leitenberg (Milton Leitenberg) talks about the essential prerequisites, which must be met, in order to produce biological weapons, namely: possession of a suitable strain of pathogenic microorganism, expert knowledge, skills in handling microorganisms in their processing, cultivation, storage and effective dispersion. (Leitenberg, 2005) William Clark states that it is necessary to have material means, professional people, but also people who are ready to carry out a bioterrorist attack (Clark, 2008). A special convenience for the use of biological agents is the fact that the production is not very expensive and that no special sophisticated equipment is required. Certain biological agents can be transported over long distances without any problems under favorable climatic conditions. The risk of using biological agents for terrorist purposes has increased, and the reason for this is a large number of new institutional and non-institutional laboratories whose work does not have total insight, simplicity in production, and wide availability of important information. The effect of a bioterrorist attack depends on the organization, size and financial capabilities of the terrorist organization.

One of the more famous attacks with biological weapons took place on March 20, 1995 in Tokyo. Five members of the Aum Shinrikyo sect dispersed the poisonous sarin gas in the Tokyo subway. The consequences of this attack were the death of 12 people, over 1,000 people were injured, 17 of whom were life-threatening. This sect also tried to use other biological agents, such as anthrax.

4. CONCLUSION

Under the influence of the development of humanity, terrorism is also developing, which represents an increasing problem of modern society. Classic forms of terrorism have largely been replaced by modern forms that use new scientific knowledge and achievements. The use of weapons of mass destruction is becoming more and more realistic. Unfortunately, it is very difficult to identify and react in a timely manner due to the very nature of biological, chemical and radiological weapons.

The goal of a bioterrorist attack is endangering a large number of innocent victims, psychological pressure, mass death, endangering the environment, the death of animal and plant life, as well as enormous economic damage. Permanent consequences on the environment can be seen in the extinction of certain plant and animal species, various mutations that manifest themselves in the form of degenerative diseases.

A bioterrorist attack requires the coordination and synchronization of police services, but also the controlled and efficient activity of all other services, such as firefighters, emergency medical services, civil organizations and others. Effective protection also requires the cooperation of states in order to suppress the effects of an attack, because the misuse of biological, chemical or radiological agents leaves a mark on the environment that goes beyond the borders of a single state.
REFERENCES


SECURITY ASPECTS OF FLAWED SETTLEMENTS OF THE ROMA POPULATION IN THE AREA OF THE AUTONOMOUS PROVINCE OF VOJVODINA

Jelena Jovanovic

1 University of Educons, Faculty of Business Economy, Vojvode Putnika 67, Sremska Kamenica, Republic of Serbia, jelena_jovanovich@yahoo.com

Received: 19th July 2022
Accepted: 9th August 2022

Professional paper

Abstract: The Roma community, a multiple vulnerable and stigmatized community in Serbia, as well as in the member states of the European Union and globally, is rarely the focus of research on their relationship to their security. The attitudes of the majority population, which often recognizes the Roma community as potential perpetrators of criminal acts and other forms of misdemeanour rules and norms, whether they are legal or social, are more visible to the general public.

The question is whether it is possible to change the inherited attitudes that Roma are "born thieves, lazy, neglected, prone to crime and other illegal activities"? Can the repulsion towards the Roma community be changed in the spirit of tolerance, understanding and acceptance of centuries-old diversity?

The paper aims to indicate the living conditions of the Roma community in the settlements in Vojvodina, their demographic structure and characteristics, layout and properties, environmental conditions in those settlements, security aspects of illegal settlements and proposed measures for improvement of living conditions.

Key words: Roma, discrimination, marginalization, informal settlements, environment

1. INTRODUCTION

The Roma community in Serbia, the member countries of the European Union and the whole world is marginalized and placed in an unequal position with the rest of the population. On its way to European integration, Serbia made all-out efforts by adopting the National Strategy on Roma Inclusion from 2016 to 2025. Thus, Serbia took the first steps in project implementation aiming to improve the quality of life in many areas. The most important ones are education, health, demystifying stereotypes and prejudices, creating a safe environment and building settlements that meet all housing quality standards under domestic and European legislation.

The situation in the Roma communities in Vojvodina until some time ago was reduced to workshops on discrimination or education programs implemented by various non-governmental organizations. By adopting a new strategy for the period from 2016 to 2025, at the Session of the Government of the Republic of Serbia on January 27, 2022., the main goal was defined as a priority "improving the quality of life of members of the Roma national
minority in Serbia, while respecting human and minority rights, eliminating discrimination and any form of racism, as well as achieving greater social inclusion in all segments of society”. Furthermore, the EU adopted the Strategic Framework for Roma Equality, their inclusion and participation in social life for the period up to 2030. The Sustainable Development Goals of the 2030 Agenda are expected to mobilize all resources to eradicate poverty, implement a strategy to fight inequality and find an answer to issues related to climate change.

The Sustainable Development Goals address many societal needs, including food, health, education, equality, clean water and sanitation, availability of renewable energy sources, decent work and economic growth, and sustainable cities and communities.

2. ROMA POPULATION IN VOJVODINA

Roma, as a minority people living in the Republic of Serbia, encounter a series of obstacles and problems crucial for the analysis of the quality of life of Serbian citizens in their daily life: from discrimination, threats to human rights related to employment and the educational process; through the impossibility of adequate accommodation and solving the housing issue.

On the other hand, for the first time, after a long series of years of neglecting the needs of the Roma community, important steps were taken on the way to solving the problem by adopting strategies that offer solutions with clearly defined deadlines and subjects responsible for implementing the planned projects. International organizations are also involved in their implementation through non-governmental organizations, and official institutions. The support they provide has several aspects of expression: advisory, financial and legal assistance.

2.1. Settlement of Roma in Vojvodina

The Roma belonged to India until the end of the 12th century, and after the exodus and wandering that lasted for centuries, the Roma settled in Serbia during the reign of Emperor Dusan in the 16th century (1308-1355). At that time, Roma lived in almost all parts of Serbia.

The history of Roma settlement in Vojvodina is linked to the group of Roma, the so-called Vlach Gypsies, who originate from the territory of today's Romania. They began to permanently settle the area of Vojvodina during the 40s of the 19th century (1825), and the story they passed on relates to the arrival of horse hounds to pull Danube boats. In 1890, they formed a larger and ethnically compact settlement on the outskirts of south-eastern Apatin.

They were engaged in various jobs: making baskets from willow wicker, and music (following their natural talents). Numerous musicians of "Gypsy origin" so-called "Gypsy gangs" have become an indispensable source of interest in rural and urban settlements in taverns and chards. They also performed at festivals and other events. One of the jobs they traditionally engaged in was the so-called "dzambas", who resold horses and plastering, i.e. repairing the walls of residential buildings with wheat mud. Although an unskilled workforce that performed simple tasks, it is still a famous brick made by the Roma, and the "pepper" tile is still often used in Roma settlements. Also, the Roma of that time were engaged in buying and selling goose feathers, while the women of the Roma population begged in wealthier houses (collecting food) or did fortune-telling (so-called divination, looking at the palm or cards, and similar).

The famous romologist Heinrich von Vlislocki (Djuric, 2010) studied the Roma who lived in Backi Breg, Bezdan, Kula, Backi Monostor and Prigrevica. He published research related to the way of life, customs, beliefs, traditions, music and jobs, as a contribution to the Palas lexicon, the best and most unsurpassed lexicographic work in Hungary.
Table 1: The number and share of Roma in the total population of Serbia and AP Vojvodina from 1948 to 2011 (Source: Census data of the Republic Institute of Statistics, 2014.)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Serbia</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>6,527,966</td>
<td>6,979,154</td>
<td>7,642,227</td>
<td>8,446,591</td>
<td>9,313,676</td>
<td>9,778,991</td>
<td>7,498,001</td>
<td>7,186,862</td>
</tr>
<tr>
<td>Roma</td>
<td>52,181</td>
<td>58,800</td>
<td>9,826</td>
<td>49,894</td>
<td>110,959</td>
<td>140,237</td>
<td>108,193</td>
<td>147,604</td>
</tr>
<tr>
<td>%</td>
<td>0.8</td>
<td>0.8</td>
<td>0.1</td>
<td>0.7</td>
<td>1.2</td>
<td>1.4</td>
<td>1.4</td>
<td>2.05</td>
</tr>
<tr>
<td><strong>Vojvodina</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1,663,212</td>
<td>1,712,619</td>
<td>1,854,965</td>
<td>1,952,533</td>
<td>2,034,772</td>
<td>2,013,889</td>
<td>2,031,992</td>
<td>1,931,809</td>
</tr>
<tr>
<td>Roma</td>
<td>7,585</td>
<td>11,525</td>
<td>3,312</td>
<td>7,760</td>
<td>19,693</td>
<td>24,356</td>
<td>29,057</td>
<td>42,391</td>
</tr>
<tr>
<td>%</td>
<td>0.5</td>
<td>0.7</td>
<td>0.2</td>
<td>0.4</td>
<td>1.0</td>
<td>1.2</td>
<td>1.43</td>
<td>2.19</td>
</tr>
</tbody>
</table>

According to the population census from 2002, shown in Table 1, a total of 29,057 persons in AP Vojvodina declared themselves as members of the Roma national community, which is 1.43% of the total population, while according to the population census from 2011, that number was significantly increased - a total of 42,391 persons declared themselves as members of the Roma national community, which makes up 2.19% of the total population of AP Vojvodina.

After the last population census from 2011 (Table 1), it is observed that the number of Roma in Vojvodina increased with deviations in 1961, when the number of Roma drastically decreased, which can be attributed to migration movements during that period (going to work abroad).

This trend was also present in Serbia, not only in Vojvodina. From 1981 until 2011, the number of Roma in Vojvodina increased in percentage and number.

Table 2 shows the number of members of the Roma national community and the percentage of the total population in the municipalities of AP Vojvodina according to the 2002 and 2011 census. Based on these data, the largest number of Roma in 2011 lived in the municipalities of Alibunar, Backa Palanka, Beocin, Vrsac, Zabalj, Zitiste, Zrenjanin, Kikinda, Kovic, Nova Crnja, Novi Becej, Odzaci, Pancevo, Pecinci, Ruma, Sombor, Sremska Mitrovica, Stara Pazova and Subotica. Table 2 shows that members of the Roma national community are present in all municipalities, i.e. cities, in greater or lesser numbers. The smallest number of Roma lives in Sremski Karlovci (14, i.e. 0.16% of the total population). They are most numerous in Novi Sad (3,576) and Subotica (2,959), and in the total population, they are most present in the municipalities of Nova Crnja (9.89%), Beocin (9.04%) and Novi Knezevac (8.19%). According to the 2011 census, the number of Roma has significantly increased compared to the previous census in every city, i.e. municipality of AP Vojvodina, and in some, it has even doubled (Bac, Becej, Vrbas, Irig, Mali Idjos, Novi Sad, Sombor, Sremska Mitrovica, Subotica, Temerin, Sid).
Table 2: The number of members of the Roma national community and the percentage of the total population in the municipalities of AP Vojvodina according to the 2002 and 2011 census (Source: Census data of the Republic Institute of Statistics, 2014.)

<table>
<thead>
<tr>
<th>No</th>
<th>Municipality</th>
<th>2002 No of Roma</th>
<th>%</th>
<th>2002 No of Roma</th>
<th>%</th>
<th>2011 No of Roma</th>
<th>%</th>
<th>2011 No of Roma</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ada</td>
<td>277</td>
<td>1.46</td>
<td>323</td>
<td>1.90</td>
<td>869</td>
<td>6.84</td>
<td>1016</td>
<td>9.89</td>
</tr>
<tr>
<td>2</td>
<td>Aličin</td>
<td>657</td>
<td>2.86</td>
<td>833</td>
<td>4.13</td>
<td>868</td>
<td>3.22</td>
<td>1295</td>
<td>5.45</td>
</tr>
<tr>
<td>3</td>
<td>Apatin</td>
<td>524</td>
<td>1.60</td>
<td>654</td>
<td>2.26</td>
<td>655</td>
<td>5.05</td>
<td>923</td>
<td>8.19</td>
</tr>
<tr>
<td>4</td>
<td>Bač</td>
<td>318</td>
<td>1.95</td>
<td>764</td>
<td>5.30</td>
<td>1740</td>
<td>0.58</td>
<td>3576</td>
<td>1.05</td>
</tr>
<tr>
<td>5</td>
<td>Bačka Palanka</td>
<td>841</td>
<td>1.38</td>
<td>1064</td>
<td>1.92</td>
<td>187</td>
<td>1.70</td>
<td>312</td>
<td>2.99</td>
</tr>
<tr>
<td>6</td>
<td>Bačka Topola</td>
<td>88</td>
<td>0.23</td>
<td>100</td>
<td>0.30</td>
<td>839</td>
<td>2.36</td>
<td>1035</td>
<td>3.43</td>
</tr>
<tr>
<td>7</td>
<td>Bački Petrovac</td>
<td>85</td>
<td>0.58</td>
<td>108</td>
<td>0.80</td>
<td>1392</td>
<td>1.09</td>
<td>2118</td>
<td>1.72</td>
</tr>
<tr>
<td>8</td>
<td>Bela Crkva</td>
<td>619</td>
<td>3.04</td>
<td>791</td>
<td>4.55</td>
<td>699</td>
<td>3.25</td>
<td>1008</td>
<td>5.11</td>
</tr>
<tr>
<td>9</td>
<td>Beočin</td>
<td>1048</td>
<td>6.51</td>
<td>1422</td>
<td>9.04</td>
<td>269</td>
<td>2.01</td>
<td>281</td>
<td>2.48</td>
</tr>
<tr>
<td>10</td>
<td>Bečeje</td>
<td>479</td>
<td>1.17</td>
<td>842</td>
<td>2.25</td>
<td>757</td>
<td>1.26</td>
<td>1297</td>
<td>2.39</td>
</tr>
<tr>
<td>11</td>
<td>Vrbas</td>
<td>136</td>
<td>0.30</td>
<td>355</td>
<td>0.84</td>
<td>581</td>
<td>2.27</td>
<td>595</td>
<td>2.55</td>
</tr>
<tr>
<td>12</td>
<td>Vrlog</td>
<td>1186</td>
<td>2.18</td>
<td>1368</td>
<td>2.63</td>
<td>609</td>
<td>3.72</td>
<td>714</td>
<td>3.58</td>
</tr>
<tr>
<td>13</td>
<td>Zabalo</td>
<td>768</td>
<td>2.79</td>
<td>1031</td>
<td>3.95</td>
<td>415</td>
<td>0.43</td>
<td>1015</td>
<td>1.18</td>
</tr>
<tr>
<td>14</td>
<td>Zitište</td>
<td>765</td>
<td>3.75</td>
<td>832</td>
<td>4.94</td>
<td>361</td>
<td>2.02</td>
<td>629</td>
<td>3.85</td>
</tr>
<tr>
<td>15</td>
<td>Zrenjanin</td>
<td>2471</td>
<td>1.87</td>
<td>3410</td>
<td>2.76</td>
<td>564</td>
<td>0.66</td>
<td>1194</td>
<td>1.49</td>
</tr>
<tr>
<td>16</td>
<td>Indija</td>
<td>263</td>
<td>0.56</td>
<td>426</td>
<td>0.90</td>
<td>10</td>
<td>0.11</td>
<td>14</td>
<td>0.16</td>
</tr>
<tr>
<td>17</td>
<td>Irig</td>
<td>58</td>
<td>0.47</td>
<td>166</td>
<td>1.53</td>
<td>1085</td>
<td>1.61</td>
<td>1193</td>
<td>1.81</td>
</tr>
<tr>
<td>18</td>
<td>Kanjiša</td>
<td>530</td>
<td>1.93</td>
<td>596</td>
<td>2.35</td>
<td>1454</td>
<td>0.98</td>
<td>2959</td>
<td>2.09</td>
</tr>
<tr>
<td>19</td>
<td>Kikinda</td>
<td>1554</td>
<td>2.33</td>
<td>1981</td>
<td>3.33</td>
<td>38</td>
<td>0.13</td>
<td>83</td>
<td>0.39</td>
</tr>
<tr>
<td>20</td>
<td>Kovačica</td>
<td>815</td>
<td>2.92</td>
<td>806</td>
<td>3.19</td>
<td>229</td>
<td>1.34</td>
<td>264</td>
<td>1.68</td>
</tr>
<tr>
<td>21</td>
<td>Kovin</td>
<td>1143</td>
<td>3.11</td>
<td>1516</td>
<td>4.50</td>
<td>337</td>
<td>2.44</td>
<td>351</td>
<td>3.08</td>
</tr>
<tr>
<td>22</td>
<td>Kula</td>
<td>163</td>
<td>0.34</td>
<td>314</td>
<td>0.73</td>
<td>93</td>
<td>0.24</td>
<td>204</td>
<td>0.60</td>
</tr>
</tbody>
</table>

2.2. Demographic structure of the Roma population in the Autonomous Province of Vojvodina

When it comes to the demographic and social characteristics of the Roma community based on the number and share in the total population of members of the Roma national community in Serbia, the Roma “represent a relevant community, and their social, economic and cultural position has an impact on the demographic characteristics and their position in society”. The data speak of different numbers of Roma from census to census that cannot be explained by demographic data (Raduski: 2009, Popovic, Stankovic, 2013).
"It is stated in the demographic literature that the frequent change of nationality is the result of a more or less pronounced process of assimilation or "ethnic mimicry" of the Roma due to the ever-present hidden or open discrimination, which is why, during the census, they are most often declared as members of the majority nationality in the area where they live, or cross into some other national body, thus losing or concealing their ethnic identity. That is why the statistical records on Roma are incomplete and unreliable i.e. their number is significantly higher than the official population censuses show" (Raduski, 2009).

"Research shows that most Roma who are educated and who have left the typical Roma environment and who have integrated into the wider social community hide their ethnic origin" (Mitrović, 1996).

Non-governmental organizations and the state assume that the number of Roma in Serbia is at least twice as large as that shown in official statistical documents. Estimates of the number of Roma differ significantly from official data. The estimate that is considered the most adequate is the estimate that about 450,000 Roma live in Serbia, and this number is also used in official documents” (Popovic, Stankovic: 2013). From the 1970s to the present, census data show a constant increase in the number of members of the Roma national community and their share in the total population in Serbia (Raduski: 2009) and a particularly large increase in the number of Roma in Vojvodina in the last population census compared to the previous census.

2.3. Characteristics of the Roma population in the autonomous province of Vojvodina

Roma generally adapt to a different culture, confession and acceptance of the language of the environment in which they live. The mother tongue is one of the most recognizable signs of national identity that can be used to research the composition of the population. Among the members of the Roma national community in Serbia, nationality generally does not coincide with the mother tongue since there is a smaller number of those who speak the Roma language than the total number of Roma shown in the 2002 census (Jovanovic, 2014).

When it comes to the religion of the Roma national community, it is related to numerous factors, one of which is the religion of the majority nation in the environment where the Roma live. Data from 2002 show that almost all religions are represented among Roma: most of them belong to the Orthodox faith (54.4%), followed by Islam 16.7%, Protestants 3.1%, and 2.7% are members of the Roma national communities of the Catholic faith. There are 13% of those who did not declare themselves, and approximately 9% belong to the "unknown" category, while those who declared themselves atheists are very few (0.2%; Raduski: 2009).

The Roma are the youngest ethnic community in Serbia, which results in a high birth rate. The largest number of Roma women give birth before the age of twenty, while in a lesser number of cases, they give birth after the age of twenty-five. According to the 2011 census, there are substantial differences in birth and mortality rates, where the birth rate among Roma is increasing both in Serbia and in Europe, while on the other hand, data from the 2002 census show that the birth rate among Roma is two times higher than the birth rate of Serbs, while mortality is at the same time twice as low (Raduski: 2009). The probable reason for this is the age limit of the Roma population. The explanation why Roma women give birth to more children comes from the fact that they live in ghettoized settlements, respect culture and tradition, have a low level of education and social status.

The educational and working structure of the Roma is primarily influenced by socio-economic relations, the educational system and work status, which are also related to the age and gender of the Roma.
3. FLAWED SETTLEMENTS IN THE AUTONOMOUS PROVINCE OF VOJVODINA

The Republic of Serbia recognizes the problem of Roma housing and legally foresees solving their housing issue. On the other hand, the existing social housing system still does not have a solution for housing Roma living in informal settlements in Serbia, and a substantial number of Roma still live in inhumane conditions.

3.1. Distribution of non-conditional settlements on the territory of the Autonomous Province of Vojvodina

On the territory of AP Vojvodina, there are numerous non-conditional Roma settlements, and the necessity of working to solve the problem is in line with the generally known data that a large number of Roma, regardless of their place of residence (town/village), live in underprivileged housing conditions. More precisely, the settlements where they live primarily do not have a regulated legal status (without the necessary documentation, illegally built buildings, lack of documentation on the land and buildings ownership). Most settlements do not have the needed infrastructure solutions (water, sewerage, electricity). A small number of residential units have a poor and overpopulated environment. Furthermore, there is a long distance from basic social facilities and service institutions (for instance, schools and health facilities).

Roma in the municipalities of Vojvodina live in Roma settlements (a row of at least 10 houses/apartments) or among the rest of the population. According to research conducted in Roma settlements, it was observed that Roma live in very poor ecological and communal conditions that do not comply with prescribed standards. "Dilapidated houses, i.e. slums in slums prone to collapse without sanitary facilities, are a common sight in settlements outside the city, while houses made of solid material are more firm if the Roma have integrated into a rural or urban settlement, which is characteristic of Roma from AP Vojvodina." Roma from Vojvodina who integrated among the rest of the population, the so-called "housed Roma" most often do not have housing problems, since their houses are identical to the houses of other national communities, although there are always exceptions when talking about Roma who live in larger cities, in hidden yards and behind residential buildings" (Marjanovic, 2008).

Roma live in separate Roma settlements, of which there are a total of 156 in AP Vojvodina. In other municipalities/cities, they live integrated with the rest of the population. That means there are no classic Roma settlements as separate quarters in those cities. There are no Roma settlements in the municipalities where the communities used to exist, since they have been displaced. The only area in AP Vojvodina where Roma have always lived mixed with the rest of the inhabitants is Coka. Roma settlements were mainly allocated in a manner that the Roma themselves bought houses in the municipality. Only Kula institutionally resolved the displacement of the Roma settlement. With the cooperation of the Government of AP Vojvodina and a Dutch foundation, The Kula Municipal Assembly bought rural households on the territory of the municipality to all Roma families from the settlement (Jovanovic: 2008; Jovanovic: 2014).

Part of the Roma population lives in other people's buildings or on other people's land that used to be social property and is often the subject of purchase by large investors who then forcefully evict them from their homes. Unconditional settlements are located throughout AP Vojvodina and are ranked from 1 to 5 according to quality of life standards.
Table 3: The number of Roma settlements in the municipalities of AP Vojvodina in 2008  
(Source: Jovanovic, 2008. I www. ombudsmanapv.org (area of protection of the rights of national minorities))

<table>
<thead>
<tr>
<th>Number of settlement</th>
<th>Municipality of AP Vojvodina</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>InDjija, Kovacica, Kovin, Mali Idjos (1) and Plandište (1)</td>
</tr>
<tr>
<td>2.</td>
<td>Ada (4), Irig, Nova Crnja, Ozaci (4), Srbobran (2), Subotica (2) and Secanj.</td>
</tr>
<tr>
<td>3.</td>
<td>Apatin (2), Beocin (3), Opovo (1), Senta and Titel</td>
</tr>
<tr>
<td>4.</td>
<td>Baci (3)</td>
</tr>
<tr>
<td>5.</td>
<td>Alibunar (1), Backa Palanka (3), Becej (4), Novi Becej, Pancevo (14), Sombor (1) and Staro Pazova (2)</td>
</tr>
<tr>
<td>6.</td>
<td>Bela Crkva and Vrsac (1)</td>
</tr>
<tr>
<td>7.</td>
<td>Novi Sad (4)</td>
</tr>
<tr>
<td>8.</td>
<td>Kikinda (7)</td>
</tr>
<tr>
<td>9.</td>
<td>Zabalj (4), Kanjiza (7), Sremska Mitrovica (4) and Pecinci</td>
</tr>
<tr>
<td>10.</td>
<td>Zrenjanin (3) and Ruma (1)</td>
</tr>
</tbody>
</table>

Table 3, which was made on the basis of research from 2008, shows that for some places, there is no data on the number of Roma colonies in AP Vojvodina, and to this table can be added the results of the research of the provincial ombudsman from 2010, where Roma settlements were included in municipalities of Irig (2), Senta (4), Sremski Karlovci (2) and Vrbas (7), which gave a total of 93 of the total number of Roma settlements in AP Vojvodina. As many as 28 local governments have at least one Roma settlement on their territory (62%). The number of Roma settlements ranges from at least one (Ruma, Plandište, Opovo, Vrsac, Alibunar and Mali Idjos) to a maximum of fourteen in the territory of the Pancevo local government.

Figure 1: Photographs of the conducted field research of Roma communities in the AP Vojvodina - Settlements graded with number 1 - Roma quarter in Backa Palanka and Roma settlement Mali Idjos and settlements graded with number 5 such as the Roma settlement Jamara in Srbobran and Beli breg, Stari Banovci (photographed in 2008)  
Source: (Jovanovic, 2014)
The results of the research of the provincial ombudsman show that the largest number of Roma settlements is located in the broader territory of the town (47 settlements - 51.1%); a slightly smaller number is located in the narrower area of the settlement (34 settlements - 37%) and the smallest number is placed outside the municipality boundaries (11 settlements - 12%).

Picture 1 shows the settlements in the Roma village in Backa Palanka, the Roma settlement of Mali Idjos, which are graded with number 1 according to quality, i.e. with number 1 are marked colonies that are in exceedingly poor condition and without infrastructure (no water, electricity, roads), the houses are dilapidated, and the entire settlement is tremendously unsanitary. Settlements with partial infrastructure (no water and roads or no electricity and roads), houses are shabby, and the complete colony is unhygienic are marked with the number 2. Such settlements are Haladas in Cantavir, Subotica and Vojvode Stepa, as well as Vrsac. Number 3 indicates settlements with water and electricity but no road infrastructure, the houses are dilapidated, and the entire settlement is unsanitary. Group 3 includes Roma settlements in Crepaja, Kovacica, Titelski red and Zrenjanin. Number 5 indicates colonies with all the infrastructure and houses in relatively good condition; the settlement is orderly, such as Jamura in Srbobran and Beli breg, Stari Banovci.

3.2. Basic properties of non-conditional settlements

Marjanovic [3] found that Roma settlements in AP Vojvodina can be classified into two types. The first type represents the isolated, ghettoized slums (meaning the part of the city that is inhabited by the poor population; backwaters and dirt, as well as streets with a bad reputation). The other type of settlement is the Roma communities at the end of the street, i.e. the settlement. According to the structure of the buildings, typical informal settlements where Roma families live consisted of buildings built from materials that were available to them (shacks and the like); temporary "mobile" housing facilities (containers); poorly built, old houses (extreme poverty); conditional one-story houses. The situation in the settlements in Vojvodina was more than worrisome as it was observed that even 38% of Roma settlements did not have a water connection, and more than 70% did not have sewage.

Furthermore, it was found that settlements are located next to canals and ponds, garbage dumps and landfill. The houses are on underwater land, full of moisture, with waste in the yards. Asphalt very often goes only to the first Roma houses, and the same is true when talking about sewage, that is, the availability of electricity and water. Streets in Roma settlements are particularly problematic in the autumn and winter period, given that due to the unpaved road, children going to school pass through mud and water, and in the "summer months, the main problem is that the canals are full of wastewater that spreads an unpleasant smell" [1].

According to the research of the Provincial Ombudsman of Roma settlements in Vojvodina from 2011, "out of a total of 41 settlements, 45.1% are located on risky, bad, unhealthy or otherwise dangerous terrains, while 50 settlements, or 54.9%, are not located on such terrains."

In those settlements located on dangerous terrain, the following conditions are stated:
- near the landfill (Bac - Selena - Siroka Bara; Sremski Karlovci - Cerat/Doka, Ruma - Rupace; S. Mitrovica - Jalija; Vrsac - Mali Rit; S. Karlovci - Little Italy; Pancevo - Ciglana Gornja;)
- location near the river, where wastewater is retained and there is a possibility of infection (Kikinda - Novi Kozarci; Odzaci - Bogojevo)
- potential landslide (Sremski Karlovci - Cerat/Doka; S. Karlovci - Little Italy)
- near the pond (Vrbas - Zmajevo - Jamuraca)
- groundwater problem (Irig - Rivnica; Vrbas - Kucura; Opovo - Naselje; Pancevo - Mali Rit; Pancevo - Krznara; Ada - Mol)
- the vicinity of the livestock cemetery (Odzaci - Deronje - Cerga I)
- near factories (Pancevo - Vojlovica; Pancevo - Topola).

The data show that insignificant number of settlements have a sewage network (13 settlements or 14.1%); only 16 (17.4%) have stormwater drainage systems; the same number of communities has implemented some way of heating; only 20 settlements or 21.7% have access to technical water, while in 6 colonies (6.7%) there is none of the above.

3.3. Living space and environment

The ecological analysis carried out in Roma settlements is directly related to the state of the environment in which the residents of Roma settlements live and work and includes monitoring data on the state of air, water, soil, elements of biodiversity and the relationship to natural resources that make up the living environment of the Roma community and similarly. Life in Roma settlements has its strengths, such as low housing costs, togetherness, good mutual knowledge, environmental awareness, connection with compatriots in other settlements and mobility within the state, even between states, and the collection of secondary raw materials as an additional source of employment.

The living environment is mostly polluted since most of the settlements are located near landfills and waste, noting that the Roma who have acquired ownership of the purchased buildings do not have these problems. All the necessary infrastructure is available to them: water, electricity, sewerage, and their homes are decorated and worthy of living.

Although Roma men and women themselves are not satisfied with the progress achieved, given that in the surveys they indicated that living conditions have improved for 14.2%, for 25.3% the improvement is minimal, around 54.8% of them did not feel any improvement, there is room for improving the environment and living space.

3.4. Measures to improve living conditions

Measures to solve the problems of Roma in general and Roma settlements must refer to arrangement or resettlement of settlements that have the following segments: urban, construction, property - legal, environmental protection, as well as the protection of socially vulnerable families in settlements at all levels, economic empowerment of families, higher level of education of children and adults and other aspects of the quality of life, whether they are of an objective or subjective nature. Bearing in mind that a society that respects the principles of sustainable development tends to protect and improve the environment, respects social needs and promotes economic success, the definition of the mission of Roma settlements in accordance with the Strategy, i.e. the reason for their existence, could be as follows: "Roma settlements are neighbourhoods in an economically healthy society where Roma families, whose social needs are respected, live in an ecologically safe environment and a protected environment, in community and mutual support".

Following the strategies for improving the position of Roma and mapping substandard Roma settlements, through the general goals of sustainable development of Roma settlements, the aim is for: Roma settlements to be part of the local environment in which responsible long-term economic progress is encouraged, the environment in the local community is protected and continuously improved, as well as to respect the social needs of all residents in each municipality of AP Vojvodina. The project activities of non-governmental organizations operating in the territory of the Republic of Serbia (Opre Roma, Alliance of Roma non-governmental organizations of the Zapadno-Backi District, Association of Citizens Impuls, etc.) also contribute to this.
4. CONCLUSION

The paper pays special attention to Roma settlements as an important segment of the quality of life of citizens of the Autonomous Province of Vojvodina and members of national and minority nations from the security aspect. The Roma are a very "old" people with their language, culture, traditions, customs and aspirations, and the state of Serbia is on its way to at least partially enacting legal and other solutions to improve the position of the Roma concerning education, employment and housing policy.

That is a very perplexing but achievable task that can be completed with proper economic and social policy and with the strategies to the general satisfaction of the Roma as a minority people and their majority neighbours - the citizens of Serbia. By recognizing the Roma community as a national minority, the possibility was opened for the creation of the National Council of Roma and institutional dealing with Roma problems. In the period behind us and ahead of us it has been shown that the first steps on the way to include Roma in all currents and activities of society are both possible and desirable.

The European Union is Serbia's largest donor for Roma inclusion, and the ongoing projects relate specifically to housing, improved living conditions for around 6,000 Roma, and their safety. Concerning the security aspect, the paper pointed out the danger of illegal settlements in terms of the proximity of waste dumps that threaten the health of the Roma population, the non-standard residential buildings prone to demolition and fires, which can cause danger not only for the Roma population but also on a broader scale that endangers both lives and a healthy environment. Further, the research indentify houses on underwater terrain, full of moisture, with waste in the yards, location near the river, where wastewater is retained with a possibility of infection, potential landslides, landfills, and similar. The main obstacle to obtaining a better living space is unemployment and insufficient education, which is one of the conditions that every person wants more and better for himself and his family.

The main security problem in the area of housing in informal settlements is related to the fact that, on the one hand, self-owned housing provides economic security, and, on the other hand, there is a whole series of challenges related to the improvement of communal services, whereby puts the necessity of waste management in the foreground. The area related to waste management is neglected in Serbia compared to the countries of the European Union, although it is realistic to say that Serbia has great potential for solving these security issues. The collection of waste at the level of local communities is about 80%, and for 20% of the litter, it is not known where it ends up, which indicates that this level of proportion is not satisfactory and that "unknown" landfills do not comply with the regulations of the European Union. The fact that the majority of the Roma population are engaged in collecting waste to feed their families with the funds obtained is also worrying. Unemployment and insufficient education of the Roma pose a threat to security since the crime rate is increasing, where children and women of the Roma population are particularly vulnerable in the form of human trafficking, begging, theft, fraud and other types of crime. For the project of the security aspect of living in settlements that are not non-conditional, support documentation has already been prepared, and in the coming period a housing solution will be implemented for over 4000 members of the Roma population. This project has the symbolic name "Roma Housing" and is financed by the European Union in cooperation with the Government of the Republic of Serbia.
REFERENCES


Vukasinovic, E., zamenica pokrajinskog ombdusmana za zastitu nacionalnih manjina, Muskinja Olivera istraživac i autor izvestaja: Romska naselja u Vojvodini. Dostupno na: www.ombdusmanapv.org (oblast zastita prava nacionalnih manjina), Novi Sad.
HIGHER EDUCATION IN EMERGENCY SITUATIONS - PROBLEMS AND OPPORTUNITIES OF ONLINE TEACHING AND LEARNING

Vesna Nikolic¹, Tamara Vukic²

¹ University of Nis, Faculty of Occupational Safety, Carnojevica 10A, Nis, Republic of Serbia, vesna.nikolic@znrfak.ni.ac.rs
² University of Nis, Faculty of Occupational Safety, Carnojevica 10A, Nis, Republic of Serbia, tamara.vukic@znrfak.ni.ac.rs

Received: 14th July 2022
Accepted: 29th July 2022

Abstract: The paper presents the results of a research aimed at determining teachers’ attitudes regarding the problems and possibilities of online teaching in emergency situations. The COVID-19 pandemic has caused extraordinary living and working conditions that have left some impact on the teaching and education systems. Therefore, the problems and opportunities of online teaching have been observed in the context of the pandemic. The research sample included 102 teachers from higher education institutions on the territory of the Republic of Serbia. For the needs of the research, a questionnaire with an assessment scale was prepared and shared with the teachers through a link. The teachers expressed their perceptions, attitudes, opinions and experiences related to personal competencies, preparation and support for online classes, practical implementation of online teaching and their relationship with students, as well as to didactic and methodological aspects of learning in an online environment.

Key words: online teaching, university teachers, emergency situations

1. INTRODUCTION

Natural and man-made disasters cause serious consequences and disturbances in the environment (ecological, social, economic, etc.) which have become increasingly difficult to predict in recent years. Therefore, the concepts of disaster and emergency management have become the focus of interest for the scientific public. Authors who study these concepts perceive the acquisition of knowledge and the importance of education in direct connection to the processes of raising the resilience of communities and developing the capacities for recovery from disasters and emergencies (Faber et al., 2014; Tuladhar et al., 2015; UNICEF, 2011). Hyogo Framework for Action (HFA) (2005–2015) emphasized the importance of the role of education in creating a culture of safety and resilience at all levels. According to HFA, disasters are basically reduced when people are well aware and the motivation is to create a culture of prevention and resilience to disaster (Zhou et al., 2014). The successor instrument to the Hyogo Framework for Action is the Sendai Framework, adopted in 2015.
Climate change and the COVID-19 pandemic have further drawn the attention of the academic community to the problems of education in emergency situations. In this regard, numerous declarations (see Nikolić & Vukic, 2022) emphasize the role of education for climate change, while the problems of education and learning in emergency situations have been brought to attention by pandemic conditions during the last two years. In addition to the issues related to the implementation of new educational programs, the creation of new educational tools and materials, the adoption of new policies and strategies, the authors put the focus of the problems of education in emergency situations on the development of teacher capacities and the empowerment of education creators (Anderson, 2012; Murphy, 2020).

The COVID-19 pandemic has led to the organization of online teaching in a sudden situation for which the world was not prepared, which is typical for emergencies (Quacquarelli Symonds, 2020; Rashid & Yadav, 2020). Schools and universities were closed in more than 160 countries, which affected over one and a half billion pupils and students (91%) worldwide. The COVID-19 has disturbed the operations of higher education globally. With the spread of the corona virus, higher education systems have switched from traditional to online access to teaching and learning within a short time to promote social distancing (Quacquarelli Symonds, 2020).

Pandemic conditions of learning brought valuable experiences (Vannak, 2020) and emphasized, or better yet, redefined, the role of teachers in emergency situations. Such conditions highlighted the necessity of future skills that include creativity, communication and collaboration, alongside empathy and emotional intelligence, helped to unlock the technology to deliver education by using available and up-coming technological tools, to recognize and acknowledge online learning in many countries (e.g. Cambodia), to strengthen teamwork and partnership within the community, to share learning materials more efficiently and improve the monitoring of student activities, etc. Through social media platforms, educators connect with students as individual learners, so the students know that the teachers are interested in them and that they follow their activities.

However, there are many more studies (Quacquarelli Symonds, 2020) that confirm numerous problems and limitations of online teaching in pandemic conditions (finance, Internet availability or instability of the Internet connection, digital (i)literacy, heterogeneity of learning styles, methodical (un)preparedness of teachers for online teaching, students’ burden with tasks and projects, lack of feedback, weak communication and interaction, weak motivation and passivity of students (Cao et al., 2020) etc.).

Analysis of the relevant literature (Moorhouse, 2020; Omotayo & Hilaru, 2020; Quacquarelli Symonds, 2020) shows that the largest number of research on teaching and learning in pandemic conditions focuses on student behavior (perception, evaluation, satisfaction, performance, etc.). Despite the large number of quantitative and qualitative analyses of the effectiveness of online learning, there are few studies on teachers’ experiences and didactic and methodological aspects of online learning in emergency conditions.

2. METHODOLOGY

In order to review the experiences of teachers in implementation of online teaching during the pandemic COVID-19, an empirical study was conducted. The research sample consisted of 102 teachers from Serbian higher education institutions. The study is based on a descriptive method, survey and scaling techniques, and uses a questionnaire with an assessment scale which teachers filled in online (via the link provided to their email address). The research instrument was especially constructed for study purposes. The paper presents a part of the
results related to the problems and opportunities of online teaching, viewed through several aspects:

(1) teachers’ competencies, preparation and support for online classes – the task of the teachers was to choose one of the offered answers to the following questions: Did you have organized trainings on the application of platforms (Zoom, Teams, Google Meet) that you used before starting online teaching? (yes or no) and How do you assess the resources of your faculty for the implementation of online teaching? (the faculty can implement online theoretical lectures and practical exercises; the faculty can implement theoretical lectures, but there are no conditions for the implementation of online practical exercises; the faculty does not have good conditions for the implementation of online teaching). In addition, teachers were asked to express their attitudes on a five-point Likert-type scale (1-strongly disagree, 5- strongly agree) in relation to the following items: i1 - Before online teaching, my digital competencies were not at a satisfactory level; i2 - I had experience in online teaching before the COVID-19 pandemic; i3 - I was able to contact the technical support/administrators in order to solve the difficulties I encountered while working in the online environment at any time; i4 - I had all the necessary equipment (computer, headphones, etc.) and a suitable workspace before online teaching started.; i5 - It took me more time to prepare for online classes than for usual classroom teaching; i6 - It was difficult for me to adapt the contents of my subject to the online environment.

(2) implementation of online teaching and relationship with students - teachers expressed their attitudes on a five-point scale (1-strongly disagree, 5- strongly agree) in relation to the following items: i7 - During online teaching, it was difficult for me to manage time (duration of certain activities); i8 - During online teaching, I had more time to dedicate to the individual needs of students; i9 - During online teaching, students were more motivated and dedicated to work than usual; i10 - During online teaching, students had greater freedom to ask questions; i11 - During online teaching, student activity was not at a satisfactory level; i12 - During online teaching, interaction with students was not at a satisfactory level; i13 - During online teaching, it was difficult for me to establish authority and I felt that I had no control over the teaching process; i14 - During online teaching, I lacked face-to-face interaction with students (e.g. seeing student reactions and facial expressions).

(3) didactic and methodological aspects of learning in an online environment – the task of the teachers was to express how often (never, rarely, often) they implemented the following activities during online teaching: dividing students into groups and assigning them activities; using presentations; playing educational films and videos; initiating a discussion on a topic and encouraging students to express their opinion; leaving the role of “presenter” to students (e.g. presentation of their papers, pre-exam obligations, etc.); giving tests/quizzes; giving homework; recording lectures and posting them on the platform. In addition, they were asked which teaching method they most often used during online teaching (teachers were offered teaching methods - lecture, conversation, demonstration, text-method, with the possibility to add their own answer).

The research sample structure with regard to the set independent variables (academic rank, length of service and previous training in the field of ICT) is presented in Table 1.

The largest percentage of teachers are full professors (33.3%), followed by assistant professors (29.4%), assistants (13.7%), associate professors (12.7%) and graduate student instructors (6.9%). The category other includes 3.9% of respondents (demonstrator, dean and professor of vocational studies). The lowest percentage of teachers have a work experience of over 30 years (15.7%), while they are almost evenly distributed in other categories. Over 40% of respondents have never had training in the field of ICT (43.1%), while almost a quarter of
teachers (24.5%) have had such training just before the implementation of online teaching during the COVID-19 pandemic.

Table 1: Research sample structure

<table>
<thead>
<tr>
<th>academic rank</th>
<th>length of service</th>
<th>ICT training</th>
</tr>
</thead>
<tbody>
<tr>
<td>graduate student instructor</td>
<td>up to 10 years</td>
<td>only one training</td>
</tr>
<tr>
<td>teaching assistant/assistant with a doctorate</td>
<td>11-20 years</td>
<td>few trainings</td>
</tr>
<tr>
<td>assistant professor</td>
<td>21-30 years</td>
<td>a training organized just before online teaching</td>
</tr>
<tr>
<td>associate professor</td>
<td>over 30 years</td>
<td>no training at all</td>
</tr>
<tr>
<td>full professor</td>
<td>other</td>
<td></td>
</tr>
</tbody>
</table>

3. RESULTS AND DISCUSSION

Problems and opportunities of online teaching in the conditions of emergency situation COVID-19 that have been identified are presented in the paper through three categories: teachers’ competencies, preparation and support for online classes; implementation of online teaching and relationship with students; didactic and methodological aspects of learning in an online environment.

3.1. Teachers’ competencies, preparation and support for online classes

Teachers’ competencies, preparation and support for online classes were analysed through their answers to two closed-ended questions and their attitudes expressed on a five-point Likert-type scale.

Teachers’ answers to question Did you have organized trainings on the application of platforms (Zoom, Teams, Google Meet) that you used before starting online teaching? indicate that just a little over half of them have had organized trainings - 52.9% of teachers answered “yes”, while 47.1% of teachers said that they did not have such trainings.

Teachers’ answers to the question How do you assess the resources of your faculty for the implementation of online teaching? are as follows:

- the largest percentage of teachers (68.6%) believe that the faculty can implement online theoretical lectures and practical exercises;
- 20.6% of teachers believe that the faculty can implement online theoretical lectures, but that there are no conditions for the implementation of online practical exercises, while
- the smallest percentage of teachers (10.8%) believe that the faculty does not have good conditions for the implementation of online teaching.

Table 2 presents teachers’ attitudes regarding the items i1-i6 and the differences in their attitudes based on their academic rank, length of service, and previous training in the field of ICT.

Considering the percentage of teachers who disagree and strongly disagree, it can be concluded that more than a half of teachers believe that their digital competencies were not at a satisfactory level before online teaching (55.9%). Also, more than half of teachers (59.8%)
had no experience in online teaching before the COVID-19 pandemic. In the case of this item, there is a statistically significant difference in the attitudes of teachers depending on their previous training in the field of ICT (p=0.000). This is quite understandable, because previous training of teachers in the field of ICT probably included the possibilities for the implementation of teaching in online environments. However, there is a much larger percentage of teachers who have not been trained in this area, or have only been trained once - before or during a pandemic (Table 1 – Research sample structure).

### Table 2: Differences in teachers’ attitudes on their competencies, preparation and support for online classes

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neither agree, nor disagree</th>
<th>Agree</th>
<th>Strongly agree</th>
<th>X² test (p value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>t1 33</td>
<td>32.4</td>
<td>24</td>
<td>23.5</td>
<td>22</td>
<td>21.6</td>
</tr>
<tr>
<td>t2 46</td>
<td>45.1</td>
<td>15</td>
<td>14.7</td>
<td>14</td>
<td>13.7</td>
</tr>
<tr>
<td>t3 4</td>
<td>3.9</td>
<td>4</td>
<td>3.9</td>
<td>11</td>
<td>10.8</td>
</tr>
<tr>
<td>t4 12</td>
<td>11.8</td>
<td>12</td>
<td>11.8</td>
<td>14</td>
<td>13.7</td>
</tr>
<tr>
<td>t5 11</td>
<td>10.8</td>
<td>14</td>
<td>13.7</td>
<td>16</td>
<td>15.7</td>
</tr>
<tr>
<td>t6 20</td>
<td>19.6</td>
<td>26</td>
<td>25.5</td>
<td>25</td>
<td>24.5</td>
</tr>
</tbody>
</table>

An encouraging fact that should be noted is that more than 80% of teachers (18.6% who agree and 44.1% who strongly agree) were at any time able to contact the technical support/administrators in order to solve the difficulties encountered while working in the online environment.

When added up, the percentages of teachers who agree and strongly agree show that more than a half of teachers (62.7%) had all the necessary equipment (computer, headphones, etc.) and a suitable workspace before online teaching. However, it must not be neglected that almost a quarter of teachers did not have all the necessary conditions for the implementation of online teaching.

Most teachers (59.8%) needed more time to prepare for online classes than for usual classroom teaching. In the case of this item, there is a statistically significant difference in the attitudes of teachers depending on their academic rank (p=0.025). The reason for this difference can be found in the “incompetence” of teachers with higher academic ranks (probably older teachers) in the online environment.

Almost a third of teachers (22.5% who agree and 7.8% who strongly agree) found it difficult to adapt the contents of their subject to the online environment, while a quarter of teachers show uncertainty about this (24.5% of teachers answered I neither agree nor disagree). However, the largest percentage of teachers (19.6% who strongly disagree and 25.5% who disagree) say that adapting the content was not difficult for them. In the case of this item, there is a statistically significant difference in the attitudes of teachers depending on their length of service (p=0.025). The reason for such difference may again be found in the fact that the online environment is not “close” to teachers with longer work experience as to younger teachers (graduate student instructors, assistants) who probably encountered ICT content during their schooling.
Table 3 presents teachers’ attitudes regarding the items i7-i14 and the differences in their attitudes based on their academic rank, length of service, and previous training in the field of ICT.

**Table 3:** Differences in teachers’ attitudes on the implementation of online teaching and their relationship with students

<table>
<thead>
<tr>
<th></th>
<th>Completely disagree</th>
<th>Disagree</th>
<th>Neither agree, nor disagree</th>
<th>Agree</th>
<th>Completely agree</th>
<th>X² test (p value)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>t7</td>
<td>43</td>
<td>42.2</td>
<td>19</td>
<td>18.6</td>
<td>19</td>
<td>18.6</td>
</tr>
<tr>
<td>t8</td>
<td>24</td>
<td>23.5</td>
<td>29</td>
<td>28.4</td>
<td>30</td>
<td>29.4</td>
</tr>
<tr>
<td>t9</td>
<td>30</td>
<td>29.4</td>
<td>25</td>
<td>24.5</td>
<td>34</td>
<td>33.3</td>
</tr>
<tr>
<td>t10</td>
<td>26</td>
<td>25.5</td>
<td>24</td>
<td>23.5</td>
<td>28</td>
<td>27.5</td>
</tr>
<tr>
<td>t11</td>
<td>5</td>
<td>4.9</td>
<td>14</td>
<td>13.7</td>
<td>27</td>
<td>26.5</td>
</tr>
<tr>
<td>t12</td>
<td>9</td>
<td>8.8</td>
<td>17</td>
<td>16.7</td>
<td>34</td>
<td>33.3</td>
</tr>
<tr>
<td>t13</td>
<td>38</td>
<td>37.3</td>
<td>28</td>
<td>27.5</td>
<td>20</td>
<td>19.6</td>
</tr>
<tr>
<td>t14</td>
<td>0</td>
<td>0.0</td>
<td>3</td>
<td>2.9</td>
<td>7</td>
<td>6.9</td>
</tr>
</tbody>
</table>

When added up, the percentages of teachers who disagree and strongly disagree show that most teachers (over 60%) did not find it difficult to manage time, i.e. the duration of certain activities (60.8%) and to establish authority and control over the teaching process (64.8%) during online classes. There is a statistically significant difference in teachers’ attitudes in the case of these items depending on the teachers’ academic rank (p=0.051 for i7; p=0.038 for i13). Such differences may be influenced by greater (long-term) experience in teaching practice of teachers with higher academic ranks in terms of good time organization of certain stages of the lesson and practical activities and greater confidence when it comes to managing the teaching process.

Approximately a half of the teachers (those who disagree and strongly disagree) pointed out that they did not have more time to dedicate to the individual needs of students (51.9%) during online teaching, that the students were not more motivated and dedicated to work (53.9%), nor that they had greater freedom to ask questions (49%) compared to the usual classroom teaching. There is a statistically significant difference in teachers’ attitudes in the case of the item *During online teaching, students were more motivated and dedicated to work than usual* depending on their academic rank (p=0.044).

More than a half of teachers emphasized that during online teaching student activity was not at a satisfactory level (34.3% who agree and 20.6% who strongly agree), with a statistically significant difference in their attitudes depending on the length of service (p=0.040).

One third of teachers (33.3%) show uncertainty when asked whether their interaction with students during online teaching was at a satisfactory level, and only a quarter (25.5%) of teachers (those who disagree and strongly disagree) think that the interaction was at satisfactory level. Accordingly, the majority of teachers (76.5%) strongly agree that they lacked face-to-face interaction with students during online teaching. An interesting fact is that there are no teachers who strongly disagree with previously stated, whereas only 2.9% teachers answered *I disagree* (3 teachers).
3.3. Didactic and methodological aspects of learning in an online environment

Graph 1 presents teaching activities and teachers’ attitudes about how often (never, rarely or often) they implemented them during online teaching.

Graph 1. Frequency of teaching activities during online teaching

Around 40% of teachers rarely: divided students into groups and assigned them activities (44.1%), played educational films and videos (41.2%), left the role of the “presenter” to students - presentation of their papers, pre-exam obligations, etc. (40.2%) and gave tests/quizzes (43.1%). Almost the same percentage of teachers (41.2%) never gave tests/quizzes during online teaching, but they often gave homework (40.2%). More than a half of the teachers never recorded and posted their lectures on the platform (52%), but they often initiated a discussion on a topic and encouraged students to express their opinion (58.8%). Notably, 94.1% of teachers often used presentations.

Graph 2 shows which teaching methods were most often used by teachers in the implementation of online teaching.

Graph 2. The most often used teaching methods in online teaching

The majority of teachers used lecture method (73.5%) for online teaching. The conversation method was used by 13.7% of teachers, while the demonstration method was used by only 7.8% of teachers. Teachers used the text-method the least (1%). Several teachers chose the
category “other” where they stated the following: “Lecture method and conversation method”, “Research work, problem method”, “Combination of all the above” and “Methods changed depending on the teaching unit”.

4. CONCLUSION

The results of this research represent a contribution to the literature related to education and learning in emergency situations. Numerous problems and challenges accompanying the realization of teaching (Vlachopolous, 2020) in new educational (virtual) situations have been confirmed. As results, the online learning does not run well since it lacks preparation and planning. First of all, the results indicated insufficient competence of teachers in the field of information and communication technology - teachers either did not have the training in ICT or only had it once, before or during the COVID-19 pandemic. Therefore, the results showing that the teachers “transferred” the traditional teaching, based on the lecture method (which was dominant among the majority of teachers) to the online environment are completely understandable and expected. In addition, the students remained passive during online classes, and the lack of “face-to-face” interaction was noticed by almost all teachers. Nevertheless, the data showing that the teachers could count on the help of technical support/administrators in order to solve difficulties encountered in an online environment, that most teachers had access to the necessary equipment for online teaching, and that the majority of faculties had opportunities for online teaching is encouraging.

Investing in technology system is crucial for both private and public higher education institutions (El-Azar & Nelson, 2020). Starting from the need for a technological support and other specific requirements imposed by online teaching, it is necessary for teachers to be well prepared to work in the virtual classroom. The students have to be familiarized with online learning to enhance their digital literacy and refine their misperceptions about online learning. Future teacher training must include the integration of technology in teaching and learning, technology enhanced teaching and learning, information and communication technology in teaching and learning, and online learning courses in their curriculum since the needs of technology integration in teaching and learning is inevitable. More studies on online teaching and learning are encouraged (Moorhouse, 2020), but there is insufficient research on particularities of online teaching and learning in emergency situations.

The COVID-19 pandemic makes us realize that we should always be ready to cope with the unexpected and get prepared to provide students the best no matter where the learning process takes place. All educational institutions should have plans for the implementation of the teaching process in crisis and unknown situations in the future while at the same time, the institutions should also look to the strengths and opportunities out of the crisis. Higher education should use the valuable experiences gained during the pandemic in order to reexamine the education strategies and review programs and the teaching process, both in the light of new risks and threats and in the context of interaction with the latest digital trends and innovations brought by Industry 4.0.

ACKNOWLEDGEMENT

This research was published with the support of the Ministry of Education, Science and Technological Development of the Republic of Serbia, following the Agreement on Realization and Financing of Scientific Research of the Scientific Research Organization in 2022, Agreement Registration Number 451-03-68/2022-14 /200148.
REFERENCES


SECURITY OF COMPUTER DATA IN THE CRIMINAL POLICY OF THE REPUBLIC OF SERBIA

Slavica Dinic

1 University of Educons, Faculty of security studies, Vojvode Putnika 67, Sremska Kamenica, Republic of Serbia, slavicadinic@yahoo.com

Received: 26th July 2022
Accepted: 17th August 2022

Review paper

Abstract: The paper presents the results of a research aimed at determining teachers’ attitudes regarding the problems and possibilities of online teaching in emergency situations. The COVID-19 pandemic has caused extraordinary living and working conditions that have left some impact on the teaching and education systems. Therefore, the problems and opportunities of online teaching have been observed in the context of the pandemic. The research sample included 102 teachers from higher education institutions on the territory of the Republic of Serbia. For the needs of the research, a questionnaire with an assessment scale was prepared and shared with the teachers through a link. The teachers expressed their perceptions, attitudes, opinions and experiences related to personal competencies, preparation and support for online classes, practical implementation of online teaching and their relationship with students, as well as to didactic and methodological aspects of learning in an online environment.

Key words: law, security, cybercrime

1. INTRODUCTION

The protection of information systems in general, and especially before the security of computer data, is provided by the incrimination of terrorism from Art. 391, Chapter XXXIV of the Criminal Code - Crimes against humanity and other goods protected by international law. However, this incrimination is, among other things, aimed at protecting the infrastructure of information systems from the most severe form of consequences in criminal law - from destruction (another type of violation), as a result of which we can classify it in a broader group of so-called political offenses, ie in the group of incriminations whose primary object of protection is the protection of the constitutional order and security of the state (criminal offenses from Chapter XXVIII of the Criminal Code; criminal offenses from Chapter XXXIV Articles 391, 391a, 391b, 391c, 391g, 392, 393 and 393a; criminal offenses under Chapter XXXVI Articles 292, 293 and 294, criminal offenses under Chapter XXV Article 287, criminal offenses under Chapter XXVII Articles 299, 300, 301 and 302). Part of the incrimination from Art. 391. CC Art. 1, item 3, which deals with the protection of information systems infrastructure, reads: “Whoever intends to seriously intimidate the population, or to force Serbia, a foreign state or an international organization to do or not do something, or to seriously endanger or violate basic constitutional, political, economic or social structures of Serbia,
foreign states or international organizations destroy a state or public facility, traffic system, infrastructure including information systems, immovable platform in the continental shelf, public good or private property in a way that may endanger human lives or cause significant damage to the economy, shall be punished by imprisonment for a term not less than twelve years or by imprisonment for a term between thirty and forty years."

The primary object of protection of the presented part of the incrimination from Article 391, however, is not the security of computer data, but humanity and other goods that are protected by international law. The international community is interested in the issue of computer data, but only in the field of protection of the mentioned values, and from the most severe type of consequences for them, while it does not deal with the issue of endangering and damaging computer data. This is supported by the fact that a significant number of relevant international documents are moving in the direction of understanding terrorism as a crime that, although directed against a specific state or international organization, affects values of interest to the entire international community.

Therefore, from the aspect of protection of our country in this domain, as well as the international community, in addition to the mentioned incrimination, the following criminal acts from the group that has criminal acts against computer data security as its object of protection should be analyzed. These are: computer sabotage from Art. 299 of the Criminal Code, creation and introduction of computer viruses from Art. 300 of the Criminal Code, computer fraud under Art. 301 of the Criminal Code and unauthorized access to a protected computer, computer network and electronic data processing referred to in Art. 302. CC.

Thus, even milder forms of consequences of crimes committed with (mis) use of computers and computer data, ie computer systems, manifested in the form of damage, concrete or abstract danger, can significantly affect the issue of security of the constitutional order and security of our country. Certainly, the above also applies to destruction, as the most severe type of consequence, which can occur even when the act is not undertaken in order to achieve the already mentioned terrorist intentions. Actions that are covered by incriminations from the group of offenses against computer data security, especially criminal offenses from Art. 299, 300, 301 and 302 of the Criminal Code, which is the subject of this paper, with implications for our social order, certainly have a relevant impact on issues in the security segment of the international community.

2. COMPUTER SABOTAGE (Art. 299 CC)

The essence of this crime is: processing of data that are important for state bodies, public services, institutions, companies or other entities. "The criminal act of computer sabotage has two forms. The first form can be achieved by: destroying, deleting, modifying, damaging, concealing or rendering unusable computer data or programs in another way (which is suitable for that), all with the intention of disabling or significantly interfering with the process of electronic data processing that are important for state bodies, public services, institutions, enterprises or other entities. According to Art. 112 para. 17. CC, computer data should define any presentation of facts, information or concepts in a form that is suitable for their fence in the computer system, including the appropriate program on the basis of which the computer system performs its function. Computer program, according to Art. 112 para. 19. CC, is considered an organized set of commands that are used to control the operation of a computer, as well as to solve a specific task using a computer.

The second form will exist if a computer or other electronic data processing device is destroyed or damaged, with the intention of taking action on the first form. The destruction of a computer or other device for electronic data processing is not considered a literal change in the physical
properties of these devices, but a change in their program performance, which is such that as a result these devices can no longer perform their intended function. The issue of destruction should be seen as reducing, not eliminating, the software performance of these devices, and thus reducing the possibility of their use for the purpose for which they are intended. Thus, in both forms, the act of execution is undertaken, exclusively, by doing.

As an example, we cite the conclusion of the judgment of the Court of Appeals in Nis, in judgment 7Kz.1.br.2607 / 11.

"The act of committing the criminal offense of computer sabotage under Article 299 of the Criminal Code implies the conduct of the perpetrator, so this criminal offense cannot be committed by the defendant's omission."

From the explanation:

"According to the actions of committing the criminal offense of computer sabotage under Art. 299. of the Criminal Code, which are alternatively determined, it follows that they imply active action of the perpetrator, where the protective object of this criminal offense is the electronic program itself, ie electronic data, the manipulation of which seems unusable, in order to significantly interfere with electronic processing, data. The first-instance court correctly determined that the factual description of the act from the indictment does not contain such actions, because the defendant is charged with not installing the HIF fund application software, so the first-instance court's correct conclusion is that the defendant's failure to act, does not represent any act of committing the criminal offense he is charged with, considering that his actions did not endanger any program or electronic data.

Therefore, the decision of the first instance court, which found that the actions of the defendant did not have the characteristics of the said criminal offense, as well as any other criminal offense, was correct, so he was acquitted of the charge, by applying Art. 355. point. 1. CPC, about which the first instance court gave sufficient and clear reasons, which are accepted by this court in everything. (Judgment of the Basic Court in Vranje K. No. 388/10 of 07.03.2011 and Judgment of the Court of Appeals in Nis 7Kz.1.br.2607 / 11 of 31.08.2012).

In both forms, a criminal offense is considered completed by taking an enforcement action with the intention of disabling or significantly interfering with the procedure of electronic data processing that is important for state bodies, public services, institutions, enterprises or other entities. The object of action, in the first form is a computer data or program, and in the second a computer or other device for electronic data processing. Any person can report as the perpetrator of this crime. Subjective elements of the criminal offense of computer sabotage are: intent and intent to disable or significantly interfere with the process of electronic data processing that is important for state bodies, public services, institutions, companies or other entities. However, the very realization of the intention, for the existence of this crime, is not important.

3. CREATION AND ENTRY OF COMPUTER VIRUSES (Art. 300 CC)

The crime consists of:

(1) Whoever creates a computer virus with the intention of introducing it into another's computer or computer network,

shall be punished by a fine or imprisonment for a term not exceeding six months.

(2) Whoever introduces a computer virus into another's computer or computer network and thereby causes damage,

shall be punished by a fine or imprisonment for a term not exceeding two years.
(3) the device and means by which the criminal offense referred to in para. 1 and 2 of this Article shall be confiscated."

This crime has two forms: basic and serious. The basic form is incriminated in paragraph 1. It exists when someone creates a computer virus, with the intention of introducing it into someone else's computer or computer network. The action of the basic form is, therefore, the creation of a computer virus, which is a technological process of procedures by which a computer virus is created. The term "computer" should be treated in the usual sense, a computer network, according to Art. 112 para. 18. CC, as a set of interconnected computers, ie computer systems that communicate by exchanging data.

The object of action in the basic form of this crime is a computer virus. Pursuant to the legal provision, ie Art. 112 para. 20. CC, a computer virus is a computer program or other set of commands entered into a computer or computer network that is designed to replicate itself and act on other programs or data in a computer or computer network by adding that program or set of commands to one or more computer program or data.

The legislator "sees" any person as an executor. However, in practice, these are only those persons who have a sufficient level of knowledge (very often informal) to create computer viruses. Subjective characteristics of the being of the basic form of the crime: intent and intent to introduce a virus into someone else's computer or computer network.

Another form of crime, incriminated in paragraph 2, exists when someone enters a computer virus into someone else's computer or computer network and thus causes damage. The action of performing this form consists of introducing a computer virus into someone else's computer or computer network. This form of crime is considered committed when damage occurs, and after the introduction of a computer virus into someone else's computer or computer network. However, it must be determined whether the damage occurred, in this particular case. The perpetrator of this form of tort can also be any person. It doesn’t have to be about who made the computer virus. Subjective element of the legal description of a more serious form of the crime of making and introducing computer viruses: intent.

For both forms of this crime, paragraph 3, provides for the mandatory confiscation of devices and means by which they were committed.

**4. COMPUTER FRAUD (Art. 301 CC)**

According to the legal description of the criminal offense of computer fraud, this offense is committed: property gain and thus cause property damage to others.” This crime has a basic, two more serious and one easier form. The first more serious form exists if by committing the basic form of the criminal offense a property gain exceeding the amount of four hundred and fifty thousand dinars is obtained, while if this amount exceeds one million and five hundred thousand dinars, there will be another more serious form. In the event that the basic form of the crime was committed with the intention of exclusively damaging another person, without the intention of obtaining illegal property gain, it will be a lighter form of the criminal offense of computer fraud.

The action of the basic form can be one of the following activities: entering incorrect data, failing to enter correct data or otherwise concealing or falsely presenting data. The crime is completed when a certain consequence occurs. In fact, it is necessary that some of the envisaged actions of doing or not doing, have an impact on the result of electronic processing or data transfer, in the form of changing the results of processing or data transfer, in the sense that the result is not compatible. Computer fraud can be committed in all situations in which
automated data processing occurs, and these are, today, almost all segments of social life, including security.

Any person can report as the perpetrator. However, it can only be the person who objectively has the ability to perform some of the planned actions. Subjective features of the basic form of being a criminal offense of computer fraud: intent (direct) and the intention to obtain illegal property gain for oneself or another and thus cause property damage to another.

5. UNAUTHORIZED ACCESS TO A PROTECTED COMPUTER, COMPUTER NETWORK AND ELECTRONIC DATA PROCESSING (Article 302 of the CC)

The essence of the crime is realized by:

(1) Whoever, in violation of protection measures, enters into a computer or computer network without authorization, or without access to electronic data processing, without authorization,

(2) Whoever records or uses the data obtained in the manner provided for in paragraph 1 of this Article, or

(3) If, as a result of the act referred to in paragraph 1 of this Article, there has been a delay or serious disruption of the functioning of electronic processing and data transmission or network, or other severe consequences have occurred.

The crime has three forms: basic and two serious. The act of execution of the basic form is: a) unauthorized connection to a computer or computer network or b) unauthorized access to electronic data processing. However, it is necessary that until the inclusion, ie. accession came in violation of some protective measure.

The perpetrator of the basic form of this crime can be any person. However, there is a special category of persons, the so-called hackers, who engage in illegal access to information systems. They are trained to master even the most complex type of computer protection, and the motives for their actions are very dispersive. The subjective feature of the being of this incrimination: intent.

The first serious form of this criminal offense exists if the data obtained by committing the basic form of the criminal offense is recorded or used. The purpose for which this was done, according to the position of the legislator, is not important, nor is the manner of recording or use. However, when sentencing, the importance of this issue is not excluded.

The second more severe form predicts the occurrence of certain consequences, caused by the execution of the basic form. These are: interruption or serious disruption of the functioning of electronic processing and data transmission or network, or the occurrence of other severe consequences. The issue of downtime should not be treated as a short-term downtime, which did not result in any harmful consequences, while severe consequences should not include only direct consequences on a computer, computer network or other device intended for electronic data processing, but all those caused by unauthorized access, or what are its result.

6. CONCLUSION

The issue of protection of computers and computer networks, primarily those that are of public importance, is primary for one society, state, is. its security in general, however, must inevitably be dedicated, because today cannot be imagined without numerous "smart" devices that work on the basis of computer programs and networks. On the one hand, it makes our lives much easier, while at the same time, on the other hand, it is a serious threat to both our individual and national security.
The Law on Amendments to the Criminal Code of the Republic of Serbia from April 2003, for the first time, included in our legislation a group of criminal offenses whose object of protection was the security of computer systems and data processing networks. After that, in 2005, the current Criminal Code of the Republic of Serbia was adopted, which has been in force since January 1, 2006. By analyzing the statistical bulletins of the Republic of Serbia, in the first eight years of application of the mentioned law (2006-2013), we come to the conclusion that the number of persons against whom criminal charges were filed and a verdict for these four crimes is extremely small, with the share of minors negligible in this issue, which is surprising given the fact that the younger generations, especially minors, are extremely computer-oriented. In general, they quickly adopt and apply all his innovations to achieve very different goals, the achievement of which is often not motivated by intent of a criminal nature, but can often result in it.

After the observed time interval, in the period from 2014 until today, the situation in this field is changing significantly. Namely, the number of filed criminal charges, but also verdicts, is significantly higher, in relation to both adults and minors. On the one hand, the expansion of computer technology into all segments of society, and thus cybercrime, but also serious steps of our state to counteract this problem, along with monitoring international trends and establishing international cooperation in this area, also contributed to that. The Republic of Serbia established the Prosecutor's Office for Computer Crime, ie the Special Department of the Higher Public Prosecutor's Office for High-Tech Crime in 2006.

However, only in the second half of the second decade of the twenty-first century, the Ministry of Internal Affairs of our country invested significant efforts and resources in the field, primarily prevention, but also the suppression of this type of crime, which greatly affected the efficiency and effectiveness of this prosecution. This problem, in addition to the legal regulations, which we can state is well set, our country actually opposes. Namely, he constantly educates his bodies of formal social control in this area, introduces them to newspapers, but also develops creativity in the employees in this field. Accordingly, the persons employed are "technologically literate", starting from the principle of "predominant interest", ie. by combating and preventing crimes in this area, the negative side of the use of computers and computer networks is trying to be reduced to the lowest possible level, ie, to this end, everything necessary and possible is undertaken to increase the benefits of using this, although today more and no, innovation.

REFERENCES


PROTECTION OF VITAL HYDROTECHNICAL FACILITIES FROM TERRORIST ATTACKS BY ENGAGING COUNTERDIVERSION DIVERS

Serif Bajrami¹, Misa Zivkovic², Nikolina Popovic Paunic³, Milan Kresojevic⁴

¹ University of Defence in Belgrade, Military Academy, Veljka Lukica-Kurjaka Street No. 33, Belgrade, Republic of Serbia, bajramiserif@gmail.com
² University of Defence in Belgrade, Military Academy, Veljka Lukica-Kurjaka Street No. 33, Belgrade, Republic of Serbia, zivkovic.misa@yahoo.com
³ River Flotilla, 1300 kaplara 11, Novi Sad, Republic of Serbia,nikolinapopovci4@gmail.com
⁴ University of Defence in Belgrade, Military Academy, Veljka Lukica-Kurjaka Street No. 33, Belgrade, Republic of Serbia, pporkresojevic@gmail.com

Received: 24th June 2022
Accepted: 14th August 2022

Abstract: International rivers such as the Danube, Tisa and Sava rivers, which mostly flow through the territory of the Republic of Serbia, as well as the Danube-Tisa-Danube canal itself are crucial when it comes to development of agriculture, economy, tourism, river transport, energy, water supply and other activities important to the prosperity of each state. Numerous hydro-technical facilities built on and along the banks of these rivers, such as bridges, locks, hydroelectric power plants, marinas, ports and other buildings, aim to ensure the most efficient use of their hydro-navigation potential. And that is exactly why hydrotechnical facilities are very sensitive, attractive and interesting security facility whose protection from possible terrorist attacks requires the application of special measures, but also the use of specially trained and equipped units. One of such forces at the disposal of our state are the diving units of the River Flotilla, which have counterdiversion (anti-sabotage) divers in their formation, one of the purposes of which may be the protection of vital hydrotechnical facilities in the internal waters of the Republic of Serbia.

Key words: terrorism, counterdiversion divers

1. INTRODUCTION

Responding to terrorist acts requires a wide range of activities, ie the use of all available resources of a society that can be engaged at a given moment within a unique, fast and efficient counter-terrorist response. The objects of a terrorist attack can be numerous and diverse, from airports, schools, stadiums, theaters, hospitals to various economic and industrial centers. However, hydrotechnical structures on rivers, lakes and canals are particularly sensitive to terrorist attacks, and their successful protection can only be carried out by specially trained and equipped anti-terrorist units. Counterdiversion divers from the River Flotilla of the Serbian
Army, due to their specificity, whose business processes are primarily realized on and in the
capture of inland waters, represent one of the most respectable forces in the fight against
terrorist and other destructive actions.

2. COUNTERDIVERSION DIVERS

According to the purpose, we can distinguish the following types of combat divers in the
formation of diving units: anti-mine divers, counterdiversion (anti-sabotage) divers, divers for
underwater actions and divers for search and rescue (Bajrami, 2022).

Counterdiversion divers (Figure 1) are a specialty within the military diving service whose
main purpose is to protect important personalities, key warships (command ships) and
hydrotechnical facilities on inland waters from various sabotage, terrorist and other destructive
activities of the enemy. Counterdiversion divers are organized in teams (strength of 8 to 10
people) within the diving units of the River Flotilla of the Serbian Army and their training and
equipment requires a special approach to planning, organizing and implementation. They
perform tasks within the diving pair using different types of diving apparatus, underwater
weapons, fast transport boats and technical means for observation and supervision. They are
engaged independently or in cooperation with other forces of the River Flotilla.

The main characteristic of counterdiversion divers is reflected in the realization of underwater
activities on inland waters whose width, depth, speed of movement of water mass, visibility,
coast and coastline, require the engagement of specially trained personnel, various vessels and
technical means available to diving units. Also, their specificity in relation to other forces of
the defense system is reflected in the fact that their direct connection with the underwater
environment provides a successful response to all challenges, risks and threats, as well as the
ability to adapt to sudden and dynamic changes all forms of terrorist attack on wars and other
vital hydrotechnical facilities on the internal waters of our country.

![Figure 1. Counter-diversion divers](source: www.objektiv.rs/vest/803673/ruski-komandosi-ratuju-pod-vodom-njihovo-oruzje-ispaljuje-specijalne-metke-i-granate-video/)

3. MEANS AND EQUIPMENT OF COUNTERDIVERSION DIVERS

During the realization of tasks, equipment and means integrated into a unique system for
support of diving activities are used. There are three types of equipment: heavy diving
equipment (HDE), light diving equipment (LDE) and deep diving equipment (DDE) (Pravilo
Ronjenja-1989). Diving equipment should also provide full autonomy, safety and security
during diving, but also the successful implementation of anti-sabotage activities such as
underwater guards, patrolling boats in the entire security area, closing access roads using
technical means (underwater sensors and cameras, binoculars, sonar, thermal imaging cameras
etc). However, the most important equipment and means used during the implementation of anti-sabotage and anti-terrorist tasks are primarily:
 - closed-circuit diving apparatus;
 - underwater weapons;
 - sonar for searching the waters and
 - diving boats for transporting divers and patrolling.

A closed-circuit diving apparatus (Figure 2a) is a means of providing a medium for divers to breathe underwater, and whose operating principle (closed-circuit breathing apparatus), unlike other types of diving apparatus, has no unmasking moment when used.

Underwater weapons (Figure 2b) are a specific type of weapon that effectively neutralizes enemy manpower under water. By applying special constructive solutions, the problem of ballistic flight of ammunition through the water environment has been overcome and thus conditions have been created for a successful anti-sabotage fight not only on land but also under water surfaces.

![Figure 2. a) Drager diving apparatus b) Underwater weapons](https://www.nordic-market.de) ![Figure 2. a) Drager diving apparatus b) Underwater weapons](https://oruzjeonline.com)

Sonar (Figure 3a) is a modern means of searching the water area, whose possibilities are significantly greater compared to standard search techniques with the help of divers. It is used to detect river saboteurs whose location is unknown, and the search conditions are unfavorable (large area, poor visibility, strong river currents, low water temperature, etc.).

![Figure 3. a) Sonar b) diving boat type Zodiac](https://commons.wikimedia.org/wiki/File:2015-06-12_SSS-100K_or_600K_Side_Scan_Sonar.jpg) ![Figure 3. a) Sonar b) diving boat type Zodiac](https://m.facebook.com/Zodiac-Black-Boats-
Diving speedboats (Figure 3b) due to their excellent maneuverability, small dimensions, easy handling and easy transport to the area of operation, are used to transport people and material resources, support diving activities, reconnaissance, patrol and search in inland waters.

4. ENGAGE OF COUNTERDIVERSION DIVERS DURING PROTECTION OF VITAL HYDROTECHNICAL FACILITIES FROM TERRORIST ATTACKS

The need to organize comprehensive, flexible and effective protection of possible objects of action is conditioned by the fact that threat bearers are increasingly being trained for special actions using various techniques and tactics.

The method of organization of protection of hydrotechnical facilities from terrorist activities will depend on a number of circumstances, and in all situations the geographical characteristics of the area and coordinated activity of river forces, military police forces and other units will be used to close waterways, subterfuge and evacuation of terrorist groups and successfully secure potentially endangered facilities (Pravilo recni odred, 2020).

After receiving information about a possible attack, the following measures and activities of anti-sabotage and anti-terrorist protection are generally taken:

- establishment of observers for visual control of the surface and below the water surface,
- periodic control of underwater parts of the endangered object,
- closure of sensitive approaches and passages from the water using technical means,
- searching the water and the coast for the timely detection and destruction of terrorist groups,
- patrolling by diving boats around the endangered object and
- defining and coordinating procedures and ways of counteracting the detection of the presence of sabotage or terrorist groups.

The method of protection of facilities located on the water and along the coastal belt will differ from the estimated threat in terms of the forces and means used, but the principles of organization will remain largely the same. The organization of anti-sabotage or anti-terrorist protection of important facilities on the water is realized in principle in three zones of defense in which efforts are made to prevent diversion.

In the first zone, anti-sabotage divers have the task to discover the means of transportation (boat, kayak, vehicle, aircraft, etc.) with their equipment, in the initial phase of the attack, and act on them. The specificity of this phase of defense (first belt) is that timely detection and action on means of transportation will enable the destruction of the entire group of saboteurs or terrorists, which is not possible in the later phases of diversion. In addition, by detecting means of transportation without the presence of the enemy in them, they will indicate the probable directions of passing to the defended object and enable timely and adequate concentration of forces in the second and third zones. The goal of introducing the first belt is to force saboteurs to leave the means of transport much earlier than planned, ie at greater distances from the object of action, which increases their psychophysical stress, time spent in the second zone, reduces their efficiency in finding and leading to object of action thus minimizing the probability of successful action. The first belt is provided by applying various technical means (sonar, drones, sensors, thermal cameras, etc.) but also by reconnaissance and patrolling diving boats with clearly assigned tasks and delimited responsibilities.

The second belt of defense, unlike the first, where the main goal is to detect and destroy means of transportation, is intended to detect and act directly on saboteurs or terrorists during the
phase of their submission to the goal. The forces and resources of the second belt are deployed at shorter distances from the defended facility than is the case with the third zone and depends primarily on the hydro-geographical characteristics of the defended area. The main characteristic of this belt is the presence of strong forces that are ready to react quickly due to the close proximity of the defended object. The second belt is also provided by applying various technical means for timely detection and locating of the enemy, but also by carrying out proactive actions such as dropping submarine bombs on the access routes.

The third belt represents the immediate protection of the defended object, with the task of destroying terrorists in the final phase of the attack or preventing their penetration to the object. The characteristic of this belt is that it is established in the immediate vicinity of the defended facility and that within it there is a large concentration of forces ready for immediate engagement. The protection of the facility in this zone is realized primarily through the direct engagement of anti-sabotage divers whose diving activities below or around the facility represent the last line of defense. In addition to underwater patrols, additional diving forces are organized in rubber boats as well as armed guards who are on land near the defended facility.

5. CONCLUSION

The realization of the protection of vital hydro-technical facilities on inland waters from possible terrorist attacks is a complex and demanding process that requires active and coordinated engagement of specially trained and equipped forces. Timely, safe and efficient response to dangers is achieved primarily through the application of appropriate measures and activities in the organization and implementation of anti-sabotage and anti-terrorist actions. For something like that, one of the basic forces of the defense system is the counterdiversion divers of the River Flotilla. Diving units, by engaging manpower, weapons, special equipment and resources, provide a universal and flexible approach to addressing unpredictable, dynamic and complex challenges and threats characteristic of a deviant social phenomenon such as terrorism.

REFERENCES


Pravilo Recni odred, (privremeno), (2020). Komanda Kopnene vojske, Nis.


www.objektiv.rs

www.nordic-market.de

https://oruzjeonline.com

https://commons.wikimedia.org

https://m.facebook.com/Zodiac-Black-Boats-1460607510932608/
ECOLOGICAL SECURITY IN THE BROADER CONTEXT
LEVEL OF GLOBAL PROCESSES

Slobodan Simić

1 Security Research Center, Nikole Pasica 60, Banja Luka, Republic of Srpska, Bosnia and Herzegovina, slobodansimicss@yahoo.com

Received: 20th July 2022
Accepted: 28th July 2022

Abstract: Environmental destruction is undoubtedly becoming a challenging issue for current and future global processes. Based on the analytical approach in the field of science and scientific disciplines that are correlated with environmental safety, it can be seen that this problem is fateful for the future of civilization.

Knowledge of causes of endangerment and the cause-and-effect relationship with the consequences have so far indicated the spread and strengthening of environmental crises, but recent events in natural and socio-humanistic environment significantly indicate an increase in these crises. This alarmingly point to the need for reaction from individuals as well as institutions, organizations and associations at various levels. The logarithmic increase in environmental degradation indicates the need to increase environmental awareness in many convergent directions emphasizing the need for an ecological culture of valuation.

Factors that deepen the environmental crisis are determined through the evaluation of the current state of environmental safety and design for the future. Establishing the factors that most cause negative environmental tendencies indicates the need to direct different activities in order to reduce them to an optimal extent. Controversies, paradoxes, discourses in this area indicate the need to provide scientific and professional opinions. The paper aims to explain how intensified the interactions of individual causes that directly and indirectly affect environmental security at the global, regional and local levels.

Key words: environmental safety, environmental degradation

1. INTRODUCTION

At the end of the 20th century, warnings about air pollution, soil pollution, global climate change, pollution of water resources and the disappearance of certain plant and animal species began to appear rapidly in the scientific and professional fields and the general public. The reached level of scientific knowledge allows, with sufficient precision, that the fashion industry emits 10% of CO₂ in relation to the total emission of CO₂ into the atmosphere, and that by the year 2050 it is predicted that there will be more plastic in seawater than fish, that climate change is the cause of many social problems.
Also, as a preventive and reactive effect, there are also attempts to protect the environment with different measures and activities and technical-technological and digital innovations of the modern era, so vacuum cleaners for CO₂ from air and water (direct "capture" of CO₂ from the air - efficiency 90%, and a CO₂ vacuum cleaner from the ocean floor), drones in Spain and India that selectively scatter tree seeds via "seedcopters", the existence of an interactive platform to show places where waste is collected, selected and recycled, making packaging/bioplastics from seaweed, etc…

There is no doubt that in the field of environmental security, a significant number of contents are observed that have a causal effect on global social processes and destroy old security paradigms.

2. IMPLICATIONS OF THREATENING ENVIRONMENTAL SECURITY

It is evident that cause-and-effect relationships in maintaining the stability of ecological security are increasingly interactive. Also, the more the pressure on the living environment continues, the negative impacts grow logarithmically and multiply their impact, which ultimately produces negative consequences. Liberalization, expansion of urban areas, felling of forests, pollution of sea surfaces, mining of mineral wealth, destruction of biodiversity, etc. there are only some segments that indirectly and directly affect environmental safety.

The establishment of the aforementioned can lead to an elementary division of the causes of the impact on the environment through social, natural and technical-technological segments. Some causes produce ecological crises, and the ways of overcoming them can be determined by solving complex problem contents.

Environmental experts who are oriented towards the social sciences and humanities broaden their view of the causes of the ecological crisis, considering that it is very important to analyze the development of society and civilization in order to discover the specific causes of a specific society and the degree of their development. When considered segmentally, in a social sense, problematic content can be seen through international law, environmental ethics and environmental awareness. The international legal aspect has a wide range of observation, from the conventions of the United Nations to the decisions of local communities, but also the work of non-governmental organizations at the global, regional and world level. In their article "Legal instruments for the protection of the environment" Vuckovic B. and Vuckovic V. (Vuckovic & Vuckovic, 2022:26) point out the importance of the right to the environment - the Aarhus Convention, consideration of the environment in legal regulations, the European Convention for the Protection of Human Rights and Basic freedom, criminal law aspect of environmental protection. Environmental ethics and awareness arise from systemic and institutional activities that are carried out through various sciences and scientific disciplines as well as through cultural and religious understanding, elements of environmental policy, concepts and strategies of sustainable development, quality of the environment as an economic good, environmental management, protection of constituents environment, etc. Viher et al. they think that the political alternatives need to be ranked according to political and economic criteria. Given that, through restriction of the weather modification techniques, we do not see any economic gain, we have decided on the following two main goals: political gain and avoidance of economic damage. (Viher, M., Kljucaric, V., Malenica N., 2019).

Ecological awareness can appear in its latent and manifest form. Interpersonal responsibility is particularly important for solving environmental problems, which enables ecological awareness to manifest itself not as latent, but in its manifest form, which implies adequate practical behavior, because it "is not a passive reflection of the objective state of the human
environment in the minds of people, but is also an effort (necessity) of man to find a way out of the ecological crisis". (Baljak, Erkić, Marković, 2022:199).

The natural causes of threats to ecological safety can be seen through natural disasters, but also the increase in the number of inhabitants in certain parts of the world - due to the increase in production and consumption, etc. The consequences of human activity, which condition the environmental problem, are generally viewed as a technical-technological problem.

Given the interdependence of the causes of ecological crises, problematic contents that convergently affect ecological security can be recognized through:

**Climate change**

Climate changes are long-term changes in the statistical distribution of climate factors, over a period of ten to a million years. Factors influencing the modern monitoring of climate change emphasize the already mentioned interactivity and can be divided into:

- Internal factors (atmosphere, water environment, ice and snow covers, etc.) and
- External factors (changes in the orbital path of the planet, different changes in the atmosphere, solar radiation, rotation of the planet, etc…).

It is evident and scientifically proven that climate change affects almost all spheres of life on the planet. Accordingly, artificial influences manifested in: increased CO₂ emissions, consumption of fossil fuels, degradation of forest potential, construction of infrastructure, development of urban areas, etc., are specially investigated. Of the above, there is no doubt that the excessive release of CO₂ into the atmosphere has the greatest impact on environmental safety, which was noticed at the end of the last century and at the beginning of this century.

In his article Mr. Bebernes think that humans have pumped so much carbon into the air that climate experts now believe even a dramatic reduction in fossil fuel emissions won’t be enough. They say we’ll also have to remove some of the carbon that’s already in the atmosphere if we want to prevent the worst impacts of climate change. (Bebernes, M., 2022).

The increase in temperature due to climate change is evident. What, unfortunately, is becoming a daily occurrence are extreme and sudden changes in temperature.

The consequences of such developments are ominous for safety and security. The sharp rise in temperatures is likely to have an effect on climate instability and the frequency of extreme events such as storms, hurricanes, and tornados. (Nayef, 2006:106). Summers should get hotter and winters warmer. The hot summer of 2003 in Europe repeated many times with higher temperature. These rising temperatures caused ocean waters to rise. Melting from glaciers, the Arctic, and, eventually, Antarctic ice sheets will also contribute to this phenomenon. This rise in sea level will threaten coastal areas, which will in turn induce many of inhabitants of these zones to move elsewhere.

According to the United Nation's Intergovermental Panel on Climate Change low-carbon technologies would need to generate 80% of the world's electricity by 2050 (up from about one-third today) in order to limit warming to two degrees Celsius above preindustrial levels.(Azevedo, Davidson, Jenkins, Karplus, Victor, 2020:21).

**Ecological migrations**

Ecological migration, in fact, represents a type of spatial migration that can be permanent and less often, temporary because people strive for better economic and ecological living conditions. In the sciences and scientific disciplines, forms such as "refugees conditioned by the living environment", "migration due to changes in the living environment" and the like
appear. An increase in temperature, a shortage of drinking water, and natural disasters can lead to an increase in the number of migratory populations. Migrant population as an endangered population is not only a humanitarian problem, but the problem contents appear in: geostrategic and geopolitical implications; this is a high-risk category for getting various types of diseases; cross-border cooperation becomes more complicated; there are always forces in the host country that do not accept environmental migrants; the group is susceptible to recruitment into extremist groups, paramilitary formations, criminal organizations, etc.; they are apostrophized for media manipulation and susceptible to human trafficking.

Luterbacher considers two main changes why migrants would like to go from their land to better areas. These are: 1) Ecological parameters such as climate change and 2) Socio-economic forces with special attention paid to the additional market forces unleashed by market liberalization and globalization. (Luterbacher, 2004:165).

Waste materials

It is evident that individual and collective awareness of the harmfulness of waste has not yet taken root among a large number of the world's inhabitants. For the sake of a systemic solution to the problem of waste, it would be necessary to involve the business side in addition to being aware of the preservation of the environment, i.e. to use technical and technological innovations to process waste into raw materials and materials that can once again be useful in the broader context of sustainable development.

Approximately 2.427 billion tons of waste (safe and dangerous, generated by households and business were produced in the EU annually 2008 and after a period of decline since 2008, waste production to grow (2016-2.53 billion tones). Consumer behavior in the long run has contributed to increase in waste production (Botlikova, Botlik, 2019:383).

Waste materials leave a direct and indirect impact on the loss of human lives, the disappearance of biological habitats, and a long-term impact on the constituents of the environment because the environment is unable to absorb the impacts (diseases of plants and animals, abandonment of habitats, degradation of fertile soil, etc.).

Social conflicts

Due to the confrontation between international entities, the need for a quality living environment is always interdependent with the supply, use and distribution of energy sources. Also, this interaction causes the phenomena of "resource politicization" and "ecological marginalization". The epilogue is very often the degradation of the natural environment due to war conflicts with unforeseeable consequences. The use of modern combat equipment in itself pollutes the environment. Minefields, residual ammunition and weapons, unexploded ordnance, biological and chemical agents significantly pollute the environment. The existence of conflict prevention in international organizations and the focus on stabilizing segments of ecological security after social conflicts significantly mitigate the impact on the natural environment (as an example, one can cite the current conflict in Ukraine, in which the fact of environmental degradation and the disappearance of part of the flora and fauna in the war-affected area is ignored).

Bearing in mind the aforementioned problem contents, which are on the same clause-conditioned plane, it is unequivocal that in the coming period they will reflect on all spheres of socio-economic life, giving a futuristic discourse in the field of security.
3. MULTIDIMENSIONAL ACTIVITIES TO MAINTAIN ENVIRONMENTAL SAFETY

Ecological safety as a catalyst of socio-economic impacts on the ecosystem is shown in Scheme 1. It is evident that ecological safety, in this sense, amortizes impacts that are negative and counterproductive for environmental protection.

Scheme 1. Ecological safety as a catalyst of socio-economic impacts on the ecosystem

Environmental security as a state of protection of the human rights of the individual, the state and society and as a correlative factor in the relationship between nature and society can be viewed multivariately at different levels. Conditionally, the division into factors that reduce the threat of environmental safety from the point of view of organization can be: international entities, states, corporations/firms, business entities and non-governmental organizations, associations and associations. These elements combine forces, activities and means, giving guidelines and directly implementing actions to protect the natural environment. At the strategic level, the "Green Agendas", conferences and summits in different formats that give the tone of the protection of the natural environment can be seen. For example, at the last conference on climate change, global goals were adopted (COP 26 The Glasgow Climate Pact, 2021:5):

- Mitigation: secured near-global net zero, NDCs from 153 countries and future strengthening of mitigation measures Over 90% of world GDP is now covered by net zero commitments. 153 countries put forward new 2030 emissions targets (NDCs). The Glasgow Climate Pact accelerates the drumbeat and puts in place the underpinning rules and systems. In Glasgow, countries agreed to come back next year with new strengthened commitments, a new UN climate programme on mitigation ambition, and they finalised the Paris Rulebook. To deliver on these stretching targets, the Presidency has driven commitments to move away from coal power, halt and reverse deforestation, reduce methane emissions and speed up the switch to electric vehicles.

- Adaptation & Loss and Damage: boosted efforts to deal with climate impacts 80 countries are now covered by either Adaptation Communications or National Adaptation Plans to increase preparedness to climate risks, with 45 submitted over the last year. The Glasgow - Sharm el-Sheikh Work Programme on the Global Goal on Adaptation was agreed, which will drive adaptation action. Record amounts of adaptation finance have been pledged, including committing to doubling 2019 levels of adaptation finance by 2025. This is the first time an
adaptation specific financing goal has ever been agreed globally. Nations have announced new partnerships to improve access to finance, including for Indigenous Peoples. A new Glasgow Dialogue on Loss and Damage funding arrangements was created. The Santiago Network on Loss and Damage was brought to life through clear functions and funding.

- Finance: mobilised billions and trillions Developed countries have made progress towards delivering the $100 billion climate finance goal and will reach it by 2023 at the latest. 34 countries and five public finance institutions will stop international support for the unabated fossil fuel energy sector next year. Private financial institutions and central banks are moving to realign trillions towards global net zero. In Glasgow, countries agreed the way forward for the new post-2025 climate finance goal. Developed countries committed significantly increased funding to vital funds such as the Least Developed Countries Fund.

- Collaboration: worked together to deliver The Glasgow Breakthroughs will accelerate collaboration between governments, businesses and civil society to deliver on climate goals faster, whilst collaborative councils and dialogues in energy, electric vehicles, shipping and commodities will help deliver on commitments. At COP26, we finalised the Paris Rulebook - agreeing the ‘enhanced transparency framework’ (common reporting of emissions and support), a new mechanism and standards for international carbon markets, and common timeframes for emissions reductions targets.

Technical and technological achievements have an imperative effect on environmental protection and influence the development of future strategies, policies and procedures. The system of smart cities, irrigation in desert conditions, innovations for renewable energy sources, etc. they can significantly reduce the impacts of climate change, global warming or CO₂ emissions. In the coming period, greater investment in this area is expected in many sciences and scientific disciplines, but also in practical solutions at all levels. For many projects, it will be conditional that they have environmental permits in order to be completed.

In accordance with the above in the area of innovation and summit conclusions, there are also theoretical concepts for solving environmental crises that primarily respect the "multifactorial" approach and are presented through (Vejnović, Simić, 2014:27):

- Philosophical-anthropological radicalism;
- Changing the socio-economic system;
- Balance maintenance strategy;
- Neoliberal concept of technological optimism;
- The strategy of reflexive rationality;
- The emancipatory role of ecological movements and
- „Realistic“ approach.

Regardless of which approach in solving the problem of ecological security in the world is pretending, it is obvious that the goals from Glasgow will be difficult to achieve. For now, it is imperative to maintain a stable security environment by adopting preventive measures and applying technical and technological solutions.

4. CONCLUSION

In the modern world, environmental protection is seen as a contemporary deviation of the global trajectory of development. Environmental problems come into the spotlight of public opinion every time major disasters with ecological consequences occur in the world. The article was created as a synthesis and result of the study of the interdependence of ecological security and the need for sustainable development of society and environmental protection. It
is a significant international, security and sociological phenomenon - various types and forms of endangerment, injury, pollution or degradation of the environment, i.e. the efforts of states and society to find an effective system of measures aimed at preventing, eliminating and suppressing environmental endangerment phenomena that have a long history tradition, but according to their intensity, frequency, appearance, scope and intensity of implications, they stand out in the second half of the 20th century with enormous technical-technological progress and comprehensive development of society. It is believed that environmental security will be imperative to consider in the future in order to make life on the planet bearable for living beings. In this context, ecological security, as a catalyst of socio-economic impacts on the ecosystem, will not only be seen as the optimal use and protection of nature, but also, from a narrow professional perspective, as the minimization of risk or the probability of feeling the negative implications of environmental changes.

REFERENCES


Botlikova M., Botlikov J., (2019), Approaches of European Union countries to waste management, Modern management tools and economy of tourism sector in present era, 4th International thematic monograph, ISSN 2683-5673, Belgrade.


UN Climate Change Conference UK 2021, COP 26 The Glasgow Climate Pact, Glasgow.


Viher M., Ključaric, V., Malenica N., (2019), Need for a Regional Summit to prevent environmental modification operations in South East Europe, Strategos, Volume III, Broj 1, ISSN 2459-8771, Zagreb.

CIVIL DEFENSE OR CIVIL PROTECTION

Dragisa Jurisic

1 Security Research Center, Nikole Pasica 60, Banja Luka, Republic of Srpska, Bosnia and Herzegovina, bicbl@yahoo.com

Received: 18th July 2022
Accepted: 28th July 2022

Abstract: Contemporary security trends are such that threats, both from natural and other hazards, are very certain, constant, and increasingly frequent. The opening of certain crisis hotspots, such as in Ukraine, also requires the reconfiguration of certain protection and rescue systems and adaptation to the resulting situation. The protection of civilians from various acts of war that affect them directly or indirectly, through the lack of fuel, food, water, and other necessities, is one of the priorities of modern protection and rescue systems. Stories about the possible use of nuclear assets moved forward the re-considering of some questions related to the shelters, stockpiles, decontamination, and similar measures that have been somewhat marginalized over the past period. This paper aims to point out the difference between civil defense and civil protection and to highlight the need for a broader concept and a return to civil defense in the context of contemporary threats.

Key words: civil protection, civil defense, protection and rescue, war, natural hazards

1. INTRODUCTION

Contemporary time has a need for contemporary measures, but measures themselves are old as mankind. New is a way how they suppose to be applied. The challenges of modern times are much more demanding and states and individuals are trying to get over them.

In most countries, different systems are developed in the last hundred years, in order to fight those challenges. Basic idea was to protect civilians, material goods, and the environment, and above of all to protect the state and secure its sustainability and duration. Which way the state was going to use was depending on the nature of the hazards and the availability of capacities.

Basically, in a civilian context, there are two basic approaches and they are civil defense and civil protection. Which of those two concepts will be used and in which volume, is depending on the threats and capability of the state to organize one of those two concepts.

This paper aims to point out the difference between civil defense and civil protection and to highlight the need for a broader concept and a return to civil defense in the context of contemporary threats for most of the states. It will be done through historical context, defining civil protection and civil defense, and a conclusion at the end of the paper.
2. HISTORICAL CONTEXT

From the beginning, man has a drive for self-preservation and the struggle for survival. In this context, he deals with self-protection every day. In addition, with the development of human communities, the need for mutual protection and mutual assistance developed in order to preserve the clan or tribe. Often, the ostrich boat is taken as an example of the first crisis management, that is mutual aid and protection. In this context, man still performs self-protection and tries to "survive". On the other hand, he protects his family and his immediate environment, that is, he implements mutual protection measures. In the context of modern times, these activities, which people, more or less, constantly realize, are regulated by law. The need for the protection of civilians by the state or some form of government is also not recent and it existed in ancient times with the formation of the first fire brigades. Thus, in Ancient Rome, in response to public demands that something is done about the increasingly frequent fires in the City, Emperor Augustus formed a brigade of guards (vigiles) in the 6th A.C., who, in addition to keeping peace and security, was in charge of supervising the night lamps and safely lighting a fire as well as for extinguishing fires and for this purpose were equipped with the means available at the time (hooks, axes, ladders, ropes, and buckets, but also water pumps that created pressure to throw the stream up to 100 feet). The brigade consisted of seven cohorts with 560 men each, with each cohort responsible for two of the 14 Roman districts. Every four months, 320 members of the guard were sent from Rome to the ports of Ostia and Portus. Each cohort had four doctors and a kind of chaplain. (Milasinovic, Kesetovic, 2011) Later, during the Middle Ages and epidemics of the plague, etc., measures were taken to protect civilians in the form of quarantine and isolation, etc. The need for flood protection, building on elevated and dry terrain, and preparations of supplies for winter (food, firewood, etc.) are all ways of civil protection in the function of personal and collective protection. This shows that the issue of civil protection, only in a different form and under a different name, has been present since the beginning of the human race through personal and collective protection.

The development of war techniques, the increase in the range of certain combat weapons, as well as their lethal effect, led to the fact that civilians had to be taken into account in wars. However, this protection of civilians was most often directed at smaller areas where armies clashed in open fields, and in the area of medieval cities where the robust and stone-made towns were shelter for civilians during the war times. In those towns were some amounts of supplies with food and water to resist the siege of the city for some period of time. With the development of modern armies at the beginning of the nineteenth century, the need to protect civilians from military operations grew. During the First World War, the need for the protection of civilians went beyond its original framework and developed into the concept of civil defense, where cities and populations played their role in the defense systems of the warring armies. However, apart from the cities in the grip of the fronts and the civilians who lived in them, this concept of civil defense remained concentrated in the areas around the fronts, because the range of artillery was still relatively small, and the effect of aviation was directed at military targets, and the appearance of chemical weapons gave a new dimension in protection system.

As a consequence of the destruction and experiences from the First World War, the population hiding function and activities on shelter construction and chemical protection were developed. In the Second World War, the development of aviation and long-range artillery and later missile systems (V1, V2), led to a broader approach to the issue of civilian protection, i.e. the development of the concept of civilian protection in a broader sense, i.e. to civil defense. The population took a direct part in the activities of civil defense, especially in Great Britain, which in 1940 was attacked by German aviation and later by German rocket systems, and later on in Germany when allied forces started to fight back.
After the Second World War and the bloc division of the world, which followed after it, civil defense gained importance, especially from the aspect of surviving a nuclear war. Shelters are being built, individual and collective, early warning systems are being created, the population is being trained in procedures in the event of a nuclear explosion, etc. With the weakening of the bloc division of the world, the creation of an environment where only natural and technical-technological disasters pose a threat to the population is again taking place. The military aspects were increasingly being neglected, and thus civil protection comes to the fore ahead of civil defense in most countries of the world. However, the latest events in Ukraine, the world economic crisis, uncertainty when it comes to world peace, and uncertainty when it comes to the confrontation of the two world nuclear powers through proxy wars, or direct confrontations, have led to the fact that civil defense once again assumes primacy.

As can be seen, civil protection and civil defense replace each other and, throughout history, give each other the leading position depending on the events in the world and the threats that present a daily challenge to states and their systems of protection and defense.

In this context, we can talk about several factors and their elements that are decisive for the development of civil defense, and these are first of all: factors related to dangers that threaten people, material assets, and the environment (war, nature, mechanical and technical conditions, modern security challenges), technical and political factors (finances, geopolitics, previous experiences, internal politics, nuclear threat - military and civilian). (Jakovljevic, 2006) That is, the four basic goals of civil defense are humanitarian issues, deterrence, controllable crisis, and survival of the state. (Vejl, 1991) It is precisely the survival of the state that is the key part that distinguishes civil defense from civil protection.

3. TERMS OF CIVIL PROTECTION AND CIVIL DEFENSE

In a functional sense, civil protection is defined exclusively as a humanitarian activity whose main goal is the protection of the civilian population. In modern conditions, the concept of civil protection is less and less related to the protection and rescue of the population in conditions of war destruction and the focus is on assistance in case of natural, anthropological, technical-technological, and other emergency situations.

In accordance with Additional Protocol I of the Geneva Conventions, which many refer to when defining civil protection, „civilian protection“ implies the performance of some or all humanitarian activities given in Article 61 of Additional Protocol I with the aim of protecting the civilian population from the threat of hostilities or accidents and to help him overcome their direct effects, as well as to ensure the conditions necessary for his survival.

Before this definition and the content of "civil protection" are taken into further consideration, it should be emphasized that in the English translation of this Geneva Convention the term in the title is "civil defense" and not "civil protection". This chapter in the same document is translated as civil protection (Zivilschutz) in German as well as in French (Protection civile) and Italian (Protezione civile), while in Russian it is translated as civil defense (Grazdanskaya oborona). The translation in neighboring countries and in Bosnia and Herzegovina is "civil protection" for that chapter of Additional Protocol I, and the same is true of the International Civil Defense Organization, whose name in Bosnia and Herzegovina, Serbia, and Croatia is translated as the International Civil Protection Organization ( although the title clearly states that it is about civil defense) because it is supposedly more politically correct. Regardless of the translation, it should be pointed out that this Additional Protocol and the Geneva Conventions relate to the protection of victims of international armed conflicts and contain measures that are characteristic of war conditions (blackouts, urgent establishment of badly
needed services of public interest, assistance in preserving goods essential for survival) which gives a clear direction that it is about civil defense and not about civil protection.

In the Dictionary of Civil Protection issued by the Federal Administration of Civil Protection of the Federation of Bosnia and Herzegovina, it is emphasized that "civil defense is a broader term than civil protection." (Huseinbasic, 2004; 24) In that Dictionary, civil defense is defined as a part of the security system of the state, which, in addition to protection and rescue, also deals with the defense of the population, material, cultural and other assets from all kinds of dangers of natural or anthropological origin. This implies the participation of the civilian population in unarmed forms of resistance to the aggressor and the creation of conditions for overall defense and protection. In addition, the civil defense has the task of creating conditions for normal life and work in the affected area. According to this dictionary, civil defense consists of civil protection, monitoring and alerting, management links, authorities, companies, and other legal entities and services, as well as planning and education. That the term "civilian defense" is broader than the term "civilian protection" and that these are two different concepts is also considered by Grisold when he presents civil protection as an integral part of civil defense in the security system of the modern state. (Grizold, Tatalovic, Cvrtila, 1999; 10)

Moreover, civil defense is an organized activity of the civilian population to reduce the effect of the enemy's action from the airspace, land, and sea, and to maintain or renew essential services necessary for the life of the people and the maintenance of living conditions. Closer tasks of civil defense are prevention of surprises: reduction of losses, moral shocks, and material damages; providing assistance, and enabling the quickest elimination of the consequences of the enemy's actions. It works closely with armed forces units. In some countries, it merges with defense and acquires a military character." (Abazovic, 2002; 87)

Some authors divide the definition of civil defense into narrow and broader. In the narrower sense, civil defense is the protection of the civilian population and material goods in conditions of war and in case of danger of natural or anthropological origin. In a broader sense, civil defense includes "the defense of civil society against political domination, ideological influences and natural exploitation in conditions of war, while not neglecting the protection and rescue of the population, material, and cultural assets in conditions of peacetime emergency situations." In a functional sense, civil defense, according to this understanding, includes in its scope of work the protection of public authorities, the economy, the territory, and the environment, information systems, and early warning of potential dangers". (Jakovljevic, 2006; 12) All this indicates that civil defense is not passive, and as part of internal security, it enables the state to exercise its right to self-defense. Although many countries try to just rename their "civil defenses" to "civilian protection", without a deeper analysis of the content of these systems, the Italian government has decided to divide it so that civil defense is an organization for military defense and leads preparations for work in war while civil protection as an organization is directed towards protection and rescue in natural and other disasters. (Huseinbasic, 2007; 68) In Switzerland, civil defense is the responsibility of the state, while 26 cantons manage civil protection and it is basically their responsibility. On the other hand, in some countries, such as Russia, these terms are identified. Although the Russians created the Encyclopædia "Civil Defense" in 2015, they defined that term in that Encyclopedia as a synonym for civil defense, and they defined civil defense as "a system of preparing and protecting the population, material and cultural assets in Russia from the dangers arising from the behavior of the enemy or the results of his actions, as well as occurrences of a natural or artificial character". (Grazdanskay Zaщита - Єнциклопедія, 2015; 383)

The return of the cold war, regional conflicts, terrorist threats, and their possibilities, and the current existence of nuclear arsenals, puts the question of the need for civil defense in addition
to civil protection into a new context. Some call it a return from civil protection to civil defense (Aleksander, 2002), but these are two functions of the state that must develop in parallel in accordance with modern democratic principles of society with full respect for basic human rights. “Preparedness for special situations in peacetime does not imply readiness for a military attack.” (DCPA, 1973), but preparedness for the war and military attack implies readiness for peacetime situations. Accordingly, it is very important to understand the content of the term civil defense. Depending on its content, it also depends on how much it will differ from other terms, including the term civil protection. In some countries, such as the USA, civil defense was and remains a way of deterrence, and through this, it can also include the protection of the country's critical infrastructure both from natural disasters and from various types of attacks, of which terrorist attacks have been very common in recent times, but they can be various politically motivated attacks as well as a military conflict. In the USA, the definition of civil defense from 1990 by the Federal Emergency Management Agency (FEMA) states that civil defense includes activities and measures designed or undertaken for the following reasons:

a) to minimize the effects on the civilian population in the event of an attack or possible attack on the USA or by a natural disaster,

b) act in case of immediate emergency conditions that would be created by such an attack or natural disaster,

c) implementation of urgent repairs or urgent establishment of vital functions and services destroyed or damaged in such an attack or by a natural disaster.

On the other hand, in the documents of the US Army (DOD Dictionary, 2007), civil defense is presented with the same definition, with the last part “or by a natural disaster” being removed from that definition.

Taking everything into account, the reasons for implementing civil defense are based on at least six factors: finance, geopolitics, previous experiences with natural emergencies, previous experiences from wars, domestic politics, and nuclear weapons. (Vejl, 1991; 52) All these factors can be considered in the countries of the Balkans, including nuclear weapons, because there is a real threat to the world and then also to the countries of the Balkans. On the other hand, significant military conflicts in the world, such as the conflict in Ukraine, and above all its economic but also military escalation, give rise to the need to think about civil defense in a different way, taking into account the war exposure as a factor in the development of the civil defense. It is the same with terrorism, i.e. the use of airplanes to bring down towers in the USA, the use of sarin in the subway in Tokyo, the use of anthrax, and the further development of various chemical and biological agents by various terrorist organizations (ISIL) who makes us aware that we must be aware the fact that it is only a matter of time when one such organization will get possession of a nuclear missile or some other type of nuclear bomb, or the states in conflicts will be bold enough to use nuclear missiles as well.

When it comes to the term civil protection, we have already seen that it is narrower than the term civil defense and that they differ in terms of content. Considering the essential difference in content between civil defense and civil protection, states must develop both components as part of internal security that will enable not only the protection of people, materials, and other goods from natural and other dangers, but also enable the state to exercise its right to self-defense both within the states themselves and in the case of war threats and war events both in the surroundings and on the territory of the Balkan countries, regardless of how these and such events occurred. Such activities are carried out by countries such as Switzerland, Germany, USA, Russia, and e.c. On the other hand, the development of civil defense is also justified in the protection of civilians from major accidents, primarily at nuclear facilities in the surrounding area, where the population must be ready to spend some time in a closed space,
and this implies the provision of food and water for a shorter period of time. A pandemic of COVID-19 showed all weaknesses of states who did not think about civil defense but rather think about civil protection. Lockdown, curfew, isolations, and other measures showed that the population was not ready for it. People were scared, with a lack of food, water, and other things (such as toilet paper). Civil defense was again raised on a level that was beyond civil protection.

4. CONCLUSION

Serbia and the Balkans, it is clear that civil defense must not be neglected. The end of military service, the exclusion of subjects such as National Defense and Social Self-Defense, and the neglect of all segments of civil defense in the last 30 years, speak in favor of the fact that civil defense is again almost at the beginning in these Balkan areas. Civil protection has gained momentum in the last few decades but is still at the level of state institutions and organizations. It is still at a very unsatisfactory level when it comes to the civil protection of local self-government units.

Civil defense needs to be rehabilitated through curricula and included in the segments of civil protection in the Balkan countries because it is content and conceptually broader than civil protection and is very little represented. The last event in Ukraine and COVID/19 pandemic showed that we need a broader concept than civil protection, there is a need for civil defense.

REFERENCES


Milasinovic S. i Kesetovic Z.(2011), Krizni menadzment u istorijskoj perspektivi, Kriminalisticko-policijska akademija, Beograd.

FUTURE TRENDS IMPACT ON REPUBLIC OF SRPSKA CIVIL PROTECTION

Goran Maksimovic

1 Security Research Center, Nikole Pasica 60, Banja Luka, Republic of Srpska, Bosnia and Herzegovina, gomax5575@yahoo.com

Received: 15th July 2022
Accepted: 28th July 2022

Professional paper

Abstract: Contemporary security trends are such that threats, both from natural and other hazards, are very certain, constant, and increasingly frequent. The opening of certain crisis hotspots, such as in Ukraine, also requires the reconfiguration of certain protection and rescue systems and adaptation to the resulting situation. The protection of civilians from various acts of war that affect them directly or indirectly, through the lack of fuel, food, water, and other necessities, is one of the priorities of modern protection and rescue systems. Stories about the possible use of nuclear assets moved forward the re-considering of some questions related to the shelters, stockpiles, decontamination, and similar measures that have been somewhat marginalized over the past period. This paper aims to point out the difference between civil defense and civil protection and to highlight the need for a broader concept and a return to civil defense in the context of contemporary threats.

Key words: civil protection, civil defense, protection and rescue, war, natural hazards

1. INTRODUCTION

Civil protection is a dynamic process that must respond to changes. The complexity of such changes becomes so obvious when the unfolding COVID-19 pandemic led to unprecedented changes around the world. Apart from such far-reaching events, society face constant changes due to many different factors. Because civil protection activities and organizations seek to protect the population from a broad range of hazards, a fundamental understanding of societal dynamics is required to effectively adapt the civil protection system to changing needs. One way to understand societal dynamics is to explore relevant trends, especially with respect to their positive and negative consequences for society and civil protection. Society changes and trend analyses can be used to support strategic decision-making, adaptation and optimization of civil protection systems.

In order to adapt to societal changes in Republic of Srpska, this paper aims to understand how change may impact the civil protection. This paper contributes to the continual evolution of the Republic of Srpska protection and rescue system. Trend overview focuses on interpreting some relevant trends in the context of the policies, practices and organization of the Republic of Srpska system. It aims to identify adjustments that may be advisable or necessary in order to maintain and optimize the efficiency of civil protection in the time to come. The paper is
intended as an aide to support decision-making and it therefore expressly avoids any prioritisation of trends. It describes some observable and relevant trends and from this basis, this paper discusses potential implications required to enable the Republic of Srpska civil protection system to respond to the various trends. Nevertheless, all of the trends described will be relevant in the coming years, and some other but not mentioned too, but it is therefore important that the Republic of Srpska civil protection system addresses them proactively.

2. REPUBLIC OF SRPSKA CIVIL PROTECTION SYSTEM

Conceptually and terminologically, civil protection (CP) is understood as taking a set of measures, actions and activities aimed at protecting the civilian population from all phenomena that have the character of extraordinary circumstances or situations. It originates from the Latin word *civis*, which means "citizen" and does not refer to his social role but to his role in protection from all kinds of dangers, natural or anthropological in origin. In Republic of Srpska, the Republic Administration of Civil Protection (RACP) performs administrative and other professional tasks related to: monitoring, harmonization and implementation of established policies and guidelines and ensuring the implementation of laws and other regulations in the field of civil protection, drafting civil protection programs of the Republic of Srpska, preparation of threat and risk assessment on the entire territory of the Republic, proposing a Civil protection Plan of the Republic, collecting data on all types of phenomena and hazards that could lead to natural and other disasters for people and material goods in the endangered area, monitoring, informing and alerting, organizing, preparing and training of civil protection units at the level of the Republic, elections and conducting of scientific research projects in the field of civil protection, providing professional assistance, issuing instructions and instructions for the work of the civil protection service of local self-government units, inspection, destruction of UXO, demining, rescue from natural and other accidents, taking preventive, operational and postoperative measures in case of accidents and international cooperation. RACP is an administrative organization under direct command and control of the Republic of Srpska Government.

According to its function and purpose, civil protection is also one of the emergency services in cases of endangering the lives and property of citizens in the event of crisis situations. Protection and rescue operations during crisis situations are of special importance for the Republic. Civil protection is a planned and organized part of the system of protection against natural and other disasters, which includes planning, organizing and preparing for protection and rescue. The civil protection system is unique for the territory of the Republic and is organized as such. The organization of civil protection includes: personal, mutual and collective protection, measures and tasks, coordination and management, emergency headquarters, protection and rescue commissioners, units and teams of protection and rescue, reporting and information system and other organizations trained in protection and rescue.

Civil protection is organized at the level of the Republic administration through the civil protection service in the municipality / city down to other legal entities. Emergency headquarters are organized at all levels as administrative and management bodies. Specialized units for protection and rescue are organized at the level of the Republic and the municipality / city, while the reporting and notification system is organized from the operational-communication center of the municipality / city through the regional civil protection offices to the Republic operational-communication center. Specialized civil protection units encompass the areas of: fire protection, medical assistance, veterinary and radiological-chemical-biological (RCB) protection, sanitation of the ground, rescue from rubble, destruction of UXO and demining, as well as water rescue. The use of forces and means for protection and rescue is foreseen and planned in accordance with the law. For the use of civil
protection nits, the CP staffs are formed as operational-professional bodies at the level of the city / municipality and the Republic. The staffs perform their function occasionally, taking action before and after the crisis (Maksimovic, 2013).

3. FUTURE TRENDS DEFINITION AND SELECTION

In this paper, term trend is used as a descriptor for a pattern that is likely to have an impact on the way the Republic of Srpska civil protection will evolve in the near future. The trends create issues that are observable in the present. However, many of the challenges and opportunities that the trends pose to civil protection in Republic of Srpska are likely to become more pronounced in the future. The trends are not ranked in regard to the importance. A main point is an assessment of the relevance and implications of each noted trend to civil protection. Impact hereby refers to the extent to which civil protection will be affected by the individual trends. Adaptability is the perceived need and ability of Republic of Srpska civil protection to address the challenges and opportunities that arise with the respective trends.

This trend review differs from a traditional risk analysis. Firstly, it does not aim to prioritize the importance of particular trends, rather providing information and advice that could be used by others in a decision support manner. Second, by focusing on trends, it enables an examination of the issues at hand, including an investigation of opportunities that arise from the trends. As should be expected in an open-ended, complex system, all of the trends, mentioned in this paper, are interdependent. The concluding section of the paper focuses on the importance of interdependencies between trends, and more general associated implications for the Republic of Srpska civil protection.

While some of the trends have positive implications for civil protection, others may have negative consequences. Both, urgent and slow-developing trends, are included in the review of relevant trends. The main criterion for choosing trends was a foreseeable and considerable impact on civil protection in Republic of Srpska. As it is the case after every crisis, it is important to critically review all the measures taken during the previous one within the civil protection system, and to incorporate the lessons learned into future activities. Thus, the focus of this paper is not on specific emergency but on on the issue where there are relevant implications to consider.

3.1. Technological trends

3.1.1. Technologies

Technological advance today leads to convergence, a process by which traditionally unrelated technologies become integrated. They grew out of research and development ties between organizations across industries and sectors and are mostly market-driven developments. It is possible that if civil protection can adapt on these market-driven adaptations, then civil protection activities would better match the society that drives the market. Because technological convergence combines technologies, effective utilisation requires a new set of practices.

As a result of convergence, an inherent dependencies between technologies and the enabling character of some of these technologies, the development of technology tends to happen in a non-linear fashion, which reduces its predictability. The possibilities for detecting increasing with systematic monitoring of patent databases to track (both positive and negative) convergence. New technologies lead to new challenges and these challenges are observable at different scales, depending on the area. Some new technologies are useful in the context of civil protection but, on the other side, it also create challenges in the context of regulation. To
date, governance happens mainly in a siloed fashion with regulation targeted in a strongly disciplinary manner.

In general, technologies provide a variety of opportunities to engage the developmental advances across disparate fields through efficient new inventions. The combinatorial power of modern technologies underlines the potential to find solutions to issues that cross existing domains. Upcoming technologies might yield substantial improvements with respect to prevention capacities. In the context of oversight of critical services, infrastructure could soon be monitored using chemical or biological sensors (microorganisms). Combined with artificial intelligence capacities, these types of sensors will likely increase prediction possibilities for more efficient critical infrastructure protection but cause some political and private issues (Kohler and Benjamin, 2020).

An long-term approach to the developments, could assist civil protection to gain most practical benefit from these developments. In order to benefit from increasing developments in technologies, long-term ties should be established among organizations, such as civil protection. At the moment, different agencies are responsible for different fields and disciplines. Given that technologies cross disciplines, developing capacities to understand how regulatory questions and problems can be addressed should be a priority with respect to this trend. Managing the cross-disciplinary nature of technologies might also be accomplished by spreading expertise across government departments. Advocating for disciplinary competencies to be spread across departments, could increase the ability of individual departments to understand and manage technologies, as necessary within a department. Concentrating competencies within departments or even departmental sections, will hinder the manage of technologies and reduce the potential to realize the opportunities they may bring in the future (Kohler and Benjamin, 2020).

3.1.2. Digitalization

Digitalization is the defining trend of our time because, data (information) becomes an increasingly valuable commodity. However, digitalization is not an entirely new trend. Digitalization directly or indirectly affects, or is the basis for, many of the trends identified as relevant for civil protection. This includes technologies, governance of critical infrastructures, social media, unmanned systems and urbanization. In more devoloping countries some other trends too. Progress in digital technological development permits ever more design processes to be undertaken virtually. The next step in the field of digital prototyping, will be the “digital twin”, the exact virtual replications of systems or infrastructure that can be tested and optimized without interfering with the real world. Many of the opportunities that digitalization offers depend on the availability of reliable, high-speed data connections with little latency. To handle the expected massive increase in the amount of data transmitted, network operators plan to implement the next generation data transmission. At the moment, the prospects for Republic of Srpska are in a way promising. Still, there are a lot of challenges to overcome in a teritory as BiH, with geographical and political distinctivness.

Digitalization brings convenience and comfort to everyday tasks, but it also poses considerable challenges for society and the civil protection system: This encompass proliferation of connected devices at all levels of society, supply chains, potential hardware espionage or software malware With digitalization, more data are being saved digitally, increasing the number of potential targets. It raises question of information security. Digitalization may also hinder social resilience during disasters. The impact of permanenet availability of these technologies leads to inability to act in case of their absence. An “analogue analphabets” are unable to deal with those kinds of situations. Digital technologies will soon boost the analysis of biometric characteristicsof the population. It raises some new challenges such as privacy
rights, the lack of data protection, the enormous potential for surveilling and even controlling the population. The civil protection system already profits from digitalization on multiple levels. Digital technologies facilitate and/or enable new disaster management, preparation, protection, adaptation, response, and recovery measures. Technologies like unmanned aerial vehicles or digital triaging are already employed in the service. Digitalization provides emergency services with huge amounts of data for potential use. Close collaboration between research, civil protection authorities, critical infrastructure operators and practitioners is central to ensure adaptations of new digital technologies to the specific needs of civil protection (Building Information Modeling, 2022).

Digitalization will influence parts of society that are specifically designated to serve civil protection purposes, like shelters in case of disaster. A digital real time information system would allow responsible personnel to be informed about the remaining capacity of protective shelters, the amount and kind of people already there and other data of interest. Accessing the benefits digitalization requires a thorough cost-benefit assessment. Adapting existing solutions to the needs of disaster relief operations is a task that could, and should, be fulfilled by researchers. The civil protection should provide funding opportunities that support these developments. Overall, it is important to keep in mind that digital infrastructures are mainly operated by private companies. Close collaboration between operators and the civil protection system, including the development of new regulating standards for these operators, will be important in the next ten years.

3.1.3. Unmanned Systems (US)

The use of unmanned systems (US), has been a trend in civil protection for already several years. The most relevant type of unmanned systems for civil protection are unmanned aerial vehicles (UAV), often referred to as drones, and unmanned ground vehicles (UGV) but unmanned underwater vessels (UUV) as well. Unmanned systems usually have an advantage when it comes to navigating around obstacles or when it comes to endurance. Thanks to progress in sensors, data availability and machine-learning, unmanned systems are being developed with increasing levels of automation and enhanced situational awareness, allowing operators to avoid hazardous environments. Most US already include partial automation and will likely be capable of high automation by 2030 (artificial intelligence level). Overall, the pace of progress in robotics is rapid and will likely trigger increased usage of unmanned automated systems in civil protection.

Large-scale deployment and regular use of US for civil protection purposes still depends on further development in two areas. First, power supply currently constrains flying machines due to the fact that endurance, operability in adverse weather conditions and load capacity determine successful deployment. For the near future, the most US in civil protection will have to rely on fossil fuel-driven technology. Initiatives to address this issue include hydrogen fuel cells, integrated solar panels, land-based power transmission and automated battery-switching and charging stations. Second, it is a question of regulation. In order to integrate a UAVs into the airspace, there is a need for a full service unmanned air traffic management regime (U-Space). This includes further development in this area. Aside from a rapid development, a challenge remains regarding robustness, cybersecurity and societal acceptance of the technology: Operational search and rescue teams have a strong preference for reliable and tested technologies in high-stress and high-stakes environments. Many applications still do not have the level of technology readiness to perform well under such circumstances. Critical infrastructures with a large threat area, will be hard to defend against a coordinated unmanned systems attack so they easily become extremist tools aiding acts of terrorism.
The opportunities provided by UV still have a lot to offer in terms of improved accuracy, available information, intelligence, situational awareness, regular maintenance and personal safety of relief forces: They can improve prevention through early detection and a reduction in human exposure to threats. The advantages in these situations include a reduction in time and cost of carrying out assessments, risk reduction for personnel working in hazardous environments and opportunities to inspect inaccessible areas. Search and rescue teams need to integrate information from multiple US a unified picture. The capability to integrate and analyse large amounts of data in real-time will serve Republic of Srpska in the future. Structures, such as the Operation Center should be organised to support such activities. In order to deploy UVs without losing public trust or violating privacy laws, transparent regulations should be developed. To further develop the use of unmanned systems in disaster response, collaborations between researchers and practitioners should be foster.

3.2. Social trends

3.2.1. Demographic „Recession“

Driven by increasing life expectancies and falling birth rates over recent decades, Republic of Srpska society is ageing. The share of the population aged 65+ grew from 17% in 2013 to 20.8% in 2020 (Centar za demografsko istraživanje Republike Srpske, 2021). The social and economic impacts of ageing society is somewhat cushioned through emigration. There is strong interaction between the demographic changes and ongoing changes in social norms and values in Republic of Srpska. Time pressure and increased expectations in career, education, leisure time and family, combined with a high level of mobility and urbanization, has resulted in less motivation to stay in this area, particularly among younger generations. The current trend in demographic will affect established processes and institutions in civil protection, especially with regard to recruitment, crisis management, and the allocation of resources. This is specifically implication of territorial distribution of population, depopulation trends and emigration as well as ageing trends that average age of population will be at 50,5 and that 28,7% of population will be 65+ (Marinkovic and Majic, 2018).

The demographic changes is a slow, gradual process influenced by many factors, and so, its continuation is uncertain in some cases. The ageing society trend would speed up in the future due to an increase in the number of younger emigrants from Republic of Srpska. The expected trend developments will pose a number of direct challenges to civil protection: Elderly people have the potential to be more vulnerable during crises and they also have additional needs in such situations. A challenge could be to accommodate these vulnerabilities and might necessitate additional civil protection. Diverse and growing difference in lifestyles between generations could hinder a common understanding of the responsibilities which could have an effect on the problem-solving skills within the civil protection system. An older population can cause personnel shortages in crises, as the pool of eligible and motivated candidates for the civil protection. The absence of age-appropriate functions for elderly people prevents a greater inclusion of this growing group into established structures.

Despite these challenges, there are also opportunities for civil protection. Creationing of opportunities and motivational incentives for certain population groups could facilitate their participation. A broader inclusion of elderly people and women will likely increase the resilience of the society as a whole. Their skills, life experience and local knowledge is also likely to benefit the civil protection system. At the same time, their integration could improve understanding of group-specific vulnerabilities in crises, and avoid generational, cultural, or gender-based exclusion or misunderstandings. The recruitment problems this trend causes offer an opportunity to reflect on the future of the organizational form of the civil protection system. A professionalization of the civil protection system could lead to higher performance
and more efficiency, if the necessary resources were allocated. By extending the creditability of community service, more young people could be available for civil protection tasks. A closer relationship with the public through direct communication, could increase the social status of voluntary engagement by highlighting its importance for civil protection. Recruitment opportunities presented by demographic changes could be overcome by opening up the system with the creation of more roles in civil protection that are accessible to older people or women, who to date remain an underutilized talent pool. More opportunities for ad hoc engagement in loose, event-based roles that do not require much training or previous experience, could motivate more young people to take on civil protection tasks. Demographic changes must also be embraced by adjusting emergency plans and procedures, especially in urban areas, and allocating resources in a way that is better adapted to the new requirements of a changing population composition.

3.2.2. Geopolitical Changes

The relative economic and military power is shifting from the unipolarity to multipolarity and the *Pax Americana* is coming to an end. These factors have led to discussions about the need for more strategic autonomy in Europe, if allowed. Against this background, the question arises how Republic of Srpska might be affected by these developments. Due to its limited resources and size, it depends heavily on the respect of international norms and institutions. Changes of geopolitics highlights structural factors based on territory and power centers and individual leaders perceptions of national interests and policy preferences. The degree of escalation in great power competition is hard to predict. Despite ongoing globalization, a counter-development towards more national and local approaches can be observed. Globally, a pattern of more independent, and less coordinated, foreign policies is emerging, shifting the focus from mutual interdependence to strategic autonomy.

At the same time, asymmetric and hybrid threats continue to add additional layers to the international threat situation. Inherent to these forms of threat is the targeting of civil society and critical infrastructures, where the latter are often owned by the private sector. This pattern is less accentuated in Republic of Srpska, as a considerable proportion of critical infrastructures are still owned by the state. Nonetheless, the potential targeting of civil society and critical infrastructures implies the need to adapt the corresponding threat management strategies, in particular civil protection and national defense. Supply chains for goods that are relevant to civil protection stretch around the world. In parallel, a concentration of production capacities in a few locations outside of Europe, by a decreasing number of suppliers, can be observed in some key sectors. Supply shortages of civil protection-relevant goods in can therefore occur. This may be caused by unplanned production lapses, or as intended or unintended consequences of conflicts between third parties. The COVID 19 pandemic has highlighted the lack of buffers in, and the vulnerabilities of, global supply chains in the face of a sharp, worldwide increase in the demand for certain goods due to an extreme event.

Notwithstanding the substantive uncertainties and challenges, geopolitical shifts also offer opportunities: Further, the emergence of more polarized geopolitical structures creates room for manoeuvre towards more independent policy options and offers potential for new, more regional avenues of transboundary partnership. As a consequence of and reaction to the ongoing transitions in the current global security situation, an increase in security spending becomes more likely. If national security is conceptualized in an inclusive and holistic manner, incorporating the protection of civil society into framework, then the area of civil protection would gain salience in, and profit from, larger financial contributions.
3.2.3. Critical Infrastructure Governance

Critical infrastructures (CI) are becoming ever more interconnected and interdependent, complicating their effective governance. In Republic of Srpska, there is not much done in terms of CI governing (Maksimovic, 2022). The optimal functioning of many infrastructures is dependent on the proper functioning of other infrastructures. Their effective design, construction, maintenance, management and regulation require adaptations in governance. The increasing interconnectedness and interdependencies between critical systems will continue throughout the coming decade. This may result in practical governance challenges, as the need for critical services grows, especially the case when ownership of critical infrastructure is mixed. One of the main drivers of critical infrastructure developments is digitalization – or more precisely digitalized control and telecommunication technology (Baezner, Maduz and Prior, 2018). A growing systemic dependencies lead to growing systemic vulnerabilities. Nevertheless, large-scale infrastructure failure rarely happens. Even in a big crisis, services provided by critical infrastructures remained mostly stable and reliable.

While technological integration of critical infrastructures continues, the developments in the political sphere are not as clear-cut. As soon as disintegration becomes the leading course of action, the chances for successfully governing globalized, networked systems declines. The trend towards increasing systemic dependencies with respect to infrastructure governance is usually linked to growing risk of systemic failure and systemic vulnerabilities. This poses a set of challenges for the civil protection system: The more tightly coupled critical systems become, the higher the probability of a large-scale breakdown leading to a catastrophic damage. Infrastructure operators and local policy-makers tend to think and act within their respective system boundaries, often missing the crucial dependencies between systems and related sectors. Governing processes for critical infrastructures often follow a prefer sectorial logic versus holistic one. As a result, policy-making and regulation efforts are unable to keep up with growing systemic dependencies. This includes opportunities for civil protection: Complexity and tight coupling can make systems more resilient. They permit the implementation of principles like decentralization, diversity and modularization. All of these are well known to increase the resilience of technological and socio-technical systems. In tightly coupled complex systems, advanced digital technologies can also be used to automatically discriminate between different users of critical infrastructure services.

When it comes to critical infrastructures, Republic of Srpska is part of an international system with close ties to, mainly, its neighbouring countries. Successfully governing of this system is only possible if actors from different countries and sectors work together. At the same time, Republic of Srpska should look for ways to, at least partly, insulate its critical systems from the larger network in case of an unfolding cascading disruption (Maksimovic, 2022). Civil protection should invest resources in research and plans for suitable ways to insulate the most important infrastructure sectors in case of a systemic failure for a short period of time. As soon as the systems are back running, insulation does not make much sense, because it is inefficient and makes the system more vulnerable to local failures as it would be missing.

3.2.4. Social Media

Social media subsumes a set of platforms and networks that allow the direct sharing and distribution of information between users. The rise of social media platforms in recent years is providing the opportunity to directly communicate to billions of people. The overall usage and the number of users of social media are growing steadily across all age groups – a development that is likely to accelerate over the next decade. Social media offers numerous applications in the context of civil protection, as it enables authorities to communicate directly with people and to receive feedback. Social media are dynamic and the preferred platforms
frequently change. Organizations using social media must therefore remain flexible, and be aware of the ever-changing usage behavior of relevant target groups.

The risks associated with social media have also become increasingly apparent. The use of social media can create an unprecedented spread of communication. This comes with a loss of control over the actual information once it is online, as it can easily be taken out of context, manipulated, or falsified. The quality and reliability of user-generated information on social media poses a particular challenge for civil protection authorities. Through social media, civil protection authorities can increase the reach of their communication, and address desired target groups more directly. Unlike most traditional communication channels, social media allows the population to give direct feedback to civil protection authorities which could help civil protection organizations to adapt their preparations and trigger aid deployments in a more targeted manner. For civil protection, social media opens up the possibility for interactive forms of communication in addition to traditional ones. This increases the criticality of correct and timely information (Lovari and Shannon, 2020).

Increased integration of social media in communication strategies, opens up new opportunities for civil protection, which should be embraced. For civil protection authorities, the major challenge is to regulate the whole process. Despite their advantages, social media should not replace other forms of communication in the civil protection system but rather, social media can act as complementary communication devices that always have traditional forms of communication as a back-up, in case digital communication fails due to power outages or signal failure.

3.2.5. Urbanization

Urbanization is commonly understood as the process by which more and more people live and work in cities instead of regional and rural areas, with cities expanding as a result. This has become one of the key trends of the 21st century, with more than 50% of the human population now living in cities. Currently, in Europe 73% lives in urban areas – a figure that is expected to grow to over 80% by 2050. (World Urbanization Prospects, 2018). In Republic of Srpska, 42% of the population now lives in or around urban areas. But, negative trends of depopulation impact the urbanization, so 17 local administrative centers does not have prerequisite for being „urban“. Hoover's index of concentration indicate that urbanization in Republic of Srpska goes in to direction of concentration in regional urban centers (Marinkovic and Majic, 2018). Rapid urbanization requires rapid land planning and urban infrastructure construction. The expansion of urban areas as centres of production has climate change implications. Given their production and population density, cities should be the points of focus in the development of ‘green’ or ‘smart’ cities to ensure sustainability of development and urbanization.

In the context of civil protection, the concentration of people, industry and infrastructure in urban regional areas is likely to result in more complex disasters, due to the interconnected nature of modern cities. Growing urban populations can impact the efficiency of critical infrastructures – putting additional pressure on critical infrastructure functioning. Poorly managed urbanization may place communities to additional risk in areas that are prone to them. The continuing growth of urban areas and increasing requirement and importance of mobility make the coordination of settlement and transport more difficult, especially during crisis responses and have significant impact on evacuation. As urban areas become more complex, populous and important for economy and production, the need to organise and develop them in a sustainable and well-managed fashion becomes more important. Regionalization put additional pressure on civil protection in terms of recruiting and operational balance.
Developing responsive processes to deal with urbanization in the context of hazards will influence both land-use planning and civil protection in the future. Emergency managers should periodically reassess population movements and adapt evacuation procedures and routes accordingly. Risk and safety analyses and risk communication processes must be incorporated directly into the broader land-use planning processes, and across administrative boundaries, given the trend towards urbanization. This includes ensuring that risk management and assessment processes for critical infrastructures consider changing conditions that can shift risk exposure, particularly for vulnerable populations.

3.3. Environmental trends

3.3.1. Climate Change

Although climate change predictions are marked by uncertainty, there is scientific consensus that climate change will continue to significantly impact environment and society at both global and local levels. For a small society like Republic of Srpska, climate change – and in particular global warming – results in numerous short- and long-term challenges for civil protection: The frequency of extreme precipitation events is predicted to increase in all seasons, but especially in winter. This will lead to an increase in flooding, an impairment of slope stability, and more frequent landslides. In the future, winter precipitation will increasingly fall in the form of rain instead of snow which increases the risk of flooding. More extreme heat will be particularly hard on the elderly and vulnerable people, posing a growing challenge to civil protection. Higher temperatures also foster forest fires and promote the spread of tropical infectious diseases. Concurrent extreme events could strain available resources.

Climate change can also reduce hazards and provide opportunities. Climate scenarios usually have a longer time horizon than measures in civil protection, which makes targeted adjustments on the part of authorities a challenge. At an international level, there are three key United Nations processes that link disaster preparedness and all three agreements have been ratified, and provide a framework for activities at a Republic level. Government measures in this area could be improved by promoting more active involvement of the population in precautionary everyday measures.

4. TREND OVERVIEW AND IMPACT

A main idea of this trend overview is to assess the implications of each trend to civil protection in Republic of Srpska by impact, adaptability and knowledge. Impact refers to the extent to which civil protection will be affected by the trends and by influencing its operations. It is assessed that civil protection in the future will be impacted by the social media, demographics, urbanization and governance of CI and the other trends are considered to be comparatively less influential. Adaptability is to the perceived need and ability of civil protection to address the challenges and opportunities that arise with the respective trends. The greatest need for adaptability is assessed with the trends demographics, governance of CI, social media and urbanization. The other trends will require a moderate to less adaptation. The third, knowledge refers to the knowledge already available within civil protection regarding the impact of trends and the necessary capacity to adapt. The differences in existing knowledge with regards to the individual trends are more pronounced than the differences for impact and adaptability. Existing knowledge is considered greatest for the social media and urbanization followed with digitalization, demographics, geopolitical change and US. There is room for improvement in civil protection with regard to acquiring the necessary institutional knowledge and capacities to address technologies, governance of CI and climate change. The summary results of the
findings based upon expert survey for each individual trend are presented in the following graphics (Table 1).

Table 1: Summary of findings regarding trends

<table>
<thead>
<tr>
<th>Trend</th>
<th>Impact</th>
<th>Adaptability</th>
<th>Knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology</td>
<td>M</td>
<td>L</td>
<td>M</td>
</tr>
<tr>
<td>Digitalization</td>
<td>M</td>
<td>M</td>
<td>H</td>
</tr>
<tr>
<td>Unmanned systems</td>
<td>L</td>
<td>L</td>
<td>L</td>
</tr>
<tr>
<td>Demography „Recesion“</td>
<td>H</td>
<td>H</td>
<td>H</td>
</tr>
<tr>
<td>Geoplotical Changes</td>
<td>M</td>
<td>M</td>
<td>H</td>
</tr>
<tr>
<td>CI Governance</td>
<td>H</td>
<td>H</td>
<td>M</td>
</tr>
<tr>
<td>Social media</td>
<td>H</td>
<td>H</td>
<td>H</td>
</tr>
<tr>
<td>Urbanization</td>
<td>H</td>
<td>H</td>
<td>H</td>
</tr>
<tr>
<td>Climate changes</td>
<td>L</td>
<td>L</td>
<td>H</td>
</tr>
</tbody>
</table>

Legend: L – low; M – medium; H – high;

5. CONCLUSION

Although all of the mentioned trends have implications for the Republic of Srpska civil protection system, the scope for civil protection actors to act varies greatly between the individual trends. However, early recognition of these trends and their impact on the civil protection system, makes it possible to build up the corresponding institutional knowledge and initiate necessary adaptive measures on time. The scope of action identified in this paper encompass the following. New technologies should be embraced as opportunities. Through the systematic and continuous identification of relevant technological advances and, where appropriate, their systematic integration into existing structures, the civil protection in Republic of Srpska could increase its efficiency and adapt its spectrum of capabilities for future needs. Both, risks and benefits, can be found in any new technology or practice. Second, the growing interconnectivity of vital areas and the resulting increase in complex risk situations, increases the importance of collaboration and cooperation between relevant actors at all levels. This requires adequate and efficient coordination and cooperation mechanisms to foster exchange of knowledge, experiences and skills. Next, growing uncertainty with respect to previously unknown threats and hazards and their potential effects, should be countered by placing more emphasis on a resilience approach. Both public and private sector actors, as well as individuals, should be considered as critical resources of civil protection. The last, a joint and coordinated approach by all components of the Republic of Srpska protection and rescue system creates trust even in uncertain times. This has become an essential prerequisite for effective action.

A continuous dialogue between authorities and the population before a crisis occurs, can establish the trust and awareness needed for a swift and efficient response in an emergency. Security organizations tend to resist changes because it is mainly perceived as instability. Overall, it is important that the Republic of Srpska civil protection does not fixate on the risks arising from the trends but also to recognize and take advantage of new opportunities in non-crisis times in order to be well prepared for forthcoming challenges.

REFERENCES


Building Information Modeling, Available: https://www.autodesk.com/industry/aec/bim


Maksimović, G. (2013), Model upravljanja kriznim situacijama u Republici Srpskoj, Fakultet za bezbjudnost i zastitu, Banja Luka.


CONCEPT OF THE PROJECT OF IMPROVING THE ORGANIZATIONAL STRUCTURE OF CBRN UNITS FOR USE IN CASE OF NATURAL DISASTERS BASED ON EXPERIENCE FROM FLOODING IN THE REPUBLIC OF SERBIA IN 2014

Dusan Jankovic

1University of Defense, Military Academy, Veljka Lukica Kurjaka 33, Belgrade, Republic of Serbia, dmjankovic83@gmail.com

Received: 21st July 2022
Accepted: 27th August 2022

Abstract: The paper presents the concept of a project of improving the organizational structure of the Serbian Armed Forces - a units of the Chemical-Biological-Radiological-Nuclear Service, which would be based on experiences from natural disasters, specifically on experiences from floods in the Republic of Serbia in 2014. The paper presents a description of the problem and the project, the needs for the project are formulated, the objectives, as well as the usefulness and activities of the project are determined, the interested parties for the implementation of the project are identified and the expected results are given. At the end, conclusions were drawn and a proposal was made for further improvement and development of the mentioned project.

Key words: project concept, organizational structure, CBRN Service, natural disasters, flood

1. INTRODUCTION

Natural disasters happen suddenly, very quickly and with a disproportionately high intensity, regardless of time, geospace and degree of vulnerability. These natural and extreme events are difficult to predict, make reacting, controlling and regulating the situation very difficult and often exceed the limit of endurance during the period of occurrence. The consequences of natural disasters are manifested by endangering the safety, life and health of a large number of people, material and cultural assets and destroying the environment.

Based on numerous geological, meteorological and other measurements, scientists predict which natural disasters could hit the Earth in the near future, as well as the areas that are particularly at risk. Although the Republic of Serbia belongs to countries of medium risk, analyzing the events in the past period, it can be seen that the geospace of the Republic of Serbia is seriously threatened by the consequences of natural disasters. According to statistical data, the most common natural catastrophic events in the world, on average annually for the period 2001-2020, are floods with 45.66% (Centre for Research on the Epidemiology of Disasters - CRED, 2022). It is certainly the most common natural disaster in the geospace of...
the Republic of Serbia. The floods that occurred in the Republic of Serbia in 2014 are one of the major natural disasters in that geospace. Eliminating the consequences of this natural disaster required the involvement of a large number of state entities, and therefore the Ministry of Defense and the Serbian Armed Forces with their capacities.

In addition to many entities of the state that are involved in eliminating the consequences of natural disasters, the Serbian Armed Forces also fulfills its role through specialized units CBRN (Chemical-Biological-Radiological-Nuclear) Service. As such, with the current organizational structure, CBRN Service occupies a special place in the organizational temporary structures of the state, which are formed to respond to disasters, and especially for the elimination of the consequences of natural disasters.

Experiences from the floods in the Republic of Serbia in 2014 favor the improvement of the organizational structures of all responding entities, in order to develop new capabilities and more successfully eliminate the consequences of natural disasters. The paper presents the concept of the project for improving the organizational structure of the units of the Serbian Armed Forces, specifically the CBRN units for use in the event of natural disasters, based on experiences from the operation to help civil authorities during the floods in the Republic of Serbia in 2014.

2. CONCEPT OF THE PROJECT

The concept of the project should contain a clear description of the project problem and formulation of project needs, defined goals, activities, stakeholders and expected results (Jovanovic, 1995), which is described below.

2.1. Description of the problem and formulation of project needs

The Serbian Army, with its capacities, plays a major role in dealing with the consequences of natural disasters, and its engagement is one of the special traditions of the armies in our area, so the saying "the army will do that" is often encountered among the people (Simovic M. 2016, p. 101). Historically speaking, there have been several natural disasters where the army has shown its capabilities and played a leading role in relation to other subjects of the state that participated in solving the problem, which was also the case in the emergency situation during the floods in 2014.

A more recent example of the use of units of the Serbian Armed Forces to assist civil authorities in responding to and eliminating the consequences of natural disasters occurred in 2014, when large-scale floods occurred in the geospace of the Republic of Serbia, which led to the introduction of a state of emergency in the entire country. The floods that occurred as well as the response to them gave a signal for the analysis, review and improvement of the existing protection and rescue system in the Republic of Serbia (Terzic M. Glisic D. & Cvetkovic Z. 2019. pp. 174). In order to improve the existing system of protection and rescue in the Republic of Serbia, it is possible to take the normative-legal and strategic-doctrinal bases of the use of the Serbian Armed Forces in such situations, in order to determine the legal basis for its use, to determine the organizational and functional links of the Serbian Army and other subjects of protection and rescue (Terzic M. Glisic D. & Cvetkovic Z. 2019. pp. 175), but we should definitely look at the implementation itself and its improvement, through the improvement of organizational structures for responding in emergency situations. The system of protection and rescue in situations like the one that happened in 2014 requires detailed analyses, risk assessments, undertaking the necessary preventive measures and the development of protection and rescue plans, but regardless of everything, it especially requires the selection of forces, their integration and joint engagement during protection and rescue and elimination of the consequences of natural disasters.
Unlike other natural disasters and natural disasters that appear suddenly and are short-lived, floods last a disproportionately long time, which can be seen on the example of the May floods, in the period from May 14 to 23, 2014. Floods in Serbia appeared after heavy rainfall that affected the central part of the Balkan Peninsula in the second half of May 2014. Extreme rainfall hit the geospace of the Republic of Serbia and over 100 liters of rain fell per square meter in 24 hours. Absolute daily and monthly rainfall maxima were recorded, and by May 16 it fell in Belgrade (258.4 l/m²), Loznica (283 l/m²), Valjevo (250.94 l/m²) and Smederevska Palanka (202.5 l/m²) (Government of the Republic of Serbia, 2014, pp. 118). This was also the rainiest month in history. Floods threatened about 1.6 million people in 38 municipalities in central and western Serbia, and damages were estimated at 1.5 billion euros, which is about 5% of Serbia's gross domestic product (Plavsic J. Vladikovic D. & Despotovic J. 2014. pp. 32). Dozens of people died as a result of swollen rivers, landslides and water, and a state of emergency was declared on May 15. During these events, the city of Obrenovac was the hardest hit by the floods, and it was estimated that 90% of the city was flooded, which resulted in the evacuation of the entire population. The size of the floods is also indicated by the fact that the flood wave on the Sava river near Sabac reached a water level of 660 cm, which is the highest water level of this river in that city, since records have been kept (Plavšic J. Vladikovic D. & Despotovic J. 2014. pp. 28). The state of emergency on the territory of the Republic of Serbia remained in force until May 23, 2014, when the Government of the Republic of Serbia adopted the Decision on its abolition on the territory of the Republic of Serbia, except in 2 cities and 17 municipalities, which were directly threatened (Government of the Republic of Serbia, 2014. pp. 3).

The natural disaster of 2014. had the proportions of a natural disaster and required the involvement of various state entities. The floods were a "practical test of the abilities" of the Emergency Situations Sector, the Emergency Situations Staff, the Serbian Armed Forces and other state entities in the protection and rescue of people and material goods. The public did not have a dilemma, "should we have an army or not", because its existence and engagement in the third mission of the Serbian Army (Supporting civil authorities in confronting security threats - 2nd task: Helping civil authorities in case of natural disasters, technical and technological and other accidents), practically tested (Simovic M. 2016. pp. 102). During the floods, the Serbian Armed Forces, with its permanent and temporary units, carried out the following activities in only the first phase: evacuation of the population, reception and treatment of vulnerable persons, water supply, delivery of food and emergency supplies, engineering works on the construction and strengthening of embankments and roads, installation of bridges crossing points, biological decontamination, veterinary surveillance, rehabilitation of landslides, water pumping, military police work, medical care and coordination of rescue teams of foreign armed forces. More than 2,500 members of the army and 185 larger assets were engaged daily, and 553 aircraft flights were carried out with about 200 hours of flying (Simovic M. 2016, pp. 104).

The CBRN unit with 2 platoons and 8 teams was engaged in the biological decontamination of the terrain. Together with public health institutes and specialized companies, disinfection was carried out in more than 10 cities, with the center of gravity in Obrenovac. On that occasion, 85 members of the army were engaged with 26 tank cars for decontamination, and 1,217 buildings and 2,318,110 m² of land and roads were decontaminated (Simovic M. 2016, pp. 106). With a part of their capacities, CBRN units were also engaged in water supply, together with other forces of the army. Water supply was realized on the territory of 14 municipalities, with 31 water tanker cars, with a total of 556 daily engagements of tankers and delivered 2665 m³ of water (Simovic, 2016).
Based on the above, CBRN Service occupies a special place in the organizational temporary structures of the state that are formed to eliminate the consequences of natural disasters and disasters. Among others, the tasks that the CBRN units performed during the May floods in the Republic of Serbia were biological decontamination (basic - expert specific task) and water supply (auxiliary task). In all engagements during the May floods, CBRN units successfully completed all assigned tasks. During the engagement, CBRN units used their peacetime organizational structures and, in addition, formed several matrix organizational structures in the form of temporary teams, adequate to the newly created situation. With the matrix model of the organizational structure, jobs from the basic functional or divisional organizational units were merged, in order to form temporary structures, which are problem-oriented for the performance of specific and temporary (project) tasks. One of the main advantages of the matrix model of organizational structure is flexibility. Temporary matrix compositions are basically very flexible, due to the temporary nature and changeability of composition and quick adaptation to new tasks and projects. The matrix model of the organizational structure is the most suitable for carrying out certain security tasks, such as eliminating the consequences of natural disasters. By forming temporary matrix formations from CBRN units, the aim is to obtain flexible teams, which are adaptable to new situations, focused on the function and the task, thus also on a specific goal, which is to eliminate the consequences of natural disasters.

On the basis of experiences from floods and realized engagements to eliminate the consequences, it is necessary to analyze the forces used by the CBRN units and consider the possibility of improving the organizational structure for engaging in operations to assist civil authorities in eliminating the consequences of natural disasters and disasters and the possibility of forming dedicated teams, which would be equipped, trained and ready for emergency response.

The formation of the aforementioned teams - temporary compositions of the matrix organizational structure from the CBRN units, during the realization of the set tasks for the execution of biological decontamination after the May floods, represent a good example of use on the basis of which the concept of the project of improving the organizational structure of the CBRN units for use in the event of natural disasters is based.

2.2. Determining the goals and activities of the project

Project goal:

Improvement of the organizational structure of the forces of the Serbian Armed Forces - the CBRN unit for use in the event of natural disasters, based on the operation to support the civil authorities during the floods in the Republic of Serbia in 2014.

Project activities:

- To analyze the existing organizational structure of the forces of the Serbian Armed Forces - the CBRN unit for use in the event of natural disasters based on the operation to support the civil authorities during the floods in the Republic of Serbia in 2014.
- To analyze all the activities that were implemented by the specialized CBRN units in the operation to support the civil authorities during the floods in the Republic of Serbia in 2014.
- Determine the necessary activities - capabilities of the organizational structures of the Serbian Armed Forces - CBRN Service that need to be developed in order to apply them in the event of natural disasters and disasters.
- Analyze the possible existence of capabilities of other forces of the Serbian Armed Forces, as additional forces to the CBRN Service formations, for use in the event of natural disasters and disasters, based on the required capabilities.
- Based on the current and desired state of the organizational structure, determine the procedures to achieve it.
- Analyze the need for equipping with modern means, needed to carry out operations to support civil authorities in case of natural disasters and disasters.
- On the basis of all previous analyses, model and form the organizational structure of the forces of the Serbian Armed Forces – the CBRN unit for use in operations to support civil authorities in the event of natural disasters and disasters.
- After analyzing the need, possibly call for a tender and acquire all the necessary modern means and equipment for the CBRN Service to carry out operations to support civil authorities in the event of natural disasters and disasters.
- Carry out the necessary further personnel training for the execution of the operation in question.

All the mentioned activities of the project would take place according to certain dynamics of work in accordance with the time plan of the project (Terzić, Sipka, & Stojanovic, 2015). After defining the project activities, the sequence and relationships between the activities would be determined. Determining the sequence of activities includes considering the reasons for possible interdependencies and different types of dependencies, which indicates the sequence of project activities (Avlijas, Avlijas, 2018). Determining the interdependencies between activities has a great impact on the development of the project timeline, e.g. does one activity have to be finished before another can start, can several activities be performed at the same time and can they overlap (Avlijas, Avlijas, 2018).

2.3. Project stakeholders

Stakeholders are all entities that are directly or indirectly involved in the project in some way, i.e. are interested in achieving the set goal of the project. These are subjects that are influenced by the project or have an impact on the project. In this project case, the following interested parties are identified:
- Ministry of Defense of the Republic of Serbia;
- Serbian Armed Forces General Staff;
- Serbian Armed Forces CBRN units;
- Military Medical Academy;
- Ministry of Internal Affairs of the Republic of Serbia;
- Emergency Situations Sector;
- Headquarters for emergency situations (republican, provincial, district, city, municipal);
- Local governments;
- Ministry of Health of the Republic of Serbia;
- Military schools in the Republic of Serbia;
- Scientific and research institutions, which study the field of security.
2.4. Expected results - usefulness of project implementation

Improved capabilities for engagement, through the structuring of the forces of the Serbian Armed Forces – CBRN units for use in operations to support civil authorities in the event of natural disasters and disasters are the expected results of the project. Also, the implementation of this project would achieve significant improvements in coordination with other forces that participate in solving the consequences of natural disasters, as well as the rationalization of forces, which would contribute to reducing the overall economic needs for the operation.

Adequate use of forces, with an emphasis on expertise, abilities and proper choice of organizational structure for specific activities, will contribute to a more efficient and effective elimination of the consequences and the achievement of the set goals. The expected results of this project would be beneficial both to the units of the Serbian Armed Forces themselves - specifically CBRN Service, and to other state structures, and especially the Emergency Situations Sector, headquarters and local self-governments, which are the bearers of activities to eliminate the consequences of natural disasters.

3. CONCLUSION

Normative-legal regulation and the establishment of an efficient system for a unified and integrated response to natural disasters and disasters, as well as the support of state institutions, represent a major organizational challenge in real circumstances. Selection of adequate composition, coordination and unification of all subjects and activities is the main goal of responding and eliminating the consequences of the situation. The role of CBRN units certainly occupies a significant place in eliminating the consequences of natural disasters. That is why it is important, by analyzing the engagements carried out during the floods in the Republic of Serbia in 2014., to conclude what is the optimal organizational structure of CBRN units for use in natural disasters and whether the existing one can be improved. All previous engagements, especially during the elimination of the consequences of the May floods in 2014, were carried out by CBRN units with civil institutions, by forming special teams. Their experiences represent a positive model for subsequent civil-military engagements and cooperation in response to natural disasters and the basis for a project to improve the organizational structure of CBRN units for use in the event of natural disasters.

The engagement of the CBRN unit and their organizational structure for eliminating the consequences of natural disasters is primarily determined by the type and level of the natural disaster, the consequences that the natural disaster left behind and the capabilities of other forces involved in solving the situation. However, there is certainly a real need for already organizationally formed forces and resources, which would be trained and ready to react before natural disasters and disasters occur.

In order for the civil authorities, who are responsible for the response to a certain emergency situation, to be able to successfully confront the emerging threat, the integration of all forces - participants, coordination and proper use, must be one of the capabilities they possess. The project aims to improve the organizational structure of the CBRN units of the Serbian Armed Forces, as a segment of the use and assistance to civil authorities in crisis situations, to achieve a certain contribution and help the leading state entities in reaching the mentioned capability, and based on the experiences from engagement in the operation to eliminate the consequences of floods in Republic of Serbia in 2014 (biological decontamination and water supply). The project of improving the organizational structure of the CBRN units of the Serbian Armed Forces can be further improved by analyzing other natural disasters and disasters where the forces of the Serbian Armed Forces – CBRN units were used, supplementing and implementing project goals and activities.
REFERENCES


GEOPOLITICS AND TERRORISM IN MODERN SOCIETY

Drazan Erkic¹, Miroslav Baljak²

¹ Faculty of Business Studies and Law, Belgrade, Serbia, drazan.erkic@hotmail.com
² Ministry of Defense of BiH - Armed Forces of BiH, Bosnia and Herzegovina, baljak.miroslav@gmail.com

Received: 21st June 2022
Accepted: 8th July 2022

Abstract: Today, geopolitics and terrorism are the subject of interest not only in scientific circles, but these two terms are increasingly interesting to the common man and the public in general. Geopolitics is related to space - territory and power in general, which is additionally very interesting in terms of the future geopolitical order and external political positioning of national states on a global level. The external positioning of national states is directly related to the geopolitical value of states, which is primarily reflected in political, economic and military power. Geopolitics is closely related to globalization, which brings with it not only the accelerated development of science, technology and the connection of people, but also certain security challenges and threats, above all terrorist threats that represent a security issue of global proportions. This Paper aims not only to conceptually define and determine geopolitics, terrorism, power and globalization, but also to indicate contemporary security threats in the geopolitical space, above all to indicate terrorism as a contemporary security threat and its impact on security in modern society.

Key words: geopolitics, terrorism, security, security threat, modern society

1. INTRODUCTION

Today, geopolitics as a science plays a special role in international relations and geopolitical actors in modern society. As an agent of future geopolitical changes, globalization is closely related to geopolitics. In such a globalized world, in which the main features are relations between people and states, the development of science and technology is related to geopolitics. Today's geopolitical value of each country is linked to their geopolitical power. That power is a crucial element of geopolitical positioning and the very influence of every nation-state in today's modern society. Today's modern society is characterized by the rapid flow of people, goods and services between people and countries, thus contributing to connecting people. Modern technological innovations are the support for this communication and connecting people. Due to the open borders and the accelerated development of scientific and technological achievements, they are a good ground for connecting people who engage in crime on an international level and who create serious security threats in modern society, among which terrorism stands out. Without any doubt, terrorism is a very serious and extremely worrisome security threat that sows fear among people and creates doubt in citizens'
trust in their own country and its institutions. Terrorism gains a global dimension thanks to the development of written and electronic media. A terrorist act committed in one country thanks to the media will be able to be seen by all of humanity in the fastest possible time. Not so far in the past, the consequences of terrorist acts, such as the attack on New York and Washington on September 11, 2001 in the United States of America, are so brutal and terrifying that they caused great disruptions in society and among people and worried many. In the context of that event, it is worth seeing Azinović who says "everything that happened that day carried an almost instinctively recognizable fateful character and the realization that nothing can remain the same." Along with this belief grew the need to discover meaning about what happened and what is still happening. Answers and explanations were necessary immediately, while Hegel's owls of wisdom were still hiding in the bright light of day". The fight against terrorism has always been demanding in society, and especially in the security sector, which is trying to find a way to prevent terrorist activities around the world. Everyone has a problem with terrorism, even the most powerful geopolitical actors in the world, who possess geopolitical power in the globalized world. They base their work on the prevention of terrorism, but also on repression when necessary. Terrorism is recognized as a serious global threat to security, which in such a modern society, in order to successfully fight against it, requires the continuous work of all security services at the international level, the rapid flow of security information concerning terrorism, but also the condemnation of everyone from individuals to national governments and international bodies against this scourge. Terrorist acts that are carried out all over the world generally have the same intentions and demands addressed to national governments, and they usually concern some political issues and concessions in a part of a certain territory that arise from secessionist or separatist motives, up to the release of their leaders from prison, the influence on certain processes in society, etc. Without any doubt, today's modern society is faced with a major security challenge related to terrorism itself and the threats of terrorism.

2. GEOPOLITICS - CONCEPTUAL DETERMINATION

In today's society, the word geopolitics can be heard more and more, both in conversation between people and in the media and on social networks. However, it must be said that there is still no single definition or agreement about what geopolitics is in scientific circles and among the professional public. In order to fully understand the very concept of geopolitics, it is necessary to point out its origin. According to Kolev, "the word, term, determinant "geopolitics" is a coin of two words: geo (Greek ge) and politics/polis (Greek politike). So both words have their roots in the ancient Greek language. Its more literal translation and etymological meaning is usually "geography of politics" or "politics of space". Since it is difficult to translate it into other languages, even into Serbian itself, it has been kept in its original form. The term was first used by the Swedish scientist Rudolf Kjelen in 1889" (Kolev, 2013: 227-228). In order to better understand and know what geopolitics is, we will point out a couple of definitions that deserve attention. According to Dugin, "geopolitics is the science of confrontation between civilizations ... a discipline that examines historical, strategic, geographical and planetary reality from the point of view of confrontation between two types of civilization - the civilization of the land and the civilization of the Sea" (Dugin, 2004: 181). Unlike Dugin, Kolev, D., Geopolitical power: contribution to the definition of the term. Civitas, MMXIII (6), Novi Sad, (2013), p. 227-251. Some authors believe that geopolitics is the science of the future, so in this sense it is worth defining geopolitics according to Grcic, who believes that "geopolitics investigates the place of a certain state on the political map of the world and the corresponding regions, with the aim of pointing out the most favorable forms and ways for its development and functioning. It is oriented towards the future. As a science of national strategy, it is the rational basis of the state's political position" (Grcic, 2000: 86). It is impossible to talk about geopolitics without taking into account the view of geopolitics
according to Klaus Dodds. According to his view, geopolitics "implies dealing with dangers, threats, space and force. It helps to explain the world in simple categories. Namely, it often seems that geographical labels such as the 'third world' are well founded. It also enables those who invoke it to make predictions about the future direction of world politics. Journalists and expert commentators often refer to geopolitics when they want to point to some important future events, whether it is the clash of civilizations, the rise of China, the collapse of history (and geography), the new American century, or the realization that Americans and Europeans are doomed to not understand each other because they live in different geopolitical universes" (Dodds, 2009: 49). Defining geopolitics according to the Little Encyclopedia, according to which "geopolitics is the science of the influence of the nature of a country (geographical position, climate, water, etc.) and its economic, social, political and cultural development on the historical development of a nation and its international position" (A small encyclopedia, 1968: 320). Many authors have made a significant contribution to geopolitics since its foundation and throughout its development, each from their own domain. However, as is known, the first term geopolitics was used by Rodolf Kjellen. According to Curak, "Rodolf Kjellen (1864-1922), a Swedish political scientist and professor of political science, is considered the founder of geopolitics, because in the work State as a Form of Life (1916), he tried to establish geopolitics as a scientific discipline. He divided politics into five disciplines, one of which is geopolitics, defining it as follows. It is the science of the state, as a geographical organism or phenomenon in space; therefore, about the state as a country, territory, area, or most clearly as land (space)" (Curak, 2002: 100-101). As the same author states, looking back on the beginnings of geopolitics and its further development, he states "due to the abuse of the fundamental but very sensitive principles of political geography by the German geopolitical circle, geopolitics was treated in classical scientific circles for many years as a pseudoscience, as a utilitarian, instrumentalized, totalitarian, state pseudogeography. Geopolitics has been kept silent for many years in the academic community due to this alienation. But globalization processes, accelerated by the collapse of the communist world and the penetration of the Western state and society into the East, have returned geopolitics to the public scene. However, the term (as well as its various representations) that has come before us has moved away from its bad history both in the media and in the health field, and as such, both in the superficial and in-depth sense, enriched with new meanings, in all its interdisciplinarity, has stepped into political science, polemology, geography, economics, ecology, culture and every other related scene, looking for a role for themselves in the many dilemmas of the new age. This deviation of the term and its content from negative historical practice is the best possible investment in geopolitics, and the beginning of a new investment cycle is timed in 1992. We symbolically tie it to William Jefferson Clinton's entry into the executive center of geopolitical power - the White House" (Curak, 2002: 86-87). It is evident that the very definitions of geopolitics clearly indicate that the basic elements of geopolitics and its key terms are space, politics and power. These terms or phenomena are most often associated with geopolitics.

3. GEOPOLITICAL POWER

Geopolitics focuses on space and politics, but also on power. The phenomenon of power is her inevitable field of interest. This is best illustrated by Kolev who says "geopolitics as a science and the phenomenon of power are in a tight and reciprocal relationship. On the one hand, geopolitics builds its cornerstone on the phenomenon of power, while, on the other, power in contemporary international relations is most often manifested as a specific form of power - as the political power of the state (eng. power politics; Russian: политическая власть), whereby geopolitical power (eng. geopolitical power; Russian: геополитической силы) appears as its basic content. Power is the basic means of achieving defined national and geopolitical interests on a global scale, and power is one of the key geopolitical concepts. 

191
Geopolitics is a valid instrument for understanding the phenomenon of power and its manifestation in the modern world" (Kolev, 2013: 227-228). In order to talk about geopolitical power in general, it is necessary to point out the very definition of the concept of power, as well as its etymology and definition. There are many sciences that deal with the phenomenon of power, thus trying to understand its essence. In addition to geopolitics, power is a central concept of the categorical apparatus in many sciences, such as history, physics, sociology, etc. Power can be said to be a very dynamic phenomenon and changes through the development of society. Just as for many sciences, power was the very focus of interest, so power was also very important for eminent scientists. Power is a very interesting phenomenon in terms of human survival, but it can also be a great danger to civilization and its heritage. As Gacinovic states, "with insufficient control of the power, the survival of the human race becomes very uncertain" (Gacinovic, 2007: 10). The very term "power" in most cases is identified with the terms "strength", "authority" and "force", so the term power can rightly be said to have multiple meanings. Regarding the identification of the concept of power and force, the opinion of Beridan is valuable, stating that "often these two concepts are identified, the concept of power and the concept of force, and in social sciences sometimes one or both are subsumed under the concept of government. For this reason, and for the sake of a better polemological understanding, it is necessary to determine the matrix of their meaning, and to more precisely define the terms of a lower order, those that arise from them. Power, (or as a synonym) strength represents potential, the existence of possibilities, capacities, resources for producing some changes in nature and society. The simplest stratification of social power is its division into individual and collective. The individual is measurable within a collectivity against other individual powers, but also beyond it, while the collective is measurable against the power of other collectivities, i.e. society" (Beridan, 2003: 29). Unlike Beridan, Kolev states that "the American political scientist Robert Dahl (b. 1915), based on Max Weber's understanding, defines power as the ability to force another subject to do something he would not otherwise do" (Kolev, 2013: 235). Power can be manifested through certain forms, so there are several types of power. According to Gacinovic, "we can distinguish several types of power: a) economic power; b) social power; c) military power; and d) political power. These types are most often manifested in connection, that is, they are never realized independently" (Gacinovic, 2007: 10-11). Geopolitical power is linked to politics and political power. Thus, according to Kolev's point of view, "theorists who deal with this science do not dispute that politics is the basic building block of geopolitics and that it possesses power that manifests itself as geopolitical power. States are basic territorialized political communities and as such imply a synthesis of geographic space and politics. That is why it is rightly claimed that the combination of geographic space and politics is the birthplace of geopolitics. International relations theorists believe that geopolitical power in international relations is most often used to create specific relations such as: a) balance of power; b) struggle for power; c) distribution of power; and d) impact on national will, etc." (Kolev, 2013: 246). Scientists who deal with geopolitical issues have not yet agreed on the definition of the term geopolitical power. The phenomenon of geopolitical power is itself very complex, so the first steps of scientific workers and researchers were based on the knowledge of the basic content of the term. In the attempt to define geopolitical power, the point of view of the representatives of the realist direction is valuable, as they tried to include the majority of its elements through one more complex definition. Thus, according to the same author, "Hans Joakim Morgento (1904-1980) in his famous book Politics Among the Nations: The Struggle for Power and Peace, which for almost three decades was the basic theoretical concept of international of US policy, implicitly provides one of the possible concepts of the structure of geopolitical power". Hans Joakim Morgento defines the concept of power as "man's control over the thinking and actions of other people", and he sees the relationship between states as "the concept of geopolitical interests defined as power". He paid special attention to the elements of state (national) power, which
also includes elements of geopolitical power” (Kolev, 2013: 247). Speaking about geopolitical power, Hans Joakim Morgento believes that "national power is built from nine basic elements (Morgentau, 1967):
- geographical location - the most stable and permanent element;
- natural resources (agricultural land, raw materials, energy);
- industrial capacities;
- military capabilities (military-technological development, armed forces, mobilization capacities, etc.);
- demographic characteristics of the population;
- the national character of the population;
- national morality;
- the quality of diplomacy ("the brain of national power"); and
- abilities of the government.

For this author, these elements are at the same time a type of instrument and political power itself through which geopolitical interests are realized. As Kolev points out, "in the absence of a more consistent definition of the phenomenon, we will represent the understanding of geopolitical power as the quantum of means, potential and ability of a state or another international entity to realize its geopolitical goals in a certain area." Therefore, the territorial moment of power is the essence of geopolitical power” (Kolev, 2013: 248). It is evident that through geopolitical power, geopolitical actors want to build a certain type of influence on the subjects of international relations, in order to realize their geopolitical interests, and the very goal of geopolitical power concerns the effort to establish control over a certain area, using the necessary and sufficient ways, techniques and methods to achieve that intended goal. These methods and techniques are usually related to economic extortion, coups, psychological manipulation, etc.

4. TERRORISM - A GLOBAL SECURITY THREAT

Security has always been desirable and necessary for human survival, especially today. Security, like geopolitics, does not have its own unique universal definition. For the sake of better understanding, it is necessary to point out several definitions, among which is the definition of Kekovic, according to which "security is a phenomenon on the occasion of which complex relations are established between people, groups, organizations in an effort to ensure such a state, that is, values that are considered essential" (Kekovic, 2009: 16). Unlike Kekovic, according to Tadic, the concept of security is somewhat different, according to which he considers security to be "a state in which country feel that there is no danger of military attack, political coercion or economic compulsions, so that they can develop freely" (Tadic, 1991: 21). In today's modern society, the globalized world, there are many security threats that threaten the safety of people and their property. As stated in the Law encyclopedia, "threat initially has a negative sign because it implies a type of pressure that hints and puts into perspective concrete damage or some evil from the position of force, all with the aim of forcing a certain object of security to make certain concessions or behavior" (Grupa autora, Legal Encyclopedia, 1979: 1101). Special attention from the aspect of security today is attracted by security threats that are a global threat to humanity. Certainly, among the global threats to security, in addition to many others (weapons of mass destruction, transnational organized crime, biological threats, etc.), terrorist threats are at the very top. Terrorist threats, in particular, gain importance for security subjects and the world community in general, after September 11, 2001, with the terrorist attack on New York and Washington. The attitude
towards this type of threat, consequences and possible perpetrators marked a new beginning, not only in prevention, but also in repression. Terrorism is also very difficult to precisely define and determine, primarily because it is a multidimensional social phenomenon that requires a multidisciplinary approach. In the context of the difficulties surrounding the definition of terrorism, and especially in today's contemporary society, Azinović's point of view is valuable, stating that "after 2001, the confusion surrounding the definition of terrorism was further deepened by reducing the focus of research on its religious motivation. As a result of the trauma produced by the attacks of September 11, 2001, part of the political elite and professional public, especially in the United States of America, created the impression that Islam or Islamism as a resulting (and allegedly legitimizing) ideology are central problems, the understanding of which today, the ability of the West to successfully respond to the challenges of terrorism depends crucially. Apart from being cognitively limiting, this obsession with Islam(ism) as the supposed key generator of contemporary terrorism is at the same time counterproductive as it diverts attention from its real causes. Not even the significant increase in interest in terrorism studies after 2001 brought us any closer to the desired outcome - the emergence of a universal academic definition of that form of political violence" (Azinović, 2012: 16). However, the complexity of the term itself is also reflected in the fact that terrorism can be viewed from many aspects, primarily from the aspect of criminalistics, politics, criminology, but also criminal law. As with most scientific terms, so with terrorism, in order to best understand it, one must start from its etymological meaning of the word itself. According to Sikman, "when defining the term terrorism, it is necessary to start from the etymological meaning of the word 'terrorism', which is derived from the Latin word *terror*, which means intense fear, or the French word *terreur*, which means sowing fear. Because of this, many definitions rely predominantly, or exclusively, on fear as the defining element of terrorism. The term terror, in the political sense, means an action of violence undertaken for political purposes - in order to intimidate and break the resistance of the person against whom it is carried out" (Sikman, 2006: 66-67). There are various definitions that determine the term terrorism, so according to Mijalkovski, "terrorism implies the application of premeditated, organized and systematic violence by a non-sovereign (non-state, non-governmental) subject (groups, gangs, organizations, political parties, etc.) or a sovereign (state) subject, i.e. state, determined to use even the most brutal physical force on a pre-selected (personal) or random victim, for the purpose of killing, maiming, kidnapping or psychological abuse, to preferentially cause a complex of fear or insecurity, anxiety or apathy in the environment from which the immediate victim of the attack is, in order to achieve the projected political goal" (Mijalkovski, 2003: 8). In contrast to this author, Milosevic defines terrorism as "a planned act of violence, undertaken by certain social groups, with the aim of preserving or conquering power, and that only terror that contains a social-psychological, i.e. political component in its being can rightly be called terrorism" (Milosevic, 2005: 9). In contrast to these two authors who give definitions of terrorism, it is necessary to point out the definitions of terrorism which are called institutional, so according to the Criminal Code of Bosnia and Herzegovina in Art. 201. terrorism means "committing a terrorist act with the aim of seriously intimidating the population or forcing the authorities of Bosnia and Herzegovina, the government of another country or an international organization to do or not do something, or with the aim of serious destabilization or destruction of serious political, constitutional, economic or social structures of Bosnia and Herzegovina, other countries or international organizations" (Commentaries on criminal/penal laws in Bosnia and Herzegovina, 2005: 659). Many scientists, in a more serious approach to terrorism, try to point out its causes. Any serious way of researching both terrorism and its causes requires a versatile and comprehensive process. There is no single answer to the causes that lead to terrorism, and here there are different views of researchers and the professional public. Often, different researchers of the phenomenon of terrorism and its causes have diametrically opposite views. However, as
Sikman states, "the causes of terrorism are primarily in deep and irreconcilable global social changes in the political, economic, social, normative and moral sphere of social life, which have occurred in the last two decades." Terrorism is a constant companion of the mentioned social, political, economic and other changes, which manifests itself through various forms of violence, which, depending on the carriers and goals, (political) destabilize the basic values of every society" (Sikman, 2006: 78). When talking about the causes of terrorism itself, there are several divisions, among which the most prevalent is the division that divides the causes of terrorism into objective and subjective. As the same author states, objective causes of terrorism "mean objective problems, injustices, frustrating anomalies in the economic base and political development of society. Some of the objective causes of terrorism can be listed as: non-democratic constitutional organization of the state, non-functioning of state institutions, economic and social differences within states, extreme nationalism and fanaticism, unresolved ethnic problems, colonial and non-colonial dependence, unresolved issues of borders and the state, religious alienation - cleroschauvinism and fundamentalism, the desire for expansion and hegemony (national, territorial, economic, social, religious and cultural domination) etc." (Sikman, 2006: 78-79). Unlike the objective causes of terrorism, as stated by Stajic, the subjective causes of terrorism "mean the assessment of the terrorists that the unsustainable social situation (objective causes of terrorism) can only be changed by violence, i.e. that violence is the fastest, most expedient, most effective and, under the circumstances, the only possible variant of action" (Stajic, 1999: 288). For a more complete understanding of the phenomenon of terrorism, in addition to its definition and the causes that lead to it, it is necessary to point out its characteristics, which relate to its manifestation and these characteristics make it special. Analyzing each terrorist act, it is evident that it is linked both to an individual and to a terrorist organization. For Sikman, the basic characteristics of terrorism are considered to be: (1) an act of violence, (2) causing fear, (3) achieving political (criminal) goals, (4) conveying a specific message, (5) organizedness, (6) brutality, immorality and irrationality terrorist act, (7) choice of victim and object of attack, (8) illegality of terrorist act and (9) condemnation of terrorism" (Sikman, 2006: 82). Terrorism, as a serious security threat to modern society, is classified in several ways and there are numerous criteria for classifying terrorism. Thus, on the scientific scene, we have different authors who state different classifications of terrorism. According to Sikman, "one of the divisions of terrorism is internal and international, based on the location of the given terrorist action, the nationality of the perpetrators and victims. Also, very often terrorism is divided into indirect (discrediting the government by proving its inability to protect the population and its goods) and direct (the goal of terrorism is to terrorize the authorities or their representatives" (Sikman, 2006: 90). A somewhat different view regarding the classification itself of terrorism is given by Mijalkovski who "classifies terrorism based on determining the basic elements of the terrorist process. As the basic elements of the terrorist process, he states: active subject (carrier), passive subject (victim) and observers. Based on the mentioned elements of the terrorist process and the facts that characterize it, terrorism classifies: 1) according to carriers - non-state and state, conditional and international, 2) according to causes - political, religious, ethnic and others, 3) according to object of attack (victim - passive subject) - selective and non-selective and 4) according to means - conventional, nuclear, biological, chemical, internet and others" (Mijalkovski, 2005: 21-56). Regardless of what type of terrorism it was, and what classification of terrorism it belongs to, the act of terrorism itself is very dangerous and causes citizens great fear and a sense of distrust in their own authorities and institutions, which is ultimately one of the goals of terrorists. To achieve their goal, theorists use and apply the terrorist strategy that they believe will be effective in achieving the ultimate goal. Through a careful analysis of the terrorist acts, it can be concluded that the strategy of terrorist activity is characterized by insidiousness, offensiveness, indirectness and long-term exhaustion of the opponent. Unlike in the past when the victims were residents who fought, adult citizens,
today's modern terrorism is different, whose victims are very often minors and even children. As Azinovic states, "if we accept the fact that the most frequent victims of modern terrorism are civilians, i.e. the non-combatant population of all ages, who do not actively participate in a conflict in any way (including the army and the police who are not engaged in the conflict), it is clear that there is no single motive which could justify their suffering, and therefore not using terrorism as a way of fighting. There is no such ideology, political goal or desired model of organizing society that can legitimize the calculated liquidation of innocent people. That is why, regardless of the motive, every act of terrorism is essentially a criminal offense. Or, as Alex P. Schmid stated in his proposal to the United Nations as a legal definition of terrorism in 1992: "An act of terrorism is a peacetime version of a war crime" (Azinovic, 2012: 16). As the ultimate conclusion of terrorist activity, it can be said that any motive or motivation from which it arises is unjustified, because the consequences they bring with them produce enormous negative consequences for individuals and society as a whole. Today, the world is faced with contemporary terrorism, which is very cruel and brutal, and the way to fight against it requires a multidisciplinary approach and a joint response of global society.

5. CONCLUSION

Today's modern society, due to a multitude of social processes, and especially in the midst of globalization, is getting a new form and framework in which it operates. Through the process of globalization, a faster flow of goods and services between countries is realized and a close relationship has been created in connecting people. Certainly, the openness of borders and the availability of goods and services to everyone, in a very quick and simple way, is a great advance for modern man. However, this represents the positive side of the globalized society itself, but there is also that other negative side which, through all these processes, has enabled the connection of criminals, who, by connecting outside the borders of national states, commit the most serious crimes, especially crimes in the field of transnational organized crime. Thus, the association of people from the criminal milieu produces serious modern security threats, such as, among other things, terrorism. Today's modern man is preoccupied with the problem and dangers of terrorism, especially after September 11, 2001. Geopolitics and the main geopolitical actors of today's modern world, through the prism of their geopolitical power, strive to thwart such threats to man, his property, states and society in general. A serious fight against this contemporary security threat and security challenge is not only placed before the main geopolitical actors in society, the security services, but also before the entire world community to help, through various forms of struggle, to stop this global evil. Looking at it from the point of view of geopolitics, it cannot be said that in today's modern society the state is the main geopolitical actor, but there are also some other non-state and supra-state actors. Although geopolitical power focuses on establishing control over space and its resources, control over contemporary security threats is not under control and this represents an additional burden for geopolitical actors with pronounced geopolitical power to sovereignly rule everything. In this fight against terrorism, it is clear that both science and technology must make their contribution, especially science through a type of multidisciplinary approach and building a system for rapid exchange of information that would primarily deal with this type of problem. Current practice shows that the most successful form of terrorism prevention is in the field of obtaining timely information about the planning and organization of a terrorist act. That's why it can rightly be said that we fight terrorism mostly with timely information. Today's and future geopolitical order and global society are fundamentally changing, and therefore a successful fight against terrorism will necessarily require greater flexibility and monitoring of contemporary socio-political trends at the global level.
REFERENCES

Azinovic, V. (2012) Introduction to Terrorism Studies. Sarajevo: Faculty of Political Sciences, University of Sarajevo.


COMMUNITY POLICING AND COOPERATION WITH EXTERNAL ENTITIES IN THE FIELD OF SECURITY - THE CASE OF THE MURSKA SOBOTA POLICE DIRECTORATE

Damir Ivancic¹, Leon Vedenik², Katja Eman³

¹ Police Directorate Murska Sobota, Ulica arhitekta Novaka 5, Murska Sobota, Slovenia, damir.ivancic@policija.si
² Police Directorate Murska Sobota, Ulica arhitekta Novaka 5, Murska Sobota, Slovenia, leon.vedenik@policija.si
³ University of Maribor, Faculty of Criminal Justice and Security, Kotnikova 8, Ljubljana, Slovenia, katja.eman@um.si

Received: 2nd August 2022
Accepted: 28th August 2022

Review paper

Abstract: The term "policing" describes all activities carried out by the police as an organisation. One of the fields of police activity is also community-oriented policing, comprising the activities of the police, which at the local level focus directly on the local community, and include repressive and preventive action with the aim of ensuring the highest possible level of security. The paper shall present the operation of the Murska Sobota PD in the local community and cooperation with all the entities with the basic aim of increasing residents' satisfaction with a sense of a safe living environment.

Key words: community policing, plural policing, security, Murska Sobota Police Directorate (MS PD), Slovenia

1. INTRODUCTION

Around the beginning of the twentieth century, police work began to change in parallel with the development in the light of extensive and important social, economic and political changes. In the field of policing, these changes that have influenced the perception of the role of the police in a democratic society stand out: the professionalisation of policing, bringing the police closer to the community, connecting with other institutions in preventing and responding to crime, expanding the role of the police - from fighting crime to ensuring the quality of life and reducing the fear of crime. With the introduction of plural policing, the police transferred individual tasks to other operators and in this way also partially relieved its burden. Plural policing belongs to the public-private model of policing (public-private divide policing) (Ponsaers, 2001). It developed as a response to a too narrow and too traditional concept of the police and policing. Modic, Lobnikar and Dvojmoc (2019: 219) emphasise that plural policing is "characterised by concepts such as breaking police work into smaller parts, splitting,
redistribution and fragmentation of police work, consumerism, privatisation, (un)safety and responsibility."

Today, policing is understood as activities carried out by professionals within a number of organisations (it is the professional implementation of certain activities) and/or by individuals in the community. Policing is performed by authorised state employees within the organisation which is most often called the police, with broad powers to deal with crime and establish and maintain law and order. In addition to police employees, policing is also carried out by other (state) employees at the local and state levels whose primary tasks fall within the field of policing (certain tasks of the customs, anti-money laundering agencies, intelligence services, military police, etc.). Policing is also carried out at the level of local self-government (municipal warden services) and in the framework of carrying out economic activities (private security, detective work, security consulting). Some authors also include surveillance with technical means under policing, especially video surveillance of certain public spaces, parking lots, etc. Stenning (2009) defines the pluralisation of policing as a dominant trend in the development of policing around the world in the last two decades, as public and private police organisations have been gradually developing in close connection with each other, as a result of which the modern model of the implementation of policing is characterised by the distribution of police tasks among different operators. The concept of the public-private model of policing is thus closely related to the concept of plural policing, which represents the process of transferring the performance of typical police tasks to private and other state and local police, security and supervising organisations. Thus, the public no longer perceives the state police as the sole bearers of responsibility for ensuring security, as this role has also been taken over by other public and private organisations that contribute to ensuring security with their activities. Such organisations include the state prosecutor's office, the customs, inspection services, security and intelligence services, court and judicial police, local police, private security organisations and detective organisations.

The main challenges of modern policing in Slovenia remain the cooperation between the various entities of the plural police family, the unification of standards in the area of powers of the representatives of organisations in the field of policing, and the issue of control over the activities of the analysed organisations. The purpose of the paper is therefore to examine the cooperation of the institutions of the plural police family in the area of the Murska Sobota PD and analyse the activities of public and private organisations that cooperate with the police in Pomurje in order to ensure security.

2. COMMUNITY POLICING (CP)

The progress and modernisation of society also brought about complex social relations and constantly new security occurrences, which led to the gradual development of modern policing approaches. For a long time, the police used the traditional (more repressive) model of police work, the purpose of which was primarily the fight against crime, and its success can be demonstrated with police statistics (Mesko, Sotlar and Lobnikar, 2018). But over time it became clear that the traditional model was not sufficient to ensure security in local communities, as many problems were not linked directly to crime. The police realised that it was necessary to build on relations between police officers and residents. Traditional models began to be supplemented with preventive activities in the local environment, and the reactive approach was replaced by a proactive one. With this, they set out to solve the problem of crime, disorder and other problems about which they warn the residents in local communities. New forms of preventive work, based on cooperation between citizens and the police, have begun to be developed, as well as joint identification of security problems and a focus on solving them (Policija, n.d.). Changes also took place in the Slovenian Police, the role of which had to
change after the independence of Slovenia and the change of the social system. This encouraged a new approach and a new form of community policing (ReNPPZK19–23, 2019).

Community policing is one of the main concepts of crime prevention (and reducing the fear of crime). It is similar to self-protection by the citizens in local communities while simultaneously cooperating with the police, aimed at solving problems in the local community in question. At the same time, Mesko (2001) points out that community policing is based on the assumption that it is necessary to look for problems in the community, discover the causes of these problems and take appropriate measures. Desired results of community policing are preventing crime, reducing the fear of crime, increasing residents' satisfaction with life in the community, solved problems, and the legitimacy and legality of police work. And the goal of community policing is to improve the quality of life of the residents.

Community policing is based on partnership cooperation and trust and is carried out professionally. Specifically, high-quality and fast elimination of security problems is a condition for public satisfaction and sense of security. It is crucial that police officers have a respectful attitude towards residents and, ultimately, this applies to every contact with residents, as people's trust can be lost due to the slightest mistake. The fundamental mission of the police is above all to serve the people (ReNPPZK19–23, 2019).

Partnership cooperation between the police and local communities in Slovenia is already defined in the Organisation and Work of the Police Act, 2013, which stipulates in Article 35: 1) cooperation of the police with the authorities of self-governing local communities; 2) cooperation of the police with other authorities, organisations and institutions, civil society and private persons; 3) cooperation of the police with state authorities, self-governing local communities, legal persons, sole traders, the law enforcement authorities of other countries, self-employed persons and with other authorities and organisations; 4) establishment of councils, advisory committees, commissions or other forms of partnership cooperation (Organisation and Work of the Police Act ZODPol, 2013).

Police work (in the community) is effective only when police officers are actually present in the community and cooperation is established in identifying problems and eliminating the causes of their occurrence. The police, however, have varying degrees of success in establishing appropriate contacts with citizens and the local community. To some extent, this is conditioned by social order and the actual attention given to this by the state (ReNPPZK19–23, 2019). The police carry out preventive activities in various areas of work, which are supported by materials and presentations for residents in the form of lectures, round tables, participation in fairs, and appearances in the media. The main operator of these activities at the local level is the neighbourhood police chief. However, community policing is the task of all police officers, not only the neighbourhood police chiefs; therefore, everyone must be aware of this responsibility, and the management must adjust to this (ReNPPZK19–23, 2019). Partnership cooperation is implemented at the level of police directorates and police stations. These report on a security situation in a certain local community in direct contact with mayors and municipal councils. Police station areas are divided into neighbourhood police areas, which are headed by the neighbourhood police chief. Operational tasks in the neighbourhood police area are performed by all police officers.

In the 2013 strategy of community policing, the police set goals to increase partnership cooperation with the local community, state authorities and civil society, increase the visibility and presence of police officers in the local community, increase the feeling of security, and increase trust and satisfaction with the work of the police (Policija, n.d.). The essence of the strategy is also to increase the independence of police stations, which should adapt their work to the needs and interests of the local community in the field of security. Commanders should
reflect the situation in the local community by independently determining police station tasks. The aforementioned goals can be achieved with the initiatives given by the police to local communities in the context of establishing security advisory committees and cooperating with residents and representatives of local communities. Greater visibility and presence of police officers are also important, as well as the coordination of municipal security programmes with the local community, professional performance of tasks and attitude towards people, and training of police officers in this field. "A police officer's community policing begins with 'good day' and ends with 'goodbye.' A polite approach, or the approach of an authorised official, must be the foundation for any further action by the police officer. If there is no such foundation, it is difficult to talk about community policing" (Smolej, 2013, p. 7).

The Security Advisory Committee is one of the forms of consultative bodies (in addition to, for example, councils and commissions), which are important in solving security issues in local communities. They are established by the municipal council at the initiative of the mayor, and the idea is that in the context of councils/advisory committees, citizens can make decisions or give opinions with regard to the issues of the local community (Local Self-Government Act ZLS-UPB, 2007). Other entities also participate in such committees, such as the police, private security companies, the mayor, etc. The purpose of establishing consultative bodies is primarily to exchange opinions on issues in the local community and ideas on how to solve them (ZODPol, 2013). The presentation of the work of the police and the exchange of information with the participants are also important. The main purpose of advisory committees is therefore to better ensure security in the local community where partnership cooperation with the police and other entities is emphasised, which is especially important for the implementation of community policing.

3. COMMUNITY POLICING AND COOPERATION WITH EXTERNAL ENTITIES

Modern policing includes activities carried out by professionals from various organisations and individuals in a certain (local) community. Modic et al. (2014) state that policing is carried out by authorised state employees in the framework of the police with broad powers to manage crime and maintain law and order. But the police are not the only ones who carry out the tasks of policing. Others include customs, money laundering prevention agency, intelligence services, military police, and judicial police officers. The latter perform policing at the state level. Policing is also carried out at the local level (municipal wardens), in the context of carrying out economic activities (private security companies, detectives) and with individuals organised in informal networks for the implementation of supervision. All of the aforementioned operators of policing can be connected into the concept of plural policing. Within the framework of plural policing, the police maintain a leading role in ensuring security and law and order, as well as in preventing criminal acts.

"Organising and ensuring security in the local community is a strategic task and an integral part of the system for the provision of internal security" (Modic et al., 2014, p. 227). At the same time, it applies that modern approaches to ensuring security are built on partnerships in which the state connects with the local and the public with the private. Ensuring security at the local level is mainly focused on preventive activities, when the community helps its most vulnerable members. In this way, methods of improving cooperation with people in the community are sought, and local supervision and the systems of functioning of state institutions are improved.

---

1 Pecar (1992) divided supervision into formal social supervision, informal social supervision, and institutionalised informal social supervision. Formal social supervision is repressive supervision carried...
The police are primarily responsible for responding to threats to security, but they find that security concerns are too often left to them alone and due to a lack of information, they often cannot react in time to occurrences and actions that disturb the residents (Policija, n.d.). By cooperating with ministries, local communities, non-governmental organisations, civil society organisations and private security services, the police plans to create partnerships cooperation for the purpose of successfully combating crime. In addition to the preventive activities of the police, in order to effectively prevent crime, it is also necessary to involve organisations at the state and local levels, the private sector and civil society. As a result, the resolution (ReNPPZK19–23, 2019) sets goals to achieve a greater number of partnership relationships between the above-mentioned entities. The cooperation with communities, municipal warden services and individuals must be adapted to security problems that have arisen or are expected. It must be timely and implemented in a way that will be effective and improve security in a certain area. The community will be satisfied with the work of the police only if the police respond to security problems as soon as possible (ReNPPZK19–23, 2019). The cooperation between the police, warden services, private security services and other entities of plural policing represents an important challenge while aiming towards a common goal: public safety. Professional relationships, cooperation and trust can be built by conducting joint training.

Cooperation at the local level is most often organised in the form of security advisory committees. These are established by mayors for the purpose of cooperation, and it is in these committees that priorities in the field of crime prevention and ensuring security at the local level are determined. Police officers, school representatives, social services, private security companies, societies, non-governmental organisations and private companies all participate in security advisory committees. When involving local residents in ensuring security at the local level, they should only focus on identifying problems and not on finding solutions for certain problems (Mesko et al., 2018). The main function of security advisory committees is to connect, organise and guide everyone who deals with security issues. Research on the work of municipal security advisory committees showed that in some municipalities they functioned effectively, while in others they were merely an unrealised idea. Some of the obstacles to the successful operation of security advisory committees were unclear roles of committee members, different understanding of security problems, lack of knowledge and unwillingness to cooperate. Nevertheless, in some places positive effects were also shown in the form of actual cooperation, raising public awareness on the issues, discussions and democratisation of social control.

When ensuring security at the local level, it is important to take into account the size of municipalities and the specificity of the problems of individual municipalities, as these can vary greatly among municipalities. The 2017 Safety in Local Communities research showed which future trends for ensuring security the residents are most in favour of. In order to effectively ensure security, residents are more in favour of social prevention than traditional forms of supervision and stricter penalty policies (Mesko et al., 2018). New technical solutions for greater traffic safety, improving the safety of children on the way to school, and changes in the penalty policy stand out. This is followed by more consistent but more flexible punishment with alternative methods of punishment. However, they were least in favour of additional pluralisation and privatisation of security. Police officers are more committed to
strengthening security advisory committees than residents. As part of the mutual cooperation between the police and the public, a symbol has also been developed that illustrates the partnership relationship of cooperation between the police and the public in the field of security (Figure 1).

![Figure 1. Partnership cooperation](source)

4. MURSKA SOBOTA POLICE DIRECTORATE CASE STUDY – COOPERATION WITH EXTERNAL ENTITIES IN THE FIELD OF SECURITY

The MS PD can be praised as an example of good practice of police cooperation with residents. In the past decade, the Pomurje police successfully implemented a model of community policing and took an important step towards a safer local community, as evidenced by the satisfaction of Pomurje residents with the work of the police. The high satisfaction of Pomurje residents with the work of the police, especially community policing, is undoubtedly (also) the result of individual projects that the police carried out for local residents or together with them and other entities responsible for security in the local community. The most prominent examples of good practice of community policing of the MS PD are the following: 1) Project Back to the people; 2) Detective Francek Academy in Terme Banovci spa; 3) Project The Family in Traffic in cooperation with primary schools, in which the Prevention Council of the municipality of Lendava also became involved; 4) Preventive projects We will paint; 5)  

---

2 The goal of the project was to strengthen the cooperation of the police with the residents and to involve all entities in eliminating the causes that enable the emergence of security problems for all people and institutions in the local area. They followed the conclusion of others that the police can be more successful in the local community if they connect more closely with the community or the people in it and, together with them, determine the causes of negative behaviour and try to eliminate them with joint efforts. They achieved the efficient implementation of the work of the neighbourhood police area and ensured that the measures are traceable/verifiable for each neighbourhood police area, police station and the entire police directorate.

3 During winter holidays, neighbourhood police chiefs and other police officers actively participate and lead preventive campaigns for children. The police, together with children who are spending winter holidays in Terme Banovci spa, "trace" the suspects of crimes and if they escape, they try to catch them together with police dog handlers, they conduct viewings of the scenes of crimes and fires, challenge the traces that suspects leave at the scene, and the children also learn about the differences between detectives in the past and today, as well as police self-defence, and take a safe driving test on a simulator (mastering a motorcycle).

4 The project was implemented at the initiative of the neighbourhood police chief of the Murska Sobota urban municipality, Tomaz Trajaric, in cooperation with the Murska Sobota urban municipality. The
Sobota bicycle and Overcoming obstacles for the blind together; 5) 6) Project Thank you for not using a mobile phone; 7) Regular working meetings with the mayors of Pomurje municipalities, where the state of security in the municipality is presented. In this way, the local community is informed about new developments in the field of security, and issues, experiences, cooperation, initiatives, etc. are also exchanged; 8) In cooperation with the Cerebral Palsy Association of Slovenia, the Soncek Murska Sobota Centre produced magnets featuring "Policeman Leon" - an exemplary young driver, which they hand out to young people at various events and thus draw attention to traffic safety; 9) Active cooperation with Roma radio, Hungarian radio and the local media (sharing preventive advice on the air, etc.); 10) Participation in the Lifelong Learning Week project at the Franc Miklosic High School in Ljutomer, where neighbourhood police chiefs and criminal investigators present their work and provide individual interesting safety information to high school students; 11) Preparation and introduction of a special form for working with victims of crimes. Its purpose is to improve the situation in the field of work with victims of crimes, especially victims of domestic violence. It is mainly used by neighbourhood police chiefs when working with victims and it shows the activities of the police in monitoring the situation in the family, and the findings are also very important when dealing with possible new or repeated violations or the commission of criminal acts; 12) Taking care of the cultural and historical presentation of the work of the Pomurje police to local residents with the publication of the book "Zgodovina orožništva in pomurske policije" (History of Gendarmerie and the Pomurje Police) and the opening of the Museum of the History of the Slovenian Police at the MS PD in 2017; 13) Training police officers to work with AED and help in cardiac arrest, which has already proven to be effective in practice; 14) Initiative and active cooperation with SI-CERT in publishing the brochure "Safe on the Internet" for the entire Slovenian police.

The MS PD can also boast of active participation in charity campaigns, the most famous of which is the annual concert of the Slovenian Police Orchestra, from which the collected funds are donated to the children in the region who are in need of help. This year, they collected €2,037.26, which will be used to finance school activities, i.e. to purchase workbooks, textbooks and other necessities.

At the Murska Sobota PD, from the plural policing perspective, the police cooperate mainly with the security services, security guards, private detectives, customs officers, inspectors, municipal wardens, and in some communities also with the public. All these authorities also participate in preventing crime. This task of theirs is especially important nowadays, when everywhere in the world and also in our country there is more and more crime every day, which appears in increasingly serious and more organised forms, and there are also more and more criminals who are increasingly specialised in their area of crime. The development of technology is also very useful for them because technology not only helps the police in catching criminals, but also makes the work of criminals easier and faster. For this reason, it

negative content painted on the walls of the buildings in the Murska Sobota park was painted over with graffiti or changed.

5 Together with the Murska Sobota Disability Council the police inspected access for the disabled, markings on the road and parking spaces, adequacy of pedestrian crossings and pavements, operation of traffic lights and signalling efficiency, etc.. The Murska Sobota urban municipality has given an electric bicycle to be used by the Murska Sobota Police Station for a period of 5 years.

6 The purpose of the preventive project was to warn and make all drivers aware of the dangers of using mobile phones while driving. The police are fundamentally a repressive body and take repressive measures against drivers who do not respect the legal ban on using mobile phones while driving. However, conscientious drivers who do not commit such offences and are aware of the negative consequences that can arise from using a phone while driving are often forgotten about.
is important that it is no longer only the police who have the power to maintain order and prevent crime in the country, but that they are also assisted by the authorities listed above within the scope of their powers, which are unfortunately too limited (Dolenc, 2010).

A great interest of the Murska Sobota PD is the mutual cooperation of the police with the security advisory committees. The following security advisory committees operate in the area of the Murska Sobota PD: the security advisory committee of the Murska Sobota urban municipality, the security advisory committee of the Puconci municipality, the security advisory committee of the Beltinci municipality, the security advisory committee of the Cankova municipality, the security advisory committee of the Gorjna Radgona municipality, the security advisory committee of the Radenci municipality, the security advisory committee of the Sveti Jurij ob Scavnici municipality, the security advisory committee of the Verzej municipality, the security advisory committee of the Tisina municipality, the security advisory committee of the Ljutomer municipality, the security advisory committee of the Razkrižje municipality, and the forum for ensuring the safety of the public in the areas of the municipalities of Crensovci, Dobrovnik, Kobilje, Lendava, Odranci, Turnisce and Velika Polana.

5. CONCLUSION

To sum up, each mentioned project and its results bear witness to the fact that the MS PD is an example of good practice of community policing, which must by no means rest on its laurels but must also strive in the future to be accessible and visible to people so that people are also willing to cooperate with the police. There must be constant cooperation between the police and the local community. Therefore, the Murska Sobota PD must also in the future constantly strive to ensure that relations with all entities in its area are the best possible and that cooperation with them is at the highest level. The cooperation of the police with the security advisory committees is particularly important, and these relations must be constantly upgraded and maintained. An important role should also be given to the neighbourhood police chiefs, who are the first point of contact with the public and who play a very important role in ensuring comprehensive security in the area of the Murska Sobota PD. Therefore, it is necessary for the police, in cooperation with the local community, to constantly carry out activities which are aimed at the residents with the purpose of providing them with satisfaction and a sense of security.

REFERENCES


Varnostni sosveti., https://www.policija.si/svetujemo-ozavescamo/varnostni-sosveti
THE ROLE OF THE MANAGER IN RAISING THE QUALITY OF HUMAN RESOURCES MANAGEMENT IN THE MODERN CORPORATION

Tatjana Gerginova

1 University “Sv. Kliment Ohridski”-Bitola, Faculty of Security – Skopje, Republic of North Macedonia, tatjana.gerginova@uklo.edu.mk

Received: 19th July 2022
Accepted: 6th September 2022

Abstract: Effective management of factor managers to raise the quality of human resource management. The manager is one of the basic factors in the operation of any company and the main driving force for mobilizing employees. Above all, it is a factor in advancing quality management with human resources. Therefore, it is necessary to create a program whose implementation will lead to efficient business operations of employees, management and the company as a whole. In the introductory part of the paper, the author defines the terms security management and security manager. The manager is one of the basic factors in the operation of every company and the main driving force for mobilizing employees. The author determines what is needed for a successful training of the security manager (abilities, skills, competencies). In the final part of the paper, the author establishes a Program for education and development of the safety culture of the employees and the security management in the modern corporation.

Key words: management, security manager, quality, human resources, training, motivation and understanding of people

1. INTRODUCTION

Management includes planning, organizing, staffing, leading or directing, as well as controlling and organizing (a group of one or more people) or attempting to achieve a goal. The skill implies the use of human resources, financial, technological and natural resources.

According to Mary Parker Follett, managers accomplish planned goals and tasks by engaging other people. According to her, the main characteristics of management work are:

- the manager performs his work through other people, not directly;
- information is an immediate subject of managerial work;
- the basic driving component of every organization is represented by managers with different levels of knowledge who encourage and direct the work of employees in the desired direction.

Managers take care of the company's employees to perform their work in a quality, timely and rational manner, and in accordance with the company's goals; the manager's work by its nature
is mostly of an intellectual nature. The flaw in this definition is that nowhere does it say that making decisions about the work to be done is also one of the functions of management. Managers take care of the company's employees to perform their work in a quality, timely and rational manner, and in accordance with the company's goals; the manager's work by its nature is mostly of an intellectual nature. The flaw in this definition is that nowhere does it say that making decisions about the work to be done is also one of the functions of management.

Managers take care of the company's goals; the manager's work by its nature is mostly of an intellectual nature. The flaw in this definition is that nowhere does it say that making decisions about the work to be done is also one of the functions of management. Managers take care of the company's employees to perform their work in a quality, timely and rational manner and in accordance with the company's goals; the manager's work by its nature is mostly of an intellectual nature. The flaw in this definition is that nowhere does it say that making decisions about the work to be done is also one of the functions of management (Gerginova, 2017).

M. Milisavljevic and J. Todorovic gave a definition, according to which to determine management it is important to consider and understand people, the organization of their joint work, business processes and their carriers, as well as the business environment and the conditions for effective interaction between the company and its environment. The goal of any for profit organization is to satisfy needs and make a profit (Danicic, 2009).

We can state that management is a process of coordinating the factors of business operations, that is, a process of planning, organizing, leading and controlling the activities of employees in order to achieve the achievement of organizational goals. Management implies optimal use of resources, management of processes and activities of subordinates, delegation of tasks and responsibilities, coordination of all resources through planning, organizing, leading and controlling. In modern business condition with very pronounced changes in the environment, management needs to know how best to use the available resources.

The importance of management is in the need to ensure the efficient functioning of the organization. Companies should gather necessary knowledge and resources and management should rationally use and control them.

2. MODERN CONCEPTS OF HUMAN RESOURCES MANAGEMENT

The concept of human resource management is particularly in the sphere of management, i.e. directing people in the company, based on the key categories of organizational behavior such as: motivation, relationships between individuals and groups, organizational socialization, organizational culture, change strategy, organizational development of human resources, etc.

For efficient and effective management of human resources, knowledge and experience, as well as using specific methods, processes and procedures for the correct directing and developing human resources, where all their abilities and creativity will come to the fore (Miceski, Micev, 2019).

Every manager provide a work atmosphere where every employee would be he felt that he belonged to the company, that he was a member of it. And the company would feel every individual as its member. Improving the quality of human resource management as a continuous process, must also contain the new concept of management, which in addition to the technological, organizational and economic components, largely prefers the social, and psychological components.

In this way, the manager's relationship with the employees is not based on strictness commanding and positional (“I am the director and you are executors”), but based on example – persuasive and motivating-creative relations, with a pronounced sense of professionalism,
competence, conscientiousness, reasonableness and pragmatism. Thus, the new concept of human resource management includes a large number of elements such as: vision, strategy, tactics, professionalism, flexibility, efficiency, effectiveness, knowledge, attitudes, values and beliefs.

3. THE ROLE OF SAFETY MANAGEMENT AND THE SAFETY MANAGER

In this part of the paper, the author develops the concepts of safety management and the role of the safety manager and determines what knowledge, skills, abilities and personal characteristics the safety manager needs to possess. Safety management is a subject of organization and management in the modern corporation (company) and in its competence are: determining the goals; planning, organizing; issuing orders; control; the coordination and responsibility for safe work of the company; compliance with legal regulations; realization of trainings for security workers, as well as for all employees in the company (Danicic, Stajic, 2008).

Security management is required to act preventively and undertake measures and activities aimed at monitoring, predicting and assessing the causes and forms of threats to persons, property and operations of the corporation that should be expected in the future period; Specifying the competences and powers of the persons working in the company on matters related to the protection of its vital values such as: the company's reputation on the market, its corporate image, morale and motivation of employees, strategic development plans, competition analysis; determination of the state of expertise and motivation of the persons working in the company; Organization and operation of the physical and technical security of all facilities belonging to the company; Protection measures related to the safety and health of employees, environmental protection, protection against fires, accidents and explosions; Measures to protect the operation of the corporation from all forms of corruption, various types of abuse, embezzlement, fraud and other methods of alienation and appropriation of its property; Specifying the measures of protection of business and official secrets; Specifying the measures regarding the control of the movement and stay of outsiders in the facilities and the space belonging to the business entity; Organization and operation of information systems and security of persons, property and operations of the corporation, especially information protection measures; Harmonization of normative acts in all segments of security with national regulations and EU standards; Assessment of the degree of endangerment of the persons who in the corporation perform work related to the protection of its vital values.

The security manager coordinates and directs the affairs of the security system of persons, properties and the operation of the corporation. In the hierarchy of company management, his place is right next to the general manager, that is, the owner of the capital. The complex and responsible work of the security system requires an appropriate level of education, multidisciplinary knowledge and specific personality traits that are necessary for the performance of this work. Security managers are more concerned with people and destructive human behavior and less with systems in the technical sense of the word. The overall system of corporate security to the greatest extent serves to proactively prevent the destructive behavior of man, and only a small part of that system is intended to resist threats arising from natural disasters, earthquakes and fires. For those reasons, the work of the security manager requires daily engagement and permanent education (Gerginova, 2017).

The successful preparation of the security manager implies constantly innovating knowledge about the forms and sources of threats to the company, competition, business partners and customers (Danicic, Stajic, 2008).
The security manager performs his tasks daily in an interactive relationship with the external and internal environment. In order to perform the tasks effectively, the safety manager needs to know the company, its operations and the business branch to which it belongs well. That is why he needs knowledge, skills, abilities and personal characteristics that he must possess and demonstrate. These are permanent qualities that you can consider, measure and develop. A security manager's knowledge, acquired through experience, learning or research, implies specific facts, awareness and understanding within a particular area.

Capabilities are permanent characteristics that an individual possesses, which are important for the successful performance of tasks by applying knowledge and skills. Skills imply the ability to perform physical or mental activities that lead to efficient task solving, while personal characteristics define the safety manager's personality, temperament, academic qualifications, interests and work habits (Ivandić, Vidović, Karlović, Ostojić, 2011).

In this regard, it is indicated that the competencies do not include the "basic" skills and knowledge, in addition to the expected success in performing the assigned tasks or the ability to write a report. Competencies do not even include the usual things and tasks that contribute to the success of the individual. Competencies imply only behavior, that is, "applied" knowledge that resulted in success, and the manifestation of skills that lead to the success of the company.

In addition to the standard conditions, such as appropriate professional training, seniority and work experience related to security, the corporate security manager also needs managerial skills, i.e. leadership abilities, responsibility, charisma, goal orientation (SMART principles), ability for managing teams, emotional intelligence, honesty, integrity and moral principles, communication, persistence in overcoming obstacles, ability to recognize problems and possible solutions, as well as knowledge of the theory of motivation and application of various motivational techniques in work. Leadership, which is the most important feature of management, includes a large number of activities from visions, defining goals, planning and defining tasks, motivating and winning employees for actions, coordinating, directing and monitoring the execution of tasks, to rewarding and taking measures of advancement, using different techniques (Ivandić, Vidović, Karlović, Ostojić, 2011).

The goal must be specific, measurable, achievable, relevant, time-bound. Decision-making requires that it be done in an organized manner, and that it be based on modern principles of management. Pressed by deadlines, security managers tend to perform analysis superficially. Superficial solving of safety problems is not allowed, which forces safety managers in the decision-making process to go much deeper into the causes of the problem and explore all possible solutions (Trivan, 2017).

In the literature, the key responsibilities of the corporate security manager are: development and application of a security strategy that demonstrates an understanding of the nature of occurrences, extraordinary events that could have a negative impact on the general level of security in the company (security policy, programs and procedures, plans for prevention and action in emergency situations); management of corporate security processes of the business entity, information gathering and assessment of risks (vulnerability) of the corporation; maintaining the readiness of the organization (ensuring the readiness of the corporation for the possibility of an attack, catastrophic events or organized security incidents – robberies, fraud, employee disloyalty, protection of workers, of key work functions, of the information system, of data, of information and reputation and healing; coordination of affairs with state institutions and bodies (Ivandić, Vidović, Karlović, Ostojić, 2011).
The security manager is a vital link in the hierarchical structure of the corporation and is usually located between officers on one side and top management on the other. In that position, he represents the views and demands of the managers in the company, but at the same time he is also responsible for presenting the views, needs and problems of subordinate officers to the management of the corporation (Danicic, Radakovic, 2011).

The following are the basic services that corporate security managers provide to the corporation's management: security strategy, risk identification and analysis, risk assessment and testing, security policy, programs and procedures, technology and infrastructure protection, information management risk, business continuity management, managing crisis management and response to crisis situations, raising employees' awareness of risks, operations related to workplace safety, investigating work behavior and its compliance with laws, protecting the corporation's management, works Business Intelligence and Business Countereelligence, verification of information obtained from sources in the corporation, forensic and investigative services, protection of documentation (Ivandić, Vidović, Karlović, Ostojić, 2011).

4. CONCLUSION

In the concluding observations, the author determines the following Program for education and development of safety culture of employees: The systematic education of employees in order to raise their level of awareness and safety culture is an irreplaceable factor in reducing the damage that threatens the corporation from various types of threats. In this regard, it is necessary to conduct education both during the employment phase and continuously the company's business operations. In a practical sense, it is important that employee education programs are aimed at the following: that the prescribed processes and procedures of the corporation are implemented in practice, and that initiatives to change processes and procedures must be encouraged among employees, especially in cases where the existing are inapplicable in practice and when it is necessary to adopt new ones, primarily due to new situations, caused by changes in technology and advancement in working processes. The employees are obliged to react and act accordingly in relation to perceived irregularities and omissions and it is urgently necessary to inform the higher levels of management in the company about the perceived and undertaken measures and activities. Senior managers in the company are obliged to constantly monitor and detect irregularities and omissions in the implementation of business processes, to order an inspection of the progress of work processes and to identify the same or similar threatening situations in other facilities or spaces of the corporation. After completing the procedure of checking the progress of a certain work process, it is necessary to make a conclusion and decision whether the registered security event was caused by a secondary fault or by the usual pattern of behavior, whether its cause is the subjective attitude of individuals or is an objective fact, which arose as a series of unpredictable circumstances and situations, i.e. to check whether the applicable work rules and other safety procedures are in accordance with reality and if they are not in accordance, to conclude that they are inapplicable. Further through the program it is necessary to determine:

Acquisition of knowledge that corresponds to modern security conditions and ensures continuity in the business operations of the corporation; Constant analysis of the causes and forms of threats to persons, property and operation of the corporation that should be expected in the future period; Assessment of the degree of endangerment of the persons who in the corporation perform work related to the protection of its vital values. Specifying the competences and powers of the persons working in the company on matters related to the protection of its vital values (Reputation of the company on the market, its corporate image, morale and motivation of the state of expertise and motivation of the persons working in the
company); Organization and operation of the physical and technical security of all facilities belonging to the company; Organization and functioning of the information systems and security of the persons, property and operations of the corporation, especially the information protection measures; etc.

The security manager and other members of the security management need to possess knowledge, skills and abilities for critical, independent and creative solving of various problems related to employee behavior as well as business operations in the modern corporation; the ability to take responsibility for further professional development and improvement and the ability to constantly evaluate the business operations of the corporation in order to make ethically based decisions; abilities for a professional approach in the work process, respecting the professional standards of work in the security authorities and services and ethical codes; ability to communicate clearly, concisely (verbal, non-verbal skills and written) with stakeholders; high level of presentation skills using advanced technology; ability to exchange opinions, conclusions and proposals with arguments and rational support of them, both with experts and non-experts, clearly and unambiguously; ability to assess the impact of internal and external factors that positively or negatively affect the business operations of the corporation and to initiate projects to improve the capacities and methodology of the business operations of the modern corporation.

REFERENCES


IMPACT OF CLIMATE CHANGES ON THE DISASTER RISK REDUCTION SYSTEM IN THE REPUBLIC OF SERBIA

Katarina Strbac¹, Nemanja Pribicevic², Marko Mihajlov³

¹ University „Union-Nikola Tesla“, School of Engineering Management, Belgrade, Republic of Serbia, katarina.strbac@fim.rs
² University of Defence in Belgrade, Military Academy, Veljka Lukica-Kurjak Street No. 33, Belgrade, Republic of Serbia, nemanjaprib@gmail.com
³ University of Defence in Belgrade, Military Academy, Veljka Lukica-Kurjak Street No. 33, Belgrade, Republic of Serbia, miihaa@hotmail.com

Received: 20th July 2022
Accepted: 5th August 2022

Review paper

Abstract: Climate change represents those climate changes that are directly or indirectly attributed to human activities, that change the composition of the atmosphere and that are recorded over a long period of time, and are the main causes of disasters that affect an increasing number of people, the environment and material goods. A disaster is a natural calamity or a technical-technological accident, the consequences of which threaten the safety, life and health of a large number of people, material and cultural goods or the environment on a larger scale, and the occurrence or consequences of which cannot be prevented or eliminated by the regular action of competent authorities and services. The goal of this paper is the current and future danger of climate change, the natural disasters they cause, as well as the presentation of the most important prevention measures and activities aimed at strengthening the state's resistance to various forms of security threats caused by climate change. In the conclusion, an overview is given of the problems caused by climate change and the basic prevention measures against natural disasters caused by climate change.

Key words: climate change, disasters, prevention measures

1. INTRODUCTION

As in the rest of the world, climate changes have been observed in Serbia during the past decades, primarily in terms of temperatures and precipitation. We have witnessed that during the past years, Serbia has faced numerous disasters that have led to significant human casualties and enormous material damage, where emergency situations undermine the safety and survival of entire cities. Natural disasters claim many human lives every day and destroy and degrade the environment in various ways, causing great material damage and losses. Climate change in Serbia manifests itself through increasingly frequent occurrences of natural disasters that cause natural disasters and that have negative consequences for hydrology and water resources, forestry, agriculture, biodiversity, but also for people's lives and health. A
natural disaster is an elemental calamity whose consequences threaten the safety, life and health of a large number of people, material and cultural goods or the environment on a larger scale, and whose occurrence or consequences cannot be prevented or eliminated by the regular action of competent authorities and services.

The general goals that the social community strives for are ensuring the survival of man and increasing his well-being. Therefore, the priority is the ability to respond in a timely manner. The risk of disasters exists in every society, because disasters slow down the sustainable development of society as a whole, and their occurrence in one region can cause damage in another region and vice versa. Disasters are a challenge that shows when, how much and in what way society is ready to react. Disasters can be avoided. There are ways to reduce risks and limit the consequences of disasters, as well as to increase society's resilience to disasters. System vulnerability assessment and risk assessment, with the use of adequate methodology, provides insight into system vulnerability, risks and potential threats, and based on which adequate preventive measures will be taken to protect and save people, material goods and the environment. In this way, preventive action is ensured in situations caused by natural disasters or remediation of their consequences to the greatest extent possible.

2. CLIMATE CHANGES

In order to understand what climate change is and the extent of the impact of climate change on natural disasters, it is first necessary to define them, and then to explain in detail the cause of their occurrence. Climate change represents those climate changes that are directly or indirectly attributed to human activities, that change the composition of the atmosphere and that are recorded over a long period of time, and are the main causes of disasters that affect an increasing number of people, the environment and material goods. CO2 or carbon dioxide is at the heart of the climate change story. It is a gas consisting of three atoms - one carbon atom and two oxygen atoms. Carbon dioxide is naturally released into our atmosphere. Humans and most animals breathe in oxygen and breathe out carbon dioxide. Plants use carbon dioxide to feed themselves in the process of photosynthesis. Carbon dioxide is also useful in regulating the Earth's temperature due to the retention of part of the sun's heat within the atmosphere. Without it, the planet would be too cold for life. However, human activity increases the concentration of carbon dioxide in the atmosphere, due to which an excessive amount of solar heat is retained in the atmosphere and the Earth becomes warmer. Additional carbon dioxide in the atmosphere is created by the burning of fossil fuels - coal, oil and gas, and their irrational use. This is a phenomenon known as the "greenhouse effect". In order to sustain life on Earth as we know it, we need to reduce the amount of carbon dioxide that is released. The existing measuring stations in several locations monitored the multi-decade trend (1961-2017) of temperatures in the territory of Serbia, where the trend of temperature growth of 0.36°C per decade was recorded, while only in the period 1981-2017, the trend of temperature increase was 0.6°C per decade. Based on this information, it is evident that the average annual temperature increase trend in Serbia is higher than the global average temperature trend. Furthermore, a trend was observed to increase the duration of heat waves (a heat wave is a period of at least 6 days during which the maximum daily temperature is higher than the expected maximum temperature for the time of year in which it is observed) by 4 days per decade, while at the same time there was a decrease in the number frost days (when the minimum temperature is below 0°C) and icy days (when the maximum temperature is below 0°C), by 2 and 1 day less per decade. On the other hand, although no significant changes in precipitation have been recorded, it should be emphasized that the Republic of Serbia faced serious droughts and floods during the last decades, which damaged the agricultural sector, infrastructure, housing and other buildings. With the help of climate models, climatologists have predicted the movement of the climate in the Republic of Serbia in the following three
thirty-year periods: 2011-2040, 2041-2070, 2071-2100. For the period 2011-2040, the average temperature is expected to rise in the range between 0.5 and 0.9°C. In the period 2041-2070, temperatures will be higher by 1.8-2.2°C, while by the end of the century, the temperature is expected to rise by more than three degrees: 3.6-4.0°C. Warming will be most pronounced in the summer season, when temperatures will exceed the threshold of 4.0°C compared to the base period (1961-1990). On all rivers in the Republic of Serbia, the water level has decreased, which will lead to consequences in terms of water quality and water supply. The cause of this recorded decrease is the decrease in the amount of precipitation in Serbia and its surroundings. There will be a reduction in the available amounts of water, especially in the summer months when it is most needed, which will create additional pressure on the water supply. The most affected will be the individual rural water supply, which is more vulnerable to the impact of climate change than the urban/public water supply, due to the lack of expertise, infrastructure and financial resources. In addition to water supply, water quality will also come under pressure: due to reduced amounts of water in watercourses, the concentration of harmful pollutants will increase in a situation where the level is low. The other side of the impact of climate change on the water system is intense rains in short time intervals that can cause floods. As much as 18% of the territory of Serbia is located on the banks of rivers and is particularly susceptible to floods, which cause great economic losses. Namely, it is considered that the economic losses from the May floods in 2014 were 1.4 billion dollars. In the future, due to climate change, more intense precipitation is predicted in the territory of Serbia, more frequent occurrences of large waters on rivers, and thus greater chances of floods (Kalkan Danko, 2021).

Climate changes and its negative consequences simply force us to react preventively and to protect ourselves. Given that disasters cause great material damage and, in addition to destroying the environment, they pose a great risk to people's lives and health. People, instead of implementing the measures that were agreed back in 2015 at the Third World Conference on Disaster Risk Reduction in Sendai, Japan, are adopting legal frameworks, successfully legislating the area of disaster risk reduction caused by climate changes, however, what is most important, what is missing is the practical application of the enacted legal frameworks. Man does not seem to notice what is happening around him, as if he does not see the exponential deterioration of the climate and in most cases does not care about the living environment, unaware of the risk to his own health and life.

3. NATURAL DISASTERS CAUSED BY CLIMATE CHANGES

In the entire historical development, all social and state communities expressed a constant need to ensure the greatest possible safety and security of their citizens and vital social systems. In an effort to achieve this and ensure well-being, the activities they undertook, sometimes accidentally, and sometimes intentionally, led people to great pollution of the environment. In response to this behavior, climate changes occur, which further lead to natural disasters and cause natural disasters. The greenhouse effect is one of the most well-known causes of climate change, for which man himself is to blame. The greenhouse effect implies the warming of the Earth due to the retention of carbon dioxide in the atmosphere, which originates from the burning of fossil fuels. As the world crisis caused by the war between Russia and Ukraine led to a deficit and an increase in the price of oil, gas and coal on the world market, deforestation increased. Forests absorb carbon dioxide, which is necessary for plant photosynthesis, and by reducing the area under forests, the amount of absorbed carbon dioxide also decreases, which contributes to the greenhouse effect and global warming. Apparently, due to the previously mentioned war between Russia and Ukraine, the importance of preserving and protecting the environment is once again being forgotten. Due to the gas deficit on the market, most countries, in fear of the upcoming winter and due to the deficit of heating energy, reactivate coal-fired
thermal power plants and prepare them for the upcoming winter. Also, a large number of households that were heated with gas will be forced to switch to heating with solid fuels, which will greatly increase the concentration of carbon dioxide, contribute to an even greater extent to the greenhouse effect, greatly reduce air quality and thus impair human health, as well as the environment.

From all of the above, it can be seen that we are yet to face a time of uncertainty and great challenges in confronting natural disasters caused by natural disasters due to significant climate changes. We are reminded of this by the unprecedented floods that occurred in May 2014, and then by the intense rainfall in September of the same year, which led to the occurrence of landslides in the Bor district. Every year in the summer period, we have more and more frequent occurrences of hail and torrential rivers that cause great material damage of a local nature. Natural disasters take a heavy toll and affect the well-being and security of the people, communities and countries affected by them. Disasters, most of which are exacerbated by climate change and are increasing in frequency and intensity, greatly hinder progress towards sustainable development. Recurring small-scale and gradual disasters especially affect communities, households and small and medium-sized enterprises, and account for a high percentage of total losses. All countries – especially developing countries, where mortality and losses from disasters are disproportionately higher – face increasing potential hidden costs and challenges in meeting their financial and other obligations. While some progress has been made in building resilience and reducing loss and damage, more substantial disaster risk reduction requires perseverance and persistence, with a clearer focus on people and their health and livelihoods.

4. LEGAL FRAMEWORK FOR DISASTER RISK REDUCTION

The problem of major climate changes, the disasters that these changes cause and the challenges, risks and threats they bring has been present in human consciousness for many years. It is no longer necessary to look at statistical data from years ago and understand from them that the climate is changing. Climate changes are clear, evident, noticeable and happen almost every day. It is not difficult to notice that the maximum daily temperatures have increased, that it has become normal for the temperature to be 40°C in summer, that summers last longer, that winters are milder and almost without snow, that precipitation is less, and that natural disasters that affect humans and animals the middle more and more. Every year, the city causes a lot of material damage, which is a big blow to agriculture, which makes up a large part of the gross domestic product. Therefore, there is a need to adopt a strong regulatory legal framework for disaster risk reduction. In the last few years, the Republic of Serbia has made progress in strengthening the legal and regulatory framework for emergency response and risk reduction. The key indicators of the development so far are the adoption of the following regulations: the Law on Emergency Situations from 2009, the Law on Amendments to the Law on Emergency Situations for the Integration of the Concept of Risk Reduction from 2011 and the National Strategy for Protection and Rescue in Emergency Situations from 2011, with an emphasis on disaster risk reduction (Babic and Komazec, 2017).

The Constitution of the Republic of Serbia, as the highest legal act in the Republic of Serbia, in Article 24. guarantees every citizen the right to life, in Article 74. the right to a healthy environment, the right to its protection, the right to be informed about its condition, while in Article 97. it regulates the defense and security of the Republic of Serbia and its citizens and measures in the event of a state of emergency (Official Gazette of the Republic of Serbia, No. 98/2006 and 115/2021).

The national security strategy is the highest strategic document that determines the national interests and the bases of the security policy in the protection of the national interests of the
Republic of Croatia, of Serbia, identify challenges, risks and security threats; determine the goals, basic principles and elements of the national security policy and define the structure, principles of functioning and responsibilities within the security system, as well as the basic goals in preserving the environment and resources of the Republic of Serbia (Official Gazette of the Republic of Serbia, No. 94/2019).

The Act on Emergency Situations regulates the action, declaration and management of emergency situations, the system of protection and rescue of people, material and cultural assets and the environment from natural disasters, technical-technological accidents-accidents and disasters, the competences of state bodies, autonomous provinces, local self-government units and the participation of the police and the Serbian Army in protection and rescue, the rights and duties of citizens, companies, other legal entities and entrepreneurs in connection with emergency situations, the organization and activity of civil protection in the protection, rescue and elimination of the consequences of natural disasters and other accidents (Official Gazette R. of Serbia, number 111/2009, 92/2011 and 93/2012).

The national strategy for protection and rescue in emergency situations aims to protect the life, health and property of citizens, the environment and the cultural heritage of the Republic of Serbia. The basis for the adoption of the National Protection and Rescue Strategy is the Law on Emergency Situations. The national strategy defines national coordination mechanisms and program guidelines for reducing disasters caused by natural phenomena and the risk of accidents, protection, response and remediation of the consequences (Official Gazette of RS, No. 86/2011 of 18.11.2011).

After the Third World Conference on Disaster Risk Reduction in Sendai, Japan, held in March 2015, the Republic of Serbia is passing more legal acts that regulate the field of disaster risk reduction. The fact that disaster risk reduction and emergency management is a national and local priority is also evidenced by the fact that in 2018 the Law on Disaster Risk Reduction and Emergency Management came into force (Official Gazette of the RS, No. 87/2018-3). According to Article 15 of the aforementioned law, the preparation of a disaster risk assessment and a protection and rescue plan became a legal obligation for the Republic of Serbia, Autonomous Provinces, local self-government units, facilities of special importance, all economic companies, health institutions except for pharmacies, as well as preschool and school institutions, faculties, for all facilities where children stay, that is, where classes take place. The consequences of disasters can be significantly reduced if there is a preventive response, which is achieved by creating disaster risk assessments and protection and rescue plans. Risk assessment, as an integral part of vulnerability assessment, is the basis for further development of preparedness, response and recovery plans. In this sense, it is very important to do the risk assessment in the best possible way with respect for realistic assumptions, respect for existing data, but also with the use of innovation. The risk assessment is prepared and adopted by legal entities that manage business, trade, sports, catering and accommodation facilities and leisure facilities with a capacity of more than 100 people, and if the facilities are intended for the stay of children up to 14 years of age, regardless of capacity. The disaster risk assessment and the protection and rescue plan are extremely important, because they train us how to defend ourselves in the event of an emergency situation at all levels, from individuals to legal entities to local self-governments (Official Gazette of RS, no. 80/2019).

Although the legal and regulatory framework for disaster risk reduction is good, it is still necessary to review existing practices, introduce new approaches and thereby improve the current way of working on disaster risk reduction (Ivanis, Babic & Komazec, 2016).
5. PREVENTION IN THE MANAGEMENT OF NATURAL DISASTERS IN THE REPUBLIC OF SERBIA

In order for society to prepare for the response to certain dangers that inevitably threaten from day to day, it is necessary to understand those dangers and assess the risk of them. In order to assess the risk, it is necessary to consider a large number of factors related to the dangers that threaten. Reducing the risk of natural disasters is a worthwhile investment in preventing future losses, which is achieved by taking preventive measures to reduce the possibility of natural disasters or, if they have already occurred, by taking measures and activities to rehabilitate their consequences. Prevention includes a set of measures and activities for mitigating existing risks as well as reducing the risk of new consequences of disasters. It is of crucial importance and very necessary to predict, plan and reduce the risk of disasters, in order to protect people, the environment and material assets in a more effective way and thus strengthen their resistance to disasters. Prevention in the management of natural disasters in the Republic of Serbia is achieved by creating disaster risk assessments and protection and rescue plans. The primary goal of disaster risk assessment and protection and rescue plans is to strive to build, support and improve the ability to act preventively on risks and hazards, as well as to mitigate the consequences of various disasters that any society and country can be affected by. The assessment consolidates existing resources on protection and rescue and response to natural disasters. By creating a disaster risk assessment and protection and rescue plans, the organization is improved, human capacities and equipment supply are strengthened, thereby increasing the level of safety and reducing the number of victims, as well as material damage.

In order to reduce disaster risk, according to the Sendai Framework, there is a need to tackle existing challenges and prepare for future challenges by focusing on: monitoring, assessing and understanding risks, sharing information about and how risks occur; strengthening the management system for disaster risk management and coordination among relevant institutions and sectors, and the full and meaningful participation of relevant stakeholders at appropriate levels; investing in the economic, social, health, cultural and educational resilience of people, communities and countries, and in environmental protection, also through technology and research, improving the system for early warning of multiple hazards, preparedness, response, restoration, rehabilitation and reconstruction. In order to complement national activities and capacities, there is a need to improve international cooperation between developed and developing countries, and between signatory states and international organizations. It is of crucial importance in the post-disaster reconstruction, rehabilitation and reconstruction phase to prevent the creation of disaster risks and to reduce them through "establishing a better system than the one before the disaster" and through increased education and increasing public awareness of disaster risks, which also is the essence of the natural disaster management process (United Nations Office for Disaster Risk Reduction (UNDRR), 2015).

The preventive policy in the Republic of Serbia is very poorly developed. Instead of taking measures to eliminate the cause of the problem and adhering to the popular proverb "prevention is better than cure", people, most often out of negligence, leave the situation to chance and only after the disaster occurs do they wonder why something was not done before the disaster happened. In order to realize the prevention and management of natural disasters, we must go back to the beginning. The most important thing is reducing the concentration of carbon dioxide from the atmosphere. Let's take the example of the French city of Grenoble. According to the Sendai Framework, there is a need to tackle existing challenges and prepare for future challenges by focusing on: monitoring, assessing and understanding risks, sharing information about and how risks occur; strengthening the management system for disaster risk management and coordination among relevant institutions and sectors, and the full and meaningful participation of relevant stakeholders at appropriate levels; investing in the economic, social, health, cultural and educational resilience of people, communities and countries, and in environmental protection, also through technology and research, improving the system for early warning of multiple hazards, preparedness, response, restoration, rehabilitation and reconstruction. In order to complement national activities and capacities, there is a need to improve international cooperation between developed and developing countries, and between signatory states and international organizations. It is of crucial importance in the post-disaster reconstruction, rehabilitation and reconstruction phase to prevent the creation of disaster risks and to reduce them through "establishing a better system than the one before the disaster" and through increased education and increasing public awareness of disaster risks, which also is the essence of the natural disaster management process (United Nations Office for Disaster Risk Reduction (UNDRR), 2015).

Grenoble is the second most densely populated city in France and in 2022 it was declared the Green Capital of Europe. This city, which has more than one hundred thousand inhabitants, has shown how to protect the environment in the best way in an urban environment with the
help of innovative and long-term projects. Grenoble has established an urban policy to mitigate pollution and biodiversity loss by limiting vehicle speeds throughout the city to thirty kilometers per hour, making it the largest low-emission traffic zone in France. The city also reduced greenhouse gas emissions by 25% from 2005 to 2016 and is working on a 50% reduction by 2030. Among other things, Grenoble promoted cycling and encouraged the opening of private gardens, the vertical greening of buildings and the planting of trees. By the way, public transport uses biogas for power, which is obtained by purifying water, that is, sewage sludge, and besides buses, trams are the most common form of public transport, but bicycles are the favorite vehicle of Grenoble residents. In addition, the number of electric cars is growing, but still on average one citizen drives in a car, so the goal is actually to reduce the total number of vehicles in the city, that is, to have as many people as possible use public transport and bicycles. By the end of 2022, electricity in public buildings will be obtained 100% from renewable sources, i.e. without fossil fuel. About 80% of thermal energy for central heating, for about 40,000 households, is obtained from renewable sources. Solar panels allow buildings to be independent objects, since they have batteries that collect electricity. Rainwater is industrial water and is mixed with city water to guarantee constant water quality regardless of the weather, while waste water is collected and treated to be used in toilets. Grenoble systematically nurtures and designs green areas. In the past 15 years, many old parks have been renovated, and new ones have been built. Since 2014, more than 5,500 trees have been planted in the city, and the plan is to plant 10,000 trees before 2030 (Beta, 2022).

When we look at the measures taken by the city of Grenoble, the policy of preserving the environment, and therefore reducing the impact of climate change on natural disasters and increasing the efficiency of natural disaster management, does not seem so difficult. The most important thing is to influence people's consciousness, the mentality of the people in a certain area, additional education in the field of environmental protection, additional subsidies in projects related to environmental protection, and every city in the Republic of Serbia can be a new Grenoble.

6. CONCLUSION

It is inevitable that climate change is an actual problem of modern world. Man uses and consumes natural resources uncontrollably, making minimal effort to use renewable energy sources, thereby endangering the environment more and more. Environmental pollution has already reached serious proportions. This primarily refers to the reduction of areas under forests, uncontrolled exploitation of energy resources, irresponsible and careless use of arable land and sources of drinking water, pollution of air, waterways and soil, and uncontrolled disposal of waste. In addition to irreparable material damage, such behavior causes unfavorable climate changes, pollutes the environment and seriously endangers people's lives. Monitoring the current state of climate change allows us to predict what may await us in the future. If we continue with unacceptable behavior, with uncontrolled deforestation, the use of non-renewable energy sources and the emission of carbon dioxide into the atmosphere, by the end of the 21st century in Serbia we can expect an increase in the average annual temperature by about 4°C compared to the period from 1961 to in 1990. This increase in temperature levels and disturbed precipitation regime may not seem particularly terrible to anyone, but it will certainly bring with it consequences that can be very serious: greater frequency and duration of heat waves and dry periods, increased risk of floods, more frequent forest fires, deterioration of quality water, deteriorating air quality, greater possibility of occurrence of natural disasters that can cause natural disasters and therefore threaten the life and health of people and lead to large material and economic losses. All this can be gradually prevented. It may seem complicated and impossible now and it is thought to require expensive, modern technology, but often the simplest way is the best way. The concentration of carbon dioxide in the air
can be greatly reduced by simply afforesting areas. Simple, right? It may not be possible to completely eliminate the consequences of global warming, but it is certainly possible to rehabilitate them to a large extent. The Republic of Serbia has adopted a number of important regulatory and legal frameworks, as well as measures and activities for the prevention and reduction of the impact of climate change on the natural disasters that they cause, however, until every person changes their consciousness and realizes what damage they have caused to nature and the environment. and as it all comes back to us, it will be difficult to deal with one of the biggest threats to the security of all citizens of the Republic of Serbia, as well as citizens of the entire world.

REFERENCES


Beta, Grenoble - The Green Capital of Europe and the French Capital of Bicycles, Available at: https://euractiv.rs/12-odrzivi-razvoj/123-vesti/17454-grenobl-zelena-prestonica-evrope, [03.07.2022].


Instructions on the methodology and content of the disaster risk assessment and protection and rescue plan, Sl. gazette RS no. 80/2019.


Kalkan D. (2021), Climate changes in Serbia - what we know so far, and what awaits us, Available at: https://www.economia.rs/klimatske-promene-u-srbiji/


MODEL PROPOSAL FOR INTEGRATION OF DATA OF THE FLOOD RISK MANAGEMENT TO THE DISASTER RISK ASSESSMENT

Merita Borota¹, Hatidza Berisa², Aleksandar Drobnjak³

¹ Ministry of Agriculture, Forestry and Water, Republic Directorate for Water Management, Bulevar umetnosti 2a, New Belgrade, Belgrade, Republic of Serbia, karamuco.1@gmail.com
² University of Defence in Belgrade, National Defense School, Veljka Lukica-Kurjaka Street No. 33, Belgrade, Republic of Serbia, hatidza.berisa@mod.gov.rs
³ Public Water Company „Srbijavode“, Bulevar umetnosti 2a, Belgrade, Republic of Serbia, alexandar_1203@hotmail.com

Received: 26th July 2022
Accepted: 24th August 2022

Professional paper

Abstract: For the purposes of preparing the national Disaster Risk Assessment, risk assessments are performed for twelve hazards. One of the hazards contained in the document is flood. For the flood hazard, it is necessary to collect data related to hydrography, historical floods, assumed areas of floods in the future, areas of potential flood risk assessment and others. Also, it is necessary to identify protected values in areas of potential flood risk assessment areas. In the process of flood risk management, data collection is performed in order to make a preliminary assessment of flood risks and flood hazard and flood risk maps. The aim of this paper is to propose a model for integrating data from the flood risk management into the disaster risk assessment, in order to increase the efficiency of flood prevention. The paper analyzes the type of data collected for the purpose of developing a documentation basis for flood risk management, which can be integrated into the national Disaster Risk Assessment in case of flood.

Key words: data, flood, risk assessment, disaster, integration

1. INTRODUCTION

Based on the data collected for the preparation of documents for risk assessment and flood risk assessment, the paper proposes a model of data integration from one document to the other. Two different ministries are responsible for the preparation of national documents that are Preliminary Flood Risk Assessments and Disaster Risk Assessments. Preliminary Flood Risk Assessment for the territory of the Republic of Serbia is under responsibility of the Ministry for water management, i.e. the Republic Directorate for Water. The Ministry responsible for emergency situations, that is, the Department for Emergency Situations, is responsible for preparing the Disaster Risk Assessment for the Republic of Serbia. In this paper, the first chapter is dedicated to the flood that is described as a phenomenon and to the method of data collection for the purposes of creating a Preliminary Flood Risk Assessment. In the second
chapter, the structure of the Disaster Risk Assessment document for floods is described. The third chapter is devoted to the data that is collected for the purposes of creating both documents, the data analysis was performed and a model of data integration from one document to another was proposed.

2. FLOODS IN SERBIA

The territory of the Republic of Serbia is intertwined with rivers. The total length of rivers in Serbia is about 65,980 km (www.premiumsrbija.rs), at least 76 rivers are longer than 50 km. Due to atmospheric precipitation and sudden melting of snow, riverbeds fill up and often overflow, which contributes to the flooding of coasts, arable land, settlements and industrial complexes, etc. The cause of flooding can also be the anthropogenic impact of people on the waters and river banks, which increases the risk of flooding. That is why flood protection measures are taken. Flood protection is implemented by managing flood risks and implementing flood defenses. In accordance with the Water Law (Zakon o vodama, 2018), flood risk management includes: "preparing a preliminary flood risk assessment, creating and implementing flood risk management plans, general and operational flood defense plans, implementing regular and extraordinary flood defense and protection from erosion and floods".

2.1. Preliminary Flood Risk Assessment

A Preliminary Flood Risk Assessment is made at the national level for the entire territory of the Republic of Serbia. The content of the document is defined by the Water Law (Zakon o vodama, 2018) and it includes: maps of water areas with the boundaries of sub-basins entered, topography and land use layers, description of floods that have occurred in the past and the probability of occurrence of similar flooding events in the future, assessment of potential harmful consequences future floods for human health, the environment, cultural heritage and economic activities, etc.

Preparing and the methodology of the Preliminary Flood Risk Assessment is defined by the Rulebook (Pravilnik o utvrđivanju metodologije za izradu preliminarne procene rizika od poplava, 2012). The result of the Preliminary Flood Risk Assessment is the determination of Areas of Potential Significant Flood Risks. In 2012, the Republic Directorate for Water, which is an integral part of the Ministry of Agriculture, Forestry and Water Management, set up the first Preliminary Flood Risk Assessment (PFRA). The result of the PFRA are 99 designated Areas of Potential Significant Flood Risks. The PFRA was updated in accordance with the regulations, and in 2019, a second one was done, which also contains data from the first. As a result of the updated document, a total of 101 Areas of Potential Significant Flood Risks (APSFR) on the territory of Serbia were determined. For the purposes of updating, data was collected according to the Rulebook annexes (Pravilnik o utvrđivanju metodologije za izradu preliminarne procene rizika od poplava, 2012)

PFRA and ARSFR were done according the water basins and sub-basins. In the Danube basin, 18 sub-basins were considered, 10 sub-basins were in the Sava basin, a total of 27 in the Morava, Ibar and Lepenac were treated with 4 sub-basins and Beli Drim with 2.

For each of the sub-basins, information has been prepared on the characteristics of the basin and watercourses, hydro meteorological characteristics of the basin, land use, protection and flood risks.

In the part related to flood protection and risks, special attention is paid to:
- flood protection system,
- floods occurred in the past,
- measures and works undertaken to reduce the risk of floods,
- possible harmful consequences of future floods,
- possible measures and works that could reduce the risk of flooding and
- certain APSFR in the basin.

2.2. Example for the Kolubara River

Based on the collected data on occurred floods in the past, the map was created showing the scope of floods (Figure 1). The data was collected by the Public Water Management Company and the local self-government units, according to the Annexes which are an integral part of the Rulebook (Pravilnik o utvrDjivanju metodologije za izradu preliminarne procene rizika od poplava, 2012). Based on data from the past, floods that may occur in the future at the same location were assumed, which is shown in Figure 2 for the Kolubara River.

![Figure 1. Location of the flood occurred in the past in the sub-basin of the Kolubara river](image1)

![Figure 2. Location of possible future floods in the sub-basin of the Kolubara river](image2)

Source: (Preliminary Flood Risk assessment for the territory of Republic of Serbia, 2019)

During the preparation of the Preliminary Flood Risk Assessment, a review was made of the physical characteristics of the observed basin and watercourse, hydro meteorological data, land use, water facilities and flood protection systems were identified, an analysis of past floods and measures and works carried out for risk reduction, assumption of possible future floods and finally the areas of potential significant flood risks are deracinated. Thus, the Kolubara River was designated as an area of potential significant flood risk along its entire course, and it is listed in the table under serial number 31 (Preliminary Flood Risk Assessment, 2019).

3. RISK ASSESSMENT OF NATURAL DISASTERS IN THE REPUBLIC OF SERBIA

In 2019, a national Disaster Risk Assessment in the Republic of Serbia (Procena rizika od katastrofa u Republici Srbiji, 2019) was set up for the territory of the Republic of Serbia, in which the risk of floods was described in a separate chapter. The document discusses the risk of "flooding" for the following rivers: Sava, Bjelica in the municipality of Lucani and on the river Kolubara in the municipality of Obrenovac. Respecting the provisions defined by the Instruction on the preparation methodology and content of the disaster risk assessment and the protection and rescue plan (Uputstvo o metodologiji izrade i sadržaju procene rizika od katastrofa i plana zastite i spasavanja, 2019), the flood risk assessment was developed for two scenarios:
1. The most likely adverse event and
2. The scenario with the most severe possible consequences.

On the Sava River, the most likely unwanted event is created for the case of flooding on the right bank of the river when the Drenovac pumping station fails due to insufficient capacity, in the Drenovac settlement that is situated in the back of the right embankment. The scenario with the most severe possible consequences was considered for the left bank of the Sava River, in the territory of Sid and Sremska Mitrovica due to the increased water level and the demolition of the quay wall in the Bosut settlement.

On the river Bjelica, the case of exceeding the capacity of the pumping station "Lucani" in the area of the "MB-Namenska" factory was considered for the scenario of the most likely adverse event, and the case of failure of the flood defense line with a mobile system in the area of the bridge was considered for the scenario with the most severe possible consequences on the road to Guca in combination with the penetration of water into the embankment which is rooted in the body of the railway line.

For the scenario of the most likely adverse event, the case of intrusion of waters on the Kolubara at the site of the intersection of the E-736 highway and the Kolubara embankment was adopted. The scenario with the most severe possible consequences is set so that Obrenovac is flooded with water of the once in a hundred years return period due to overflowing of the left Tamnava embankment, overflowing of the Kolubara embankment upstream of the Cikovac stream with water intrusion at the intersection of the E-763 highway with the left Kolubara embankment during a flood wave on the Sava that was hundred-year return period.

3.1. Flood risk assessment case for the Kolubara river

For the case of flooding from Kolubara in Obrenovac within the boundaries of the municipality, on the basis of the collected data, a hydraulic model of flooding was made for the case of the most likely adverse event (Figure 3). According to the adopted probability of the flood event, the consequences for people's life and health, economy and social stability were estimated obtained overall risk in the high rank (Figure 4).
Figure 2 shows a possible flood in the future in Kolubara, and Figure 3 shows the level of the determined risk of flooding. Based on the figures, it can be concluded that the Kolubara River has been identified as a flooding river with a high risk. It is also concluded that there is a risk of flooding along the entire course of the river.

4. DATA COLLECTION AND PROPOSAL FOR INTEGRATION MODEL

For the purposes of preparing the Preliminary Flood Risk Assessment for the territory of the Republic of Serbia and the preparation of the Disaster Risk Assessment in the Republic of Serbia in case of a flood risk, it is necessary to collect data. The basic data that has been collected is first of all the data on the recorded flood events that happened in the past.

For the purposes of preparing the Preliminary Flood Risk Assessment for the territory of the Republic of Serbia, data were collected in accordance with the Rulebook (Pravilnik o utvrđivanju metodologije za izradu preliminarne procene rizika od poplava, 2012). Annex 1 of the Rulebook prescribes the type of flood data that is particularly requested:

- location and date of the event described with the following information: municipality, cadastral municipality, water district or melioration area, watercourse, section of watercourse with a code and description from the current operational flood defense plan, flood reach,
- characteristics of the flood described through the date of occurrence, duration in days, flooded area, length of the threatened section, probability of flood occurrence, maximum registered water level, registered precipitation and etc,
- the cause of flooding (rainfall, melting snow, overflowing of embankments or dams, etc.),
- mechanism of flooding (exceeding the capacity of the basic riverbed without a protective system, overflowing of the embankment, failure of the function of the protective facilities, narrowing of the riverbed, congestion of the bridge, etc.),
- character of floods (slow onset, fast onset, torrential, with great depths, with great speeds, large amount of floating embankment, etc.).

In addition to the above data, data on the consequences of the flood on people’s life and health, the environment, cultural heritage and economic activities are also collected. Among the other data, the applied flood protection measures, the rehabilitation works performed and the planned works aimed at reducing the risk of floods are mentioned.

For the purposes of creating a disaster risk assessment for the danger of flooding in the territory of the Republic of Serbia, data was also collected on historical floods that had significant harmful consequences on human health, the environment, cultural heritage and economic activity, then the characteristics of the flood, the reach of the flood wave, the direction of the flow and assessment of the adverse impact on protected values, the construction of the flood protection system, the efficiency of the constructed facilities, weak points in the system and others. Table 1 shows the data that was used to create the document

<table>
<thead>
<tr>
<th>Preliminary Flood risk Assessment</th>
<th>Disaster Risk Assessment (in case of floods)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maps:</td>
<td>Maps:</td>
</tr>
<tr>
<td>Water basins with the boundaries of sub basins</td>
<td>Water basins in the needed scale with the boundaries of sub basins</td>
</tr>
<tr>
<td>Topografy</td>
<td>Topografy</td>
</tr>
<tr>
<td>Corrina land use</td>
<td>Corrina land use</td>
</tr>
<tr>
<td>Hydrographic surfaces</td>
<td></td>
</tr>
<tr>
<td>Pedological foundations</td>
<td></td>
</tr>
<tr>
<td>Characteristics of floods</td>
<td>Characteristics of floods</td>
</tr>
</tbody>
</table>
Table 1 shows that for both documents it is necessary to obtain data related to the same set of data. Based on this, the following model of data collection can be proposed for the purposes of creating a Preliminary Flood Risk Assessment, which can be completely assigned and integrated for the purposes of creating a Disaster Risk Assessment for floods.

![Diagram](image)

**Figure 5.** Proposed data integration model

On the basis of Figure 5, which proposed a model for the integration of data collected for the purposes of creating a Preliminary Flood Risk Assessment, it is concluded that the same data can be integrated and used for the purposes of creating a Disaster Risk Assessment for floods. In this way, the process of making a Disaster Risk Assessment in case of floods is simplified in terms of saving human and material resources.

5. CONCLUSION

In this paper, a model of data integration that is used to translate one document into another is proposed. The analysis determined that for the purposes of preparing the Preliminary Flood Risk Assessment for the territory of the Republic of Serbia, the same data is used as for the preparation of the Disaster Risk Assessment for the Republic of Serbia (in case of flood risk). In order to rationalize work, save human and material resources, the data used can be handed over to the competent institution for further use. Since the Preliminary Flood Risk Assessment in responsibility of the water sector authority and the Disaster Risk Assessment is under responsibility of the emergency sector, the proposed model shows that the work on the Disaster Risk Assessment in case of floods can be simplified by using already collected data and results.

REFERENCES


Pravilnik o utvrđivanju metodologije za izradu preliminarne procene rizika od poplava, Službeni glasnik Republike Srbije, broj 1/12

Preliminary Flood Risk Assessment for the territory of the Republic of Serbia, Ministry of Agriculture, Forestry and Water Management, Belgrade, 2019
Uputstvo o metodologiji izrade i sadržaju procene rizika od katastrofa i plana zastite i spasavanja, Sluzbeni glasnik Republike Srbije, broj 80/19

Zakon o vodama, Sluzbeni glasnik Republike Srbije, broj 30/10, 93/12, 101/16, 95/18 i 95/18-i dr. zakon


https://www.premiumsrbijsa.rs/ accessed 7. July 2022 y 12.00

PROTECTION OF TUNNELS AS CRITICAL INFRASTRUCTURE ON THE CONNECTION NIS - VRANJE FROM THE DANGER OF EARTHQUAKE

Vukasin Vuckovic¹, Aleksandar Petrovic², Boban Rankovic³

¹ University of Defence in Belgrade, Military Academy, Veljka Lukica-Kurjaka Street No. 33, Belgrade, Republic of Serbia, vvukasin77@gmail.com
² University of Defence in Belgrade, Military Academy, Veljka Lukica-Kurjaka Street No. 33, Belgrade, Republic of Serbia, ale_petrovic@live.com
³ University of Defence in Belgrade, Military Academy, Veljka Lukica-Kurjaka Street No. 33, Belgrade, Republic of Serbia, boban.rankovic@gmail.com

Received: 3rd August 2022
Accepted: 11th August 2022

Professional paper

Abstract: The tunnel, as an important part of the traffic infrastructure, represents a construction solution that has always provided relief in traffic. However, the issue of construction and maintenance itself is not simple. Moreover, these buildings are mostly related to the environment that surrounds them, and therefore to all the geomorphological features, changes and processes that take place on that soil. The natural phenomenon that threatens them the most is earthquakes. This paper deals with the topic of the impact of earthquakes on tunnels as critical traffic infrastructure on the route Nis-Vranje. The issue was presented from the point of view of explaining the concept of earthquake and the susceptibility of the area to earthquakes. The focus is also on the most important legal frameworks that a tunnel must have during construction. At the end, the risk and vulnerability of the tunnel on the given route from earthquakes as a hazard was discussed.

Key words: tunnel, infrastructure, earthquake, danger

1. INTRODUCTION

Since ancient times, humanity tried to facilitate the fastest possible transportation of people, the transfer of information, the transportation of goods, with the aim of the smoothest possible functioning of society and a better standard of living. In support of this, there was a continuous effort to develop and improve the traffic infrastructure in order to make life more efficient. In this way, it was possible to get from the well-trodden paths to the finest highways. A parallel problem in the traffic infrastructure is the construction of tunnels. This venture has always been a solution that would eventually prove to be profitable, primarily due to the shortening of the road section.

On the other hand, the difficulties faced by man during its construction did not decrease proportionately with the advent of new technologies. Namely, the more sophisticated the equipment for tunnel construction was, the more complex the construction requirements and
construction challenges were, and it was increasingly difficult to combine modern requirements with the possibilities of tunnel construction. The roughness of the soil, the geomorphological structure, the frequency of vehicle movement on that section of the road, the threat of tunnels from natural and other disasters, are just some of the parameters that make it difficult to build them. One of the serious security threats to this type of critical infrastructure are earthquakes.

The impact of earthquakes on traffic infrastructure, as well as on all other forms of critical infrastructure, has always been enormous. The main problem that occurs with this type of danger is the impossibility of predicting and announcing them. Therefore, earthquakes represent a serious threat to this type of critical infrastructure, especially for the reason that the frequency of vehicles in tunnels is high, and the safety solutions, which will be discussed, are sometimes insufficient.

In this paper, a consideration of the impact of earthquakes on tunnels as forms of critical infrastructure is presented. The route chosen for the discussion of this topic is the Nis - Vranje route. This location was chosen for several reasons. First of all, there was no processing of this problem for the given location, also, there was no consideration of the seismological safety aspects of the tunnels built at this location. And finally, these tunnels represent high-frequency infrastructure buildings, especially in the summer season, so it is necessary to look at all aspects of earthquake risk.

2. TERM AND CHARACTERISTICS OF EARTHQUAKE AS NATURAL PHENOMENA

Earthquake occurs due to the movement of tectonic plates, the movement of the earth's crust or the occurrence of an impact, and the consequence is the shaking of the earth's crust due to the release of high energy. Epicentre is the place on the earth's surface where seismic waves first reach directly above the magmatic hearth. Earthquakes have varying consequences, including changes in geological features, damage to the anthropogenic environment, i.e. environments and objects created by man and have a great influence on human's life. Earthquakes can cause dramatic geomorphological changes, including ground movement both horizontally and vertically (Zec, 2011). Most devastating earthquakes are caused by the mutual contact of tectonic masses. Shaking, swaying, vibrations, and undulations in the Earth's crust and on its surface occur because of internal stresses and movements in the lithosphere. The common characteristic of all earthquakes is that they occur due to certain disturbances in the lithosphere. According to the causes of occurrence and the way of manifestation, earthquakes are divided into (Petrovic & Manojlovic, 2003):

1. Tectonic earthquakes most often occur as a result of today's movements and disturbances in the labile parts of the Earth's crust. These movements are caused by contraction in the zones of the crown mountains and faulting in the peripheral parts. The largest number of earthquakes is related to these tectonic movements and disturbances, about 90% of all earthquakes belong to them;

2. Volcanic earthquakes are characteristic of volcanically active areas. Most often they occur as a precursor to volcanic eruptions or during volcanic activity;

3. Primordial earthquakes are associated with karst regions where underground cavities occur. Due to the action of groundwater, these cavities grow, but their stability decreases. This is how the ceilings in caves and pits collapse, and the resulting earthquakes are transmitted to the surface as tremors, and
4. Artificial earthquakes occur during explosions. The strongest earthquakes are caused by underground atomic explosions. Artificial earthquakes can be caused by the filling and emptying of large reservoirs of water in the karst.

Figure 1 shows the effect of an earthquake:

![Figure 1. Earthquake effect](http://geografijagimnazijakgsasa.blogspot.com//)

Another parameter that needs to be defined is the magnitude of the earthquake. It represents a relative measure of the energy released during an earthquake. It is an unnamed number, and common magnitude values range from 1 - 9, although the magnitude scale is open on both the top and bottom. Very weak earthquakes can also have a negative magnitude (since the magnitude is defined by a logarithmic function). Thus, the magnitude is the equivalent energy measure of an earthquake related to its focal point, which means that it does not depend on the depth of the hypocentre. In honour of seismologist Charles Richter, who in 1935 mathematically defined magnitude as an energy measure of earthquakes, this earthquake parameter is also called Richter's magnitude (seismo.co.me, 2016).

The strength of an earthquake is measured on various scales. The most widely used are the Richter and Mercalli scales. The Richter scale divides earthquakes according to the amount of energy (magnitude) released in the hypocenter of the earthquake. The Mercalli scale (from 1 to 9) and the Richter scale (from 1 to 12) cannot be compared, because they give completely different data. According to the Richter scale, earthquakes are divided according to the amount of energy that is released in the hypocenter of the earthquake, while according to the Mercalli scale, they are divided according to the acceleration of points on the ground surface that occurs at the point of measurement. A common abbreviation for the Mercalli scale is MSC (seismo.co.me, 2016).

3. TUNNELS – CRITICAL INFRASTRUCTURE WITH STRICT LEGAL STANDARDS

Critical infrastructure consists of systems, networks, facilities or their parts, which interruption of functioning, or the interruption of goods or services delivery, can have serious consequences on national security, health and lives of people, property, the environment, the safety of citizens, economic stability, i.e. endanger the functioning of state. Critical infrastructure is divided into energy, traffic, water management, food supply infrastructure, health, financial, telecommunication and information infrastructure, environmental protection infrastructure, the functioning of state authorities and emergency services, and science and education infrastructure (Methodology of preparation and content of disaster risk assessment). This paper deals with the topic of the branch of traffic critical infrastructure, tunnels.
Tunnels are underground structures in the form of tubes open at both ends, placed horizontally or at a slight incline, and through them passes a railway, road, canal or waterway, which connect two parts of the road separated by an obstacle that cannot be overcome in any other way (Petkovic, 2016). This paper deals with the problem of road tunnels. In support of this, some of the main legal norms that must be respected during their construction are the following (Official Gazette of RS No. 41/18 and 95/18):

- For tunnels, where the expected traffic load will be greater than 10,000 vehicles per traffic lane per day for a period of 15 years, the construction of two tunnel tubes with one-way traffic is planned;
- The number of traffic lanes, except for the stop lane, must be the same in the tunnel and outside the tunnel;
- In new tunnels that do not have a stop lane, emergency lanes are provided to be used in the event of a breakdown or accident;
- Emergency exits are built in the new tunnels, if the traffic load is greater than 2,000 vehicles per traffic lane per day;
- Whenever the conditions of the terrain allow it, outside the tunnel with two or more tunnel tubes, a passage through the dividing belt is made possible to provide the emergency services with access to each tunnel tube;
- In an existing tunnel with a two-way traffic flow longer than 1,000 m and a traffic load of more than 2,000 vehicles per traffic lane per day, in which there are no stop lanes, the feasibility and effectiveness of the application of stopping surfaces must be evaluated;
- The lighting of the tunnel is carried out in such a way as to enable adequate visibility during the day and at night in the entrance/exit zones of the tunnel, as well as in their interior;
- The lighting of the evacuation routes in the tunnel is placed at a height of no more than 1.5 m so as to ensure sufficient visibility;
- Emergency stations are constructed as cabins or recesses in the side wall, and are located near the tunnel portal on the outside and inside the tunnel, at a distance between them that cannot be more than 150 m in new tunnels, and not more than 250 m in existing tunnels;
- Emergency stations contain at least one telephone or other means of communication in case of emergency and two fire extinguishers and
- In case of danger in the tunnel, all tunnel tubes are immediately closed to traffic.

3.1. Location and characteristics of the tunnel on the route Nis - Vranje

On the Nis - Vranje route, 4 tunnels have been built so far, but 2 tunnels were built in the second half of the 20th century and do not represent the forms of traffic infrastructure covered by the Roads Act. The reason is that these tunnels are not longer than the 500m prescribed by law and there is almost no traffic frequency on those routes. This paper deals with the more recent tunnels, the Manajle and Predejane tunnels on Corridor 10. This corridor is one of the most important pan-European traffic corridors that passes through Serbia and connects Austria, Hungary, Slovenia, Croatia, Serbia, Bulgaria, Macedonia and Greece.

The Manajle tunnel. 1804m long, is located on the southern branch of Corridor 10, highway E75, on the section Caricina Dolina - Vladicin Han, and was built according to the principle of two separate tunnel tubes. The tunnel is equipped with the most modern telecommunication systems, traffic equipment and signaling. It is also equipped with video surveillance, a radio communication system, SOS stations, niches for sheltering broken down vehicles, a fire alarm system, a system for detecting and monitoring toxic gases in the tunnel and speed measurement. The tunnel pipes are interconnected by passages, which are intended for
pedestrians and emergency vehicles. Tunnel pipes have extensions, they are connected by passages for eventual evacuation. There are passages for vehicles every 600 meters, and for passengers every 300 meters (danars.rs, 2017).

The Predejane tunnel, 1085m long, is also located on the southern branch of Corridor 10, highway E75. This tunnel was also built in a system of two separate tubes that are interconnected in certain places for possible evacuation and emergencies and is one of the longest tunnels in Serbia. It is equipped with the same systems as the aforementioned Manajle tunnel, and with sophisticated equipment, safety is guaranteed. What these two tunnels have in common is that they represent tunnels with a length of over 1000m and a frequency of over 2000 vehicles per day, in this regard, they are subject to the requirements mentioned, which concern tunnels in the Roads Act (episasee.com, 2020).

3.2. The impact of natural disasters on tunnels

Tunnel construction carries always new risks to human life and various types of property that must be taken into account. Due to the different terrains, geological conditions, anthropogenic elements, but also the great influence of natural disasters that can lead to collapse and other types of endangerment of tunnels, there must be a calculation of the impact of all factors. Many of the mentioned elements are subject to influence and change, however, the impact of natural disasters represents a range of dangers that are almost impossible to control (Sang, Sungjin & Junseo, 2020).

Research in South Korea was conducted on 277 tunnel tubes of various constructions and degrees of modernity. The topic was the impact of natural disasters on tunnels. The conclusion was that the anthropogenic factor greatly influenced and influences the development of certain climatic phenomena, and thus also natural disasters. Therefore, the term "natural" disaster can be considered and whether it is an adequate description of a disaster as a phenomenon if humans influence it through their actions and development. The impact of natural disasters on tunnels as elements of critical infrastructure is enormous (Sang, Sungjin & Junseo, 2020). The dangers that can threaten tunnels as natural disasters are (Methodology of preparation and content of disaster risk assessment):

- **earthquakes** - which are very difficult, almost impossible to identify. The seismic activity of an earthquake leads to ground shaking, and thus to the instability of the entire tunnel architecture, because ground vibrations are directly transmitted to the structure. For these reasons, earthquakes represent the most serious threat to every type of infrastructure, including tunnels. An example of such a disaster is collapse of the Long Xi tunnel in China as a result of the Wenchuan (Szechuan) earthquake in 2008, during which the entire tunnel structure collapsed within a few minutes;

- **Escarpments, landslides and erosions** - these phenomena usually follow heavy rainfall and threaten every type of critical infrastructure. According to research, 86.4% of the surface in Serbia became erosive after the floods (Raskovic & Mrdja, 2013). In this regard, escarpments, erosions and landslides directly affect the tunnels by endangering the ground on which the tunnels are located, whether they threaten the approaches to the tunnel tubes, or the entire structure. An example of such a disaster is the Jammu tunnel in India in 2022, where a landslide destroyed the entire tunnel;

- **floods** - occur as a result of heavy rainfall, and often after sudden melting of snow. The result is an increased water level of the rivers that overflow and flood the surroundings of their bed. The danger of the tunnel from this type of danger is small in terms of damage to the structure of the tubes, but the danger of flooding inside and thus preventing the frequency of traffic is high. An example of this threat is the Tapovan tunnel in India in 2021. Other phenomena that
can threaten the tunnel as a form of critical infrastructure are not characteristic of this climate (tsunamis, typhoons, volcanoes, etc.).

The sensitivity of the tunnel to earthquakes is obvious. Tests performed on tunnels can never predict all circumstances, and often even the smallest parameters affect the outcome of the entire catastrophe. Therefore, the tunnel's vulnerability to earthquakes is obvious. In order to prove this thesis, in Table 1, examples of tunnels that experienced disasters under the influence of earthquakes can be observed (Zhang, Yujing & Kazuhiko, 2020):

Table 1: The impact of earthquakes on tunnels

<table>
<thead>
<tr>
<th>Year</th>
<th>Location</th>
<th>Magnitude</th>
<th>Impact on tunnels</th>
</tr>
</thead>
<tbody>
<tr>
<td>1964</td>
<td>Niigata (Japan)</td>
<td>7.5</td>
<td>Largely damaged 20 road tunnels</td>
</tr>
<tr>
<td>1970</td>
<td>Tonghai (China)</td>
<td>7.7</td>
<td>Severe damage to the tunnel, especially the arches</td>
</tr>
<tr>
<td>1971</td>
<td>Los Angeles (USA)</td>
<td>6.6</td>
<td>Some serious damage to the mountain tunnel that runs through the Thelma Fault and minor damage to 3 other mountain tunnels</td>
</tr>
<tr>
<td>1995</td>
<td>Hyogoken-Nanbu (Japan)</td>
<td>7.2</td>
<td>20 tunnels were damaged, 10 of which require reconstruction</td>
</tr>
<tr>
<td>1999</td>
<td>Chi–Chi (Taiwan, China)</td>
<td>7.6</td>
<td>Damage to 57 tunnels, of which 14 were seriously damaged, 11 were moderately damaged and 23 were slightly damaged</td>
</tr>
<tr>
<td>2004</td>
<td>Niigataken-Chuetsu (Japan)</td>
<td>6.8</td>
<td>50 tunnels were damaged, 25 of which require reconstruction</td>
</tr>
<tr>
<td>2008</td>
<td>Wenchuan (China)</td>
<td>8</td>
<td>55 tunnels were damaged, of which 15 were seriously damaged, 13 were moderately damaged and 27 were slightly damaged</td>
</tr>
</tbody>
</table>

From the attached table, it can be concluded that earthquakes have an obvious impact on tunnels as infrastructure buildings. With this detailed analysis, it is not only possible to determine the magnitude that causes damage to the tunnels. However, it can also be seen from the attached that the most seismic soils in the world are precisely the far east due to the frequent movement of the lithospheric plates.

4. ENDANGERMENT OF TUNNELS FROM EARTHQUAKE ON THE RELATION NIS - VRANJE

Engineers involved in the construction of tunnels adhere to the thesis that tunnels are naturally resistant to earthquakes for a wide range of years, unless they are hit by an earthquake of great magnitude [5]. This perspective is supported by relevant data on tunnels throughout history. Research that was done on 71 tunnels. Parameters that are always taken into account when considering the impact of seismic waves on tunnels are "Peak ground acceleration" (PGA) and "Peak ground velocity" (PGV) (Downing & Rozen, 1998).

The damage done by the earthquake was ranged from slight cracking to the entire collapse of the structure. The tunnels that were investigated were in California, Alaska, and Japan. This research led to the following conclusions (Jaramillo, 2017):
- Tunnel collapse only occurs under extreme conditions;
- No damage is read when PGA is less than 0.19 g (ground acceleration 9.81 m/s) and PGV is less than 0.2 m/s;
- Small to moderate damage occurs when PGA is up to 0.5 g, and PGV is up to 0.9 m/s;
- Greater damage occurs when PGA is greater than 0.5 g and PGV is greater than 0.2 m/s;
- Tunnels are much safer than all other above-ground forms of traffic infrastructure and
- Earthquakes with an intensity of less than 7 degrees MSC cannot cause any damage to modern tunnels.

4.1. Endangerment of the tunnels Manajle and Predejane

The tunnels in question were built in 2019 and represent objects of traffic critical infrastructure that are at the very top of construction in these areas. A year after the opening of the tunnel, numerous regular tests were carried out by the Corridor of Serbia and the foreign company "Az Virt" regarding safety and security. After three weeks of testing, both tunnels passed the tests and were declared safe. JP "Roads of Serbia" also participated in the testing (plotonlogistics.com, 2020). From the above, it can be concluded that the tunnels were built in such a way that they meet the provisions of the Rulebook on the minimum safety requirements that a tunnel on a public road must meet from the point of view of traffic safety and the Rulebook on how to manage a tunnel.

In support of that, PGA and PGV parameters, which are basic when assessing and testing the impact of seismic action, are important when considering the safety of the mentioned tunnels. According to the research of this part of the Balkans, it was shown that the PGA ranges from 0.03g to 0.06g, and that the PGV ranges from 0.11 m/s to 0.13 m/s. These data indicate that the earthquakes that occurred in the past century are not dangerous for tunnels as a type of infrastructure in these areas (Eposito & Lervolino, 2011). Finally, as the last parameter, you should look at the seismological map of Serbia for the return period of 95 years made in the MSC scale, shown in Figure 2:

![Seismological map for a return period of 95 years](http://195.222.96.83:18000/)

**Figure 2.** Seismological map for a return period of 95 years


From the attached, the Predejane tunnel is located in the V-VI MSC intensity zone, and the Manajle tunnel is located in the VI MSC intensity zone. Therefore, the conclusion that follows from this is that the tunnels are located in the safe zone from earthquakes, because the scale does not exceed VI MSC.
5. CONCLUSION

Earthquakes represent one of the most dangerous natural disasters that can strike any form of critical infrastructure. When it comes to tunnels and their vulnerability, the problem must be seen from several aspects. Therefore, the paper gives an overview of the measures and norms that must be met during the construction of the tunnel in order to make it safe. After that, all the parameters that are taken into account when assessing the vulnerability of tunnels, obtained from previous earthquakes that caused damage to tunnels in the previous period, were presented. At the end, the conclusion of the endangerment of the tunnels on the Nis - Vranje route was given, considering each aspect individually.

From the attached it can be concluded that the Manajle and Predejane tunnels are newly built tunnels, safe, secure, but also that they are located in a zone that is not seismically active. However, the safety and protection of the tunnel in every sense of the word must not only include the assessment of the infrastructure object and its vulnerability. In support of this, adequate measures must be taken to reduce risks of any kind, such as regular testing, arrangements, maintenance of facilities, new designs and more. Only such work can achieve the protection of tunnels as a critical infrastructure, as mentioned in the title, because the safety of human lives is a priority and continuous goal.

REFERENCES

Article 96, paragraph 4 of the Law on Roads (Official Gazette of the RS No. 41/18 and 95/18) Rulebook on the minimum safety requirements that a tunnel on a public road must meet from the point of view of traffic safety.

Article 98, paragraph 3 of the Law on Roads (Official Gazette of the RS No. 41/18 and 95/18) Rulebook on the method of tunnel management.


Methodology for preparation and content of disaster risk assessment.


Zec, A. (2011) Historical frequency and spatial distribution of earthquakes in the territory of Southeast Europe and the Mediterranean, final thesis, basic academic studies, Faculty of Technical Sciences, Novi Sad.

www.seismo.co.me: Institute of Hydrometeorology and Seismology of Montenegro, Department of Seismology.

www.plutronlogistics.com: “Safely through Manajle and Predejane - Completed testing in the tunnels in the Grdelica gorge.”


www.danas.rs: The last tunnel on Corridor 10 has been breached.
THE PLACE AND ROLE OF THE ARMY OF SERBIA IN THE DISASTER RISK REDUCTION SYSTEM IN THE TERRITORY OF THE REPUBLIC OF SERBIA

Nikola Vukojevic¹, Uros Polovina², Jelena Lazarevic³

¹ University of Defence in Belgrade, Military Academy, Veljka Lukica-Kurjaka Street No. 33, Belgrade, Republic of Serbia, nikola_vukojevic@gmail.com
² University of Defence in Belgrade, Military Academy, Veljka Lukica-Kurjaka Street No. 33, Belgrade, Republic of Serbia, uros.polovina@gmail.com
³ University of Defence in Belgrade, Military Academy, Veljka Lukica-Kurjaka Street No. 33, Belgrade, Republic of Serbia, jcrvenkov@gmail.com

Received: 18th July 2022
Accepted: 16th August 2022

Abstract: Disasters in recent decades represent an increasing threat to people’s lives and work. In all their forms, they cause great damage, complicate and partially or completely prevent the functioning of various systems in society. Since the beginning of the 21st century, the Republic of Serbia has been affected many times by floods, fires, and earthquakes, which resulted in the loss of human lives and the material damage was enormous. The Serbian Army played an important and perhaps the biggest role in eliminating the consequences of the disasters that affected Serbia. The Army, as an organization whose basic role is to protect the territory from armed threats, through its doctrinal and legal documents foresees the engagement of equipment and members of the Army in the tasks of assisting civilian structures in eliminating non-military threats. The Serbian Army played a key role in the tasks of rescuing residents in the May floods of 2014, where the training and readiness of the Army to respond to all tasks from the mission of supporting civilians in confronting security threats came to the fore.

Key words: disasters, the Serbian Army, missions and tasks, floods

1. INTRODUCTION

Disasters, both natural and disasters caused by technical - technological and other accidents, in recent decades represent an increasing threat to the life and work of people all over the world. They cause great damage, complicate and partially or completely prevent the functioning of various systems in society. As a result of disasters, human lives, material and cultural goods, infrastructure of various purposes are lost, while financial losses are measured in tens of millions of euros.

The surface of the Republic of Serbia, only since the beginning of the 21st century, has been affected many times by floods, fires, and earthquakes that took human lives and the material losses were enormous. The state, as the most responsible for preventing and remediating the
consequences of disasters, managed to respond to these tasks with the participation of a large number of state institutions and citizens. The Serbian Armed Forces played an important and perhaps the biggest role in the realization of the tasks of eliminating the consequences of disasters.

The army as an organization, whose primary role is to protect the territory from armed threats from the outside, through its doctrinal and legal documents foresees participation in the tasks of helping civil structures in eliminating non-military threats. Through clearly defined missions and tasks of the Army, the possibility of its involvement in emergency situations in order to help the population and authorities is foreseen. Its units, in accordance with the specific task and mission, can be engaged in the protection and rescue of people, material and cultural assets from natural disasters, technical-technological accidents, elimination of consequences and prevention of terrorism.

A large number of personnel as well as equipment were engaged by the Army during the removal of the consequences of the floods in May 2014, where the readiness and training of the Army to engage in the mission of assisting the civil authorities in confronting security threats came to the fore.

2. DISASTERS ON THE TERRITORY OF REPUBLIC OF SERBIA

Disasters are natural or man-made events that have a great impact on society and the state. Disaster-related events can have major economic, social and environmental consequences. In recent decades, an increase in the number of disasters affecting the world as well as their destructiveness is evident (Cvetkovic 2014). Damages and lost human lives, which are the result of disasters, cause a change in the way certain systems in society function.

In recent decades, countries have been investing more and more resources in disaster protection systems, but also in remediating the consequences of disasters. In the last two decades, Serbia was repeatedly affected by major disasters that caused enormous material damage, therefore, the state had to invest considerable material resources in remediating the consequences of the disasters. The estimated damage from the floods in May 2014 alone is around 1.5 billion euros (State Audit Institution 2019).

2.1. Types and characteristics of disasters on the territory of the Republic of Serbia

Serbia has a favorable geographical position. Its waterways have exceptional potential. Thanks to the favorable conditions, there are thousands of watercourses on the territory of Serbia. Their total length is about 66,000 km. The largest rivers are transit watercourses, which also have great water management importance. However, in the basins of these rivers, the biggest water management problems are, such as floods, strong soil erosion in some places with the appearance of ravines and torrents. Increasing water pollution is a limiting factor in the use of rivers in Serbia (Assessment of the risk of disasters in the Republic of Serbia 2017.). According to the data of the Water Management Foundation of the Republic of Serbia, "nearly 1.6 million hectares, of which about 80% is arable agricultural land, are at risk of flooding." There are more than 512 larger settlements, 515 industrial and other economic facilities, 680 km of railways and about 4,000 km of roads on potentially endangered areas (Assessment of the risk of disasters in the Republic of Serbia 2017.).

Although Serbia is not located in an area of high seismic activity, it has been affected by earthquakes of up to 5.9 on the Richter scale. Considering the unfavorable invulnerability of the built infrastructure, such earthquakes can be destructive. In the previous 100 years, the territory of Serbia was hit by about 400 earthquakes of strong and moderate intensity and about 6,000 of weak intensity. Kopaonik, Arandjelovac, Valjevo, Kosovo and Metohija (Gnjilane
and Vitina) and Vranje are the parts of Serbia with the most seismic activity and the parts where strong and medium intensity earthquakes have occurred and where there is a high possibility of earthquakes (Assessment of the risk of disasters in the Republic of Serbia 2017).

Forest fires, as the most destructive form of destruction of forest ecosystems, often affected the territory of Serbia in the past. On that occasion, large forest areas were destroyed in a short time, ecosystems were damaged and the habitats of many plant and animal species were damaged or destroyed. Coniferous and mixed forests suffered the greatest damage from the fire.

The territory of Serbia was affected by epidemics, pandemics, droughts, technical and technological accidents, which in terms of their intensity and material damage were less destructive than floods, fires and earthquakes.

### 2.2. Consequences of disasters on the territory of the Republic of Serbia

Based on the analysis of the available data, the conclusion is reached that floods in Serbia mostly occurred as a result of "overflow of water from the river beds, along sections where there are no flood protection facilities built, as well as due to overflowing and demolition of protective structures" (Assessment of the risk of disasters in the Republic of Serbia 2017.).


The characteristics of these floods are that arable land was completely or partially flooded and agricultural crops were mostly destroyed. Infrastructure of various purposes, including parts of critical infrastructure, were partially damaged or threatened. Residential infrastructure was damaged, and the return of people to their homes was only possible after drying and disinfecting the buildings. Due to sudden torrential flows on small rivers and streams, which caused landslides, many village roads were damaged and some places were cut off. Material damage was measured in millions of euros.

The biggest earthquakes, where in addition to material damage there were also losses of human life, hit Kraljevo in 2010 - 2 people lost their lives and Gnjilane in 2002 - 1 person lost their lives. The strongest earthquake on the territory of Serbia (5.9 on the Richter scale) was recorded in 1927 in Gornji Milanovac, where 7 people lost their lives (Assessment of the risk of disasters in the Republic of Serbia 2017.). The damage to infrastructure facilities was extensive and some residential facilities had to be demolished due to the unprofitability of reconstruction.

Large forest fires affect Serbia every ten years. The last big fires hit Tara and the immediate surroundings of Cacak in August 2012, when about 10,000 hectares of forest were damaged (Nedeljnik Vreme 2012.).

### 3. THE ROLE AND TASKS OF THE SERBIAN ARMY IN THE NATIONAL SECURITY SYSTEM

The national security system represents a normatively, structurally and functionally regulated entity whose activities ensure the protection and realization of the national interests of the Republic of Serbia (National Security Strategy of the Republic of Serbia 2020.). The administrative part of the system consists of: the National Assembly, the President of the Republic, the Government and the National Security Council, and the executive part: the
defense system, the internal security system, the security-intelligence system and other subjects important for national security.

On December 27, 2019, the National Assembly of the Republic of Serbia adopted the National Security Strategy, as the highest strategic document in which positions, determinations and measures are expressed in order to protect and realize national interests. "National security of the Republic of Serbia is the objective state of protection of its national values and interests from all forms of threats." (National Security Strategy of the Republic of Serbia 2020.). Regional and local conflicts, ethnic and religious extremism, terrorism, organized crime, proliferation of weapons of mass destruction, illegal migration, hybrid threats, cyber threats, limited availability of natural resources, including water and food, energy and raw materials, as well as climate change and degradation of the natural environment, threaten the stability of states, as well as global security (National Security Strategy of the Republic of Serbia 2020.). The National Security Strategy of the Republic of Serbia also recognizes natural disasters as a threat to the country "which in a very short time can cause significant consequences and make life impossible in certain parts or the entire country." (National Security Strategy of the Republic of Serbia 2020.). Floods, droughts, fires, earthquakes, technical-technological and other accidents are a risk for Serbia.

3.1. The role of the Serbian Army in the national security system

The Defense Strategy of the Republic of Serbia defines the defense of Serbia through "organizing, preparing and engaging subjects of the defense system to carry out tasks... using the Serbian Armed Forces and other defense forces." (Defense Strategy of the Republic of Serbia 2020.). The defense system is part of the national security system and is made part - the National Assembly, the President of the Republic, the Government, the Ministry of Defense, the General Staff of the Serbian Armed Forces and the Council for National Security (Defense Strategy of the Republic of Serbia 2020.) and their task is to manage the defense system and ensure the conditions for its stable functioning and the use of the Army and other forces of defense and the executive part - the Serbian Army and other defense forces.

"The Army of Serbia is an organized armed force that defends the Republic of Serbia from armed threats and carries out other missions and tasks in accordance with the Constitution, the law and the principles of international law.” Life and health of people, at the proposal of the Minister of Interior and Defense and with the approval of the President, the Government is forming military and police forces to carry out the task. The forces are subordinated to the head of the Army. The army unites all participants in combat operations and is responsible for commanding all forces in combat operations in a state of emergency and war. Army units can be engaged as auxiliary forces in the provision of assistance for the protection of life and safety of people and property or for the protection of the environment (Law on the Serbian Armed Forces 2019.). The army also performs other tasks, based on the decision of the National Assembly.

3.2. Missions and tasks of Serbian Army

The army, as an organized armed force, is organized at the strategic, operational and tactical level into commands, units and institutions. The General Staff is the highest staff authority for the preparation and use of the Army (Law on the Serbian Armed Forces 2019.). It is made up of permanent and reserve forces and performs its tasks in accordance with the Constitution, the Law on Defense and the Law on the Serbian Armed Forces, as well as doctrinal documents.

The missions of the Serbian Armed Forces are (Army Doctrine 2010.):

1. defense of the Republic of Serbia against armed threats from the outside,
2. participation in building and preserving peace in the region and the world
3. support to civil authorities in confronting security threats.

Performs assigned missions by performing assigned tasks. The defense of the Republic of Serbia against armed threats from the outside is accomplished by deterring armed threats, defending the territory and defending the airspace. Participation in building peace in the region and the world is realized through participation in international military cooperation and participation in multinational operations (Army Doctrine 2010.).

The third mission of the Army is achieved through assistance to civil authorities in countering internal threats to security, terrorism, separatism and organized crime and through assistance to civil authorities in case of natural disasters, technical-technological and other accidents (Army Doctrine 2010.). In addition to this, the permanent task of the Army is to train commands, units and institutions to carry out missions and tasks.

4. ENGAGEMENT OF THE ARMY OF SERBIA IN THE DISASTER RISK REDUCTION SYSTEM

The disaster risk reduction system is part of the national security system and represents an integrated form of management and organization of the subjects of this system when performing the tasks of protection and rescue from the consequences of disasters, including recovery measures from those disasters (Law on Disaster Risk Reduction and Emergency Management 2018.). The risk reduction system includes a set of measures and activities aimed at preventing new and reducing existing risks. The forces of the system are the headquarters for emergency situations, civil protection units, fire-rescue units, the Police, the Serbian Army, the Red Cross of Serbia, the Mountain Rescue Service, the Fire Brigade of Serbia, the Association of Radio Amateurs of Serbia, citizens, associations of citizens and organizations whose activities are of special interest in the development and functioning of the system (Disaster Risk Reduction and Emergency Management Act 2018.).

The Serbian Army can be used in peacetime, state of emergency and wartime, in accordance with the law and the decisions of competent state authorities. Making a decision on the use of the Army is conditioned by the state of security in the region and the world, the degree of threat to the state, available resources, and spatial and weather conditions. The use of the Army includes peacetime activities and the planning, preparation and execution of combat and non-combat operations (Army Doctrine 2010.).

4.1. Legal regulation of the engagement of the Serbian Armed Forces in disasters

The bearers of opposition to non-military threats to security are the Headquarters for emergency situations. The engagement of the forces of the Serbian Armed Forces to provide assistance to civil authorities is carried out based on the request of the headquarters for emergency situations, through the Republic Headquarters for emergency situations. The forces of the Serbian Armed Forces, which are used in providing assistance in protection and rescue, are commanded by competent senior officers of the Serbian Armed Forces. In order to coordinate joint activities with other protection and rescue forces, representatives of the Serbian Armed Forces are appointed to the staffs for emergency situations at all levels of organization. The Minister of Defense and the Chief of the General Staff of the Serbian Armed Forces or a chief appointed by the Chief of the General Staff are members of the Republic Headquarters for Emergency Situations, while provincial, district, city and municipal headquarters are appointed by chiefs from commands and units, in accordance with the garrison division and responsibilities (Command doctrine in the Serbian Army in 2016.).
The President of the Republic or the Minister of Defense, upon the authorization of the President of the Republic, may decide that the Serbian Armed Forces provide assistance to the competent state body, i.e. organization, body of autonomous provinces and body of local self-government units, at their request, for the protection of life and safety of people and property, protection of the environment and elimination of harmful consequences that may arise from non-military threats to security (Doctrine of command in the Serbian Armed Forces 2016.).

The Chief of the General Staff of the Serbian Armed Forces, commanders of operational commands and brigade commanders, based on the special authorization of the President of the Republic, and for the purpose of protecting and rescuing people, material and cultural assets from natural disasters, technical-technological accidents, fires, explosion, the consequence of terrorism and other large-scale accidents, can order the implementation of preparedness measures and the use of parts of the Serbian Armed Forces (Command doctrine in the Serbian Army in 2016.).

4.2. Operational capabilities of the Army that enable participation in protection and rescue tasks

In conditions when other forces and means of the system are not sufficient for the protection and rescue of people, material and other goods, the Ministry of Defense and at the request of the Republic Headquarters for emergency situations, ensures the participation of its organizational units, to provide assistance in protection and rescue, except in war and state of emergency (Act on Disaster Risk Reduction and Emergency Management 2018.). In case of a decision to engage the Serbian Armed Forces in protection and rescue tasks, in addition to the liaison officer of the Serbian Armed Forces who is a member of the staff, specialists may also be referred to the competent Headquarters for Emergency Situations officers (engineering, ABHO, etc.) who are needed for the implementation of specific tasks of protection and rescue. A liaison officer is a specialist who has information about the capabilities and possibilities of using the Serbian Armed Forces for protection and rescue tasks and coordinates requests to the Serbian Armed Forces, but does not decide on the use of the Serbian Armed Forces (Command doctrine in the Serbian Army in 2016).

At the request of the Ministry of Internal Affairs, the Serbian Armed Forces provide support to the forces in the fight against terrorism, organized crime and armed insurgency in order to prevent and eliminate the consequences. In opposing terrorism and armed insurrection, adequate threat forces are used. Their composition includes units of the Serbian Armed Forces intended for counter-terrorist operations, as well as others, which, in accordance with their purpose and capabilities, can be used to perform certain tasks. The Chief of the Serbian Armed Forces commands the military forces and assigns tasks to the police forces, in accordance with their competences, in order to carry out joint tasks. He is responsible for the state of security in the area of operation, the realization of the mission and the achievement of the conditions for ending military operations, i.e. the desired end state (Command doctrine in the Serbian Army 2016.)

Army units can provide assistance in almost all protection and rescue actions, especially in: observation of a threatened area, transmission of information and notification, saving human lives and evacuation from threatened areas, taking measures to prevent the further spread of danger (construction of embankments on rivers, localization of fires), delivery of medicines, food, drinking water, repair of roads, construction of pontoon crossings, provision of air transport of people and material resources, radiological-chemical control of the territory, decontamination of people, facilities and resources (MlaDjan, 2015). The army can also be engaged when controlling certain routes, strengthening blockades, ensuring safe routes for
movement, controlling and channeling a large number of people, protecting warehouses and providing medical assistance (Mladjan, 2015).

4.3. Case study - Engagement of the Serbian Army in the floods of 2014.

The involvement of members of the Army in removing the consequences of disasters has become a "tradition" in our region. The largest involvement of the army was in 1963 in removing the consequences of the earthquake in Skopje. At that time, the commander of the 3rd Army of the JNA directed the elimination of the consequences of the devastating earthquake (Simovic, 2016). The beginning of the 21st century was characterized by major disasters that hit Serbia, for the elimination of which it was necessary to engage the Army - the flood in the village of Jasa Tomic in 2005, the earthquake in Kraljevo in 2010 ("engaged 1248 soldiers and elders and 299 motor and engineering vehicles" (Simovic, 2016); extremely low temperatures in Crna Trava, Sjenica, Vrsac, floods in Trgovište in 2010; extremely high temperatures and fires in 2012 (engaged 1809 soldiers and elders, 169 motor vehicles, 41 special and engineering equipment).

The largest and most important involvement of the Serbian Army in the tasks of eliminating the consequences of natural disasters was ongoing even after the floods in May 2014. Its capacities were engaged in the area of 12 administrative districts in 39 municipalities and in 50 locations. Over 2,500 of its members and 185 larger assets (helicopters, engineering machines, boats, amphibious vehicles, motor vehicles) were engaged daily. The Air Force performed 553 flights with about 200 flight hours (Simovic, 2016).

Members of the Army evacuated 10,305 residents, of which 6,863 by land and 3,442 by air. 10 helicopters, 3 amphibians, 41 boats and 47 motor vehicles were engaged. The largest number of residents were evacuated from Obrenovac. About 2,500 people were taken care of and accommodated in military facilities.

The army installed 13 heavy mechanized bridges, filled about 142,000 sacks and built about 15,775m of embankment. The center of gravity in the construction of the embankment was in Sabac. The Army removed 23 tons of mud and waste from the threatened area with the involvement of 1,017 soldiers and officers, 12 engineering machines and 21 dump trucks. Specialized ABHO units decontaminated 1,217 buildings and 2,318,110 m2 of land and roads. Two veterinary teams are engaged in veterinary supervision. Engineering units were engaged in the rehabilitation tasks of 14 landslides and 23 landslides; landscaping of the riverbed (1,200m); road breaking (600m) and road repairs (20km) (Simovic, 2016). Members and equipment of the Army were engaged in water pumping tasks for 72 days. Health authorities examined and treated 1,100 people.

5. CONCLUSION

The disasters that hit Serbia, in addition to the loss of human lives, caused great material and non-material damage. The Serbian Armed Forces, as part of the executive system of national security, played a key role in eliminating the consequences of disasters.

A large number of members of the Army, in accordance with the law and doctrinal documents, were engaged in eliminating the consequences of disasters. On that occasion, a large number of techniques were used, such as helicopters, amphibious vehicles, motor vehicles, and engineering machines. The army is engaged in evacuation tasks, taking care of evacuees and the sick, building embankments, repairing and breaking roads, extinguishing fires, transmitting information, decontamination of buildings, roads and land, as well as pumping out water from flooded areas. An important role was also played by members of the Army's medical security, who treated and examined around 1,100 people during the floods in May 2014 alone.
All these tasks are performed by the Army in accordance with the third mission - supporting the civil authorities in countering security threats. Thanks to the preparedness, training and readiness of personnel and equipment to engage in the event of elementary, technical-technological and other accidents, the state, with the key role of the Army, managed to remove the consequences of the disasters that hit it in the shortest possible time. Although according to legal and doctrinal documents, the Army is engaged in the third mission to help the civil authorities, due to the large scale of the disasters, the Army’s role was primary.

The Army played the most notable role in 2014, where over 2,500 of its members were engaged every day during the May floods. The Air Force performed 553 flights, with about 200 flight hours. They evacuated over 10,000 people, almost 4,000 of them by air. The strain on personnel and equipment was great, but with respect for the principles of use, as well as properly defined and required operational capabilities, the Army responded to all the tasks set.

Adherence to defined missions and tasks and improvement of operational capabilities will enable the Army to successfully respond to similar or more difficult tasks in the future.

REFERENCES


Drzavna revizorska institucija (2019.) Prevencija poplava u Republici Srbiji, broj 400-1111/2019-03/24, Beograd.


Ministarstvo odbrane Republike Srbije, Generalstab Vojske Srbije (2010.), Doktrina Vojske, Medija Centar, Beograd.


Zakon o smanjenju rizika od katastrofa i upravljanju vanrednim situacijama (2018) – Sluzbeni glasnik RS br. 87/2018

APPLICATION OF MULTI-CRITERIA DECISION-MAKING IN THE SELECTION OF A LOCATION FOR THE DISPOSAL OF FLUORESCENT TUBES CONTAINING MERCURY IN THE TERRITORY OF THE CITY OF NIS

Vukasin Vuckovic¹, Darko Bozanic², Dusko Tesic³

¹ University of Defence in Belgrade, Military Academy, Veljka Lukica-Kurjaka Street No. 33, Belgrade, Republic of Serbia, vvukasin77@gmail.com
² University of Defence in Belgrade, Military Academy, Veljka Lukica-Kurjaka Street No. 33, Belgrade, Republic of Serbia, dbozanic@yahoo.com
³ University of Defence in Belgrade, Military Academy, Veljka Lukica-Kurjaka Street No. 33, Belgrade, Republic of Serbia, tesic.dusko@yahoo.com

Received: 4th August 2022
Accepted: 11th September 2022

Professional paper

Abstract: Disposal of hazardous materials is a procedure that has been a problem since its inception. According to the variety of dangerous substances, there are also different methods of disposal. However, the goal during disposal is always the same, so that people, the environment and other goods are not endangered. This paper deals with the problem of disposal of fluorescent tubes containing mercury in the territory of the city of Nis. One of the problems related to this type of hazardous materials is the choice of location for disposal after use. In this regard, multi-criteria decision-making methods can help in deciding the location. In this paper, the problem of choosing a location for the disposal of this type of hazardous waste is addressed using the AHP and TOPSIS methods. The first method determines the weight coefficients of the criteria, while the second method determines the choice of one of the three alternatives.

Key words: Hazardous substances, decision-making, AHP and TOPSIS

1. INTRODUCTION

The development of human society has always flowed in the direction of creating relief in everyday functioning. Unfortunately, progress itself has not always brought improvement in all spheres. Such is the example of dangerous substances. The benefits, which they brought on the one hand, speeded up certain processes, would always be matched by a bad impact on people's lives and health, the environment and other goods.

The influence and production of dangerous substances grew with the development and the desire of society itself. The turning point is definitely represented by the industrial revolutions that accelerated various production processes. Seen from the aspect of environmental
protection, in an inversely proportional relationship, starting from that period, was the very
development and concern of man about the disposal of that hazardous waste that appeared. In
other words, as the industry developed, so did the endangerment of the environment, as well
as the lethality of dangerous substances. Therefore, the choice of location for their disposal is
of great importance.

In this paper, in the domain of hazardous materials, fluorescent tubes containing mercury and
the problem of their disposal in the territory of the city of Nis will be dealt with. First of all, it
should be mentioned that this type of light bulbs was discovered way back in 1840, and that in
Serbia their recycling started ten years ago and on a smaller scale (eKapija.com, 2010). So, the
disposal is in a way inevitable, with a strict procedure.

Another part of the problem is determining the location on the territory of the city of Nis. At
first glance, making this decision is the easier part of the job, however, the harmful impact of
hazardous substances in general must not be ignored, therefore a scientific approach must be
taken when it comes to the selection of locations for the disposal of hazardous waste. Taking
all this into account, the Analytical Hierarchical Processes (AHP) method and the Technique
for Order Preference by Similarity to Ideal Solution (TOPSIS) method of multi-criteria
decision making were used in the work. The essence of the problem is the choice of one variant
of use, which the decision maker (DO) will choose based on the comparison of all elaborated
variants (Saaty, 1980). The first method was used to determine the weighting coefficients of
the criteria, while the second method was used to determine the best alternative for the source
location for the disposal of fluorescent tubes containing mercury in the territory of the city of
Nis.

2. PROBLEM DESCRIPTION

Fluorescent tube is a light source in which visible light is produced on a fluorescent layer
excited by ultraviolet radiation created by an electric charge in a mixture of noble gases.
Compared to an ordinary light bulb, it is characterized by a higher degree of electrical energy
conversion into light and a longer lifespan. These bulbs are very economical, in addition to
favorable energy characteristics, different light color temperatures are an additional advantage.
There is a wide range of powers, shapes and light intensities that provide the optimal solution
for different applications. In short, these features have led to the mass use of these consumers
of electricity, which further leads to their disposal being a problem due to their mercury
content. Mercury belongs to the group of substances of the 1st danger class. Therefore,
disposal of these products is mandatory. The amount of mercury can vary depending on the
type of light bulb and is 3-5 mg per unit (Satoshi, 2022).

In accordance with the above, the Rulebook on the method and procedure for managing
fluorescent tubes containing mercury was adopted. The provisions of this rulebook refer to
fluorescent tubes containing mercury, namely:
1) compact fluorescent light sources with a mercury content of up to 5 mg;
2) flat fluorescent light sources for general purposes in which the content of mercury
compounds does not exceed the following values (Brown, Richard & Hyun, 2013):
   - halo phosphates 10 mg;
   - triphosphates with a normal shelf life 5 mg;
   - triphosphates with a long shelf life 8 mg and
3) flat fluorescent light sources for special purposes containing mercury.
Management of waste fluorescent tubes containing mercury is a set of measures that include collection, sorting, transport, storage and treatment of waste fluorescent tubes containing mercury or disposal of residues after treatment. The management of waste fluorescent tubes containing mercury is carried out in a way and according to a procedure that does not pose a risk of water, soil or air pollution, and which can be avoided, in order to protect human health and the environment. Waste fluorescent tubes containing mercury are sorted and classified in the prescribed manner and stored until handed over to the collector and/or person who transports waste fluorescent tubes containing mercury, i.e. the person who stores and/or treats waste fluorescent tubes containing mercury. Waste fluorescent tubes containing mercury are marked in accordance with the regulation governing the management of electrical and electronic products. In the warehouse of waste fluorescent tubes containing mercury, pretreatment and treatment of waste fluorescent tubes containing mercury is not carried out. Collected waste fluorescent tubes containing mercury, before reuse or disposal, are treated in a treatment facility that has a permit, in accordance with the law governing waste management and the regulation governing the management of electrical and electronic products. The treatment of waste fluorescent tubes containing mercury is carried out in a manner and according to a procedure that ensures the protection of human health and the environment, in accordance with the law and special regulations (Official Gazette of RS No. 97/2010).

3. DESCRIPTION OF APPLIED METHODS

Multi-criteria decision-making is one of the most well-known areas in decision-making theory. It can be defined as a structured framework for analysing and solving decision problems characterized by multiple objectives. Multi-criteria decision-making uses a set of mathematical methods and tools to support the decision-maker in solving real problems in various fields, and in situations where there is a large number of, most often, conflicting criteria, that is, goals. In everyday real decision-making problems, there is almost no "ideal" alternative that would be optimal in relation to each criterion or goal. So, for example, an alternative that is more useful is usually more expensive. As there is almost always a conflict of goals, the main purpose of multi-criteria decision-making is to determine a "good" compromise, that is, an alternative that satisfies all set goals to the greatest extent (Gajovic & Radivojevic, 2014).

Although multi-criteria analysis as a scientific discipline has relatively short history, about 50 years, a large number of different methods have been developed to date, and the literature continuously records the development of new multi-criteria analysis methods (Nikolic & Borovic, 2000). In parallel with the development of multi-criteria analysis methods, the number of scientific and professional works that deal with the application of methods for solving various decision-making problems is also increasing. Each method has some unique characteristics, logic, advantages, and disadvantages. The choice of the method that will be used to solve the specific problem of multi-criteria analysis depends on the nature of the problem being solved, the availability of information about the problem, the number of alternatives, as well as the knowledge, previous experience, and preferences of the decision maker (Cupic & Sukanovic, 2010).

The paper used the AHP-TOPSIS hybrid model, where the AHP method was used to determine the weighting coefficients, while the TOPSIS method was used to rank the alternatives. Table 1 shows how to solve the problem using this hybrid model (Djukic, Petrovic, Bozanic & Delibasic, 2022):
The table shows how to solve the problem using the hybrid AHP-TOPSIS model. This model has been successfully applied in many works according to the principle shown in the table.

### 3.1. AHP method

Analytical Hierarchy Processes (AHP) method was used to determine the weighting coefficients of the criteria. It was developed by Tomas Saaty in the early eighties of the last century and it represents a tool in decision analysis. It was created to provide assistance to decision-makers in solving complex decision-making problems involving a large number of DOs, there are a large number of criteria in several specific time periods. The field of method application is multi-criteria decision-making, where based on a defined set of criteria and attribute values for each alternative, the most acceptable solution is selected, i.e. the complete distribution of the importance of the alternative is displayed in the model (Madic, Nedic & Radovanovic, 2015). Due to the simpler application of the method, software from the Expert Choice decision support system class was developed on a concrete example. In doing so, four stages of the method application were recorded (Cupic & Sukanovic, 2010):

1) structuring the problem;
2) data collection;
3) assessment of relative weights and
4) determining the solution to the problem.

Problem structuring consists of decomposing a decision problem into a series of levels. In this step, it is necessary to decompose the problem, define the goal, criteria, sub-criteria and alternatives. A graphic representation of the problem structuring is presented in Figure 1 (Cupic & Sukanovic, 2010):

![Figure 1. Structuring the problem](Brown, Richard & Hyun, 2013.)
With the collection of data and their measurement, the second phase of the AHP method begins. The decision maker assigns relative scores to pairs of attributes of one hierarchical level, and for all levels of the entire hierarchy. In doing so, the most famous nine-point scale (Saaty's scale) is used, presented in Table 2 (Cupic & Sukanovic, 2010):

**Table 2. 9 point scale**

<table>
<thead>
<tr>
<th>Scale</th>
<th>Explanation/Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>The absolute most significant/preferred</td>
</tr>
<tr>
<td>8</td>
<td>Very strongly towards the absolute most significant/preferred</td>
</tr>
<tr>
<td>7</td>
<td>Very strongly towards very important/preferred</td>
</tr>
<tr>
<td>6</td>
<td>Strong to very strong</td>
</tr>
<tr>
<td>5</td>
<td>Stronger more significant/preferred</td>
</tr>
<tr>
<td>4</td>
<td>Weaker to stronger</td>
</tr>
<tr>
<td>3</td>
<td>Weaker more significant/preferable</td>
</tr>
<tr>
<td>2</td>
<td>Equally to the weaker more</td>
</tr>
<tr>
<td>1</td>
<td>Equally important/desirable</td>
</tr>
<tr>
<td>0.50</td>
<td>Equally to the weaker minor</td>
</tr>
<tr>
<td>0.33</td>
<td>Weaker less significant/preferred</td>
</tr>
<tr>
<td>0.25</td>
<td>Weaker to strongly minor</td>
</tr>
<tr>
<td>0.20</td>
<td>Strongly less important/preferred</td>
</tr>
<tr>
<td>0.17</td>
<td>Strong to very strong/minor</td>
</tr>
<tr>
<td>0.14</td>
<td>Extremely strong less significant/preferred</td>
</tr>
<tr>
<td>0.13</td>
<td>Very strongly to absolutely minor</td>
</tr>
<tr>
<td>0.11</td>
<td>Absolute least important/preferred</td>
</tr>
</tbody>
</table>

Upon completion of this phase, the appropriate pairwise comparison matrix corresponding to each level of the hierarchy is obtained. Determining the relative weights is the third stage of applying the AHP method. The pairwise comparison matrix is transferred into the problem of determining the eigenvalues – the normalized and unique eigenvectors. Weights are obtained for all attributes - for all levels of the hierarchy (Pamucar, 2018). You can read more about the AHP method in numerous scientific and professional works (Pamucar, Djorovic, Bozanic & Cirovic, 2012), (Bozanic, Pamucar & Komazec, 2016), (Petrovic, Sakovic, Marinkovic, 2017), etc.

### 3.2. TOPSIS method

The TOPSIS method was developed by Hwang and Yoon in 1991. It is based on the concept that the optimal method should have the smallest Euclidean distance from the positive-ideal solution and the largest from the negative-ideal solution (Pamucar, 2018). Positive-ideal solution is a hypothetical solution for which all attribute values of the alternative correspond to the most desirable attribute values in relation to all criteria (Cupic & Sukanovic, 2010). On the other hand, negative-ideal solution is a hypothetical solution for which all attribute values correspond to the most undesirable attribute values in relation to all criteria. Therefore, the solution determined by the TOPSIS method is "closest" to the hypothetical best solution and at the same time "farthest" from the hypothetical negative-ideal solution (Pamucar, 2018).

The basic procedure for changing the TOPSIS method can be summarized in the following steps (Pamucar, 2018):
- Step 1: Normalizing the decision matrix;
- Step 2: Weight normalization of the performance matrix;
- Step 3: Determination of ideal solutions;
- Step 4: Determining the distance of alternatives from ideal solutions;
- Step 5: Determining the relative proximity of alternatives to the ideal solution;
- Step 6: Ranking matrix.

The TOPSIS method is a well-known method and applied to a large number of scientific and professional works, in which you can read more about it (Pamucar, Bozanic & Kurtov, 2016), (Djukic, Petrovic, Bozanic & Delibasic, 2022), etc.

4. USE OF THE MODEL

Before using the multi-criteria decision-making model, the locations for the disposal of hazardous substances must be defined, as well as the criteria that will be the parameters for decision-making. Taking into account the location of the largest places for collecting a given type of hazardous waste, as well as the population density, three potential locations were chosen for the disposal of fluorescent tubes containing mercury in the territory of the city of Nis. The first location that was chosen for a potential station is located on Camurlijski put. The second location is located on the road leading to Niska Banja, while the third potential location is land near the Nis Penitentiary. The location of all three locations is shown in Figure 2:

![Figure 2. Waste disposal locations on the territory of Nis](https://a3.geosrbija.rs/)

Before starting the application of the method, the basic criteria are defined on the basis of which the risk assessment is carried out. The criteria for risk assessment in this model for a specific problem are as follows:

Criterion 1 (K₁) - Distance and impact on water systems;
Criterion 2 (K₂) - Population density in that area,
Criterion 3 (K₃) - Possible impact on the environment;
Criterion 4 (K₄) - Distance from transport corridors;
Criterion 5 (K₅) – Construction costs.

4.1. Calculation of the weight coefficients of the criteria

The calculation of the weighting coefficients is carried out using the already mentioned AHP method. First, the initial decision matrix (X) should be mentioned. Alternatives are shown by vectors within it Ai = (xi₁, xi₂, ..., xin), where ij x is the value of the i-th alternative according to the j-th criterion (i=1,2,...,m; j=1,2,...,n). In order to determine the weight coefficients, the given criteria are compared in pairs, as shown in table 3 (Borovic & Milicevic, 2001):
Using the mathematical model of the AHP method, the **weighting coefficients of the criterion** \( W \) are calculated. The value of the weighting coefficients is shown in table 2:

<table>
<thead>
<tr>
<th>Criteria</th>
<th>W</th>
</tr>
</thead>
<tbody>
<tr>
<td>( K_1 )</td>
<td>0,4344</td>
</tr>
<tr>
<td>( K_2 )</td>
<td>0,1955</td>
</tr>
<tr>
<td>( K_3 )</td>
<td>0,2207</td>
</tr>
<tr>
<td>( K_4 )</td>
<td>0,1175</td>
</tr>
<tr>
<td>( K_5 )</td>
<td>0,0915</td>
</tr>
</tbody>
</table>

### 4.2. Choosing the best alternative

The first step in choosing an alternative in the AHP-TOPSIS hybrid model is to evaluate the alternatives according to the criteria. This initial decision matrix is shown in Table 5:

<table>
<thead>
<tr>
<th>Criteria charac.</th>
<th>( K_1 ) max</th>
<th>( K_2 ) min</th>
<th>( K_3 ) min</th>
<th>( K_4 ) min</th>
<th>( K_5 ) min</th>
</tr>
</thead>
<tbody>
<tr>
<td>( A_1 )</td>
<td>4</td>
<td>178</td>
<td>83,6</td>
<td>5,5</td>
<td>17000</td>
</tr>
<tr>
<td>( A_2 )</td>
<td>0,5</td>
<td>101</td>
<td>75,8</td>
<td>6,5</td>
<td>19500</td>
</tr>
<tr>
<td>( A_3 )</td>
<td>4,9</td>
<td>631</td>
<td>92,4</td>
<td>6</td>
<td>11000</td>
</tr>
</tbody>
</table>

The value of the relative proximity of the alternatives and the ranking of the best alternative is determined using the TOPSIS method. The result of the calculation using the mathematical model is shown in table 6:

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Relative proximity</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>( A_1 )</td>
<td>0,6352</td>
<td>2.</td>
</tr>
<tr>
<td>( A_2 )</td>
<td>0,9192</td>
<td>1.</td>
</tr>
<tr>
<td>( A_3 )</td>
<td>0,077</td>
<td>3.</td>
</tr>
</tbody>
</table>

**Therefore, the final ranking of the alternatives is: \( A_2 > A_1 > A_3 \).** With the fact that this ranking of alternatives according to the TOPSIS multi-criteria decision-making method does not necessarily represent the best solution. Therefore, after this part of the research, it would be necessary to look at the solution of this problem through some other multi-criteria decision-making methods and through the engagement of experts. This approach would ultimately provide a quality solution to the problem.

### 5. CONCLUSION

Finally, a conclusion can be made about the necessity of processing this topic. First of all, because the disposal of hazardous waste has become one of the most important modern problems, due to the fact that awareness about it is insufficiently developed, especially in this...
part of Europe, so until then, the selection of a location for the disposal of hazardous materials is a complex process that requires looking at the problems from multiple perspectives.

The paper shows the use of AHP and TOPSIS. From the attached, it can be seen that for those locations that are selected as alternatives for the disposal of fluorescent tubes, there must be certain criteria, the more criteria, the more objective the decision. In the end, the paper shows that by using appropriate mathematical models of the method, an adequate decision can be made.

REFERENCES


Pamuca, D., Djorovic, B., Bozanic, D., Cirovic, G. (2012) Modification of the dynamic scale of marks in analytic hierarchy process (AHP) and analytic network approach (ANP) through application of fuzzy approach, Scientific Research and Essays, Belgrade.


EVOlUTION AND CHARACTERISTICS OF THE THEOREY AND STRATEGY OF DEterRENCE OF THE RUSSIAN FEDERATION

Milan Miljkovic¹, Hatidza Berisa², Srdjan Zgonjanin³

¹ University of Defence in Belgrade, National Defense School, Veljka Lukica-Kurjaka Street No. 1, Belgrade, Republic of Serbia, milanmiljkovic04011@gmail.com
² University of Defence in Belgrade, National Defense School, Veljka Lukica-Kurjaka Street No. 1, Belgrade, Republic of Serbia, hatidza.berisa@mod.gov.rs
³ University of Defence in Belgrade, National Defense School, Veljka Lukica-Kurjaka Street No. 1, Belgrade, Republic of Serbia, strategija@va.mod.gov.rs

Received: 25th July 2022
Accepted: 11th September 2022

Abstract: The paper analyzes the evolution and features of the Russian deterrence theory and strategy. The paper states that the Russian approach to deterrence differs from the Western conceptualization of this term. Deterrence from the point of view of Russian military theory is much broader than the meaning that Western experts have in mind. It advocates the use of threats to maintain the status quo, to change the current strategic situation, as well as to prevent escalation or de-escalation. The term is used to describe activities before and during military conflict, but is also applied during all phases of war. The current concept of strategic deterrence, which represents the third phase of the evolution of Russian theory and practice of deterrence, unequivocally indicates the increased importance of non-military and within them informational deterrence measures, which, together with military measures, represent an integrated and holistic concept for shaping the adversary's decision-making.

Key words: strategy, deterrence, coercion, non-military measures, informational operations

1. INTRODUCTION

Since the collapse of the Soviet Union, Russian deterrence theory has evolved through various schools of strategic thought in the Russian Federation. The current Russian approach to deterrence is much broader than the meaning Western experts attach to the term deterrence. In a word, deterrence from the Russian point of view means the use of threats, sometimes accompanied by limited use of force, with the aim of a) maintaining the status quo ("deterrence" in the Western language), b) changing the status quo ("coercing" in the Western language), c) shaping strategic environment within the framework of mutual interaction with other strategic factors, and g) preventing escalation or leading to de-escalation (Adamsky, 2020). The term is used to describe activities both before and during a military conflict, and
includes all phases of war. As such, the Russian interpretation of deterrence is closer to the Western conceptualization of "coercion", in its pre-war period and within wartime forms.

**2. CONCEPT AND CONTENT OF STRATEGIC DETERRENCE**

Strategic deterrence, in the sense used by Russian military theory, is a holistic concept that envisages the integration of non-military and military measures to shape an adversary's decision-making. This concept integrates the state's non-military instruments of national power and identifies specific military capabilities that are "strategic" because of the expected effects when used for deterrence purposes. In Russia's view, strategic deterrence is a concept that is adaptable, as it can be applied to managing contingencies ranging from local wars with one state, through regional conflicts against coalitions, to large-scale wars against nuclear-armed global powers (Kofman et al, 2020).

The National Security Strategy of the Russian Federation from 2015 gives us a detailed description of the measures applied within the concept of strategic deterrence, stating that strategic deterrence consists of a series of interrelated political, military, military-technical, diplomatic, economic and informational measures aimed at preventing the use forces against Russia, the defense of sovereignty and the preservation of territorial integrity (Указ Президента Российской Федерации, 2015). Similarly, the official dictionary of military terms of the Ministry of Defense of the Russian Federation defines strategic deterrence as "a system of violent (military) and non-violent (non-military) measures aimed at restraining the other side from using force against the Russian Federation, especially on a strategic scale." In terms of the time period of their application, strategic measures of deterrence are used continuously in peacetime not only for deterrence but also for containment, and in war for the purpose of managing the escalation of conflicts (Энциклопедия Министерства Обороны РФ).

Although it may seem that the concept of strategic deterrence relies too much on the application of non-military measures, which would be in line with the modern trends of military thought in the Russian Federation, it leans heavily towards the military or violent, especially in the armed phase of the conflict, as can be seen from the positions of the highest Russian military leaders, but also in numerous texts in Russian military magazines. In this regard, it can be specified that, despite the demonstrated interest of Russian military theorists in non-military means, the management of escalation or the concept of deterrence within war is consistently positioned as based on force measures, relying on force without which other approaches prove impotent or ineffective (Стерлин et al, 2019).

**3. TERMINOLOGICAL DIFFERENCE WITH THE WESTERN CONCEPT OF DETERRENCE**

Before continuing with the analysis of the concept, it is important to note the terminological specificity of the Russian concept. To begin with, it should be emphasized that deterrence from the Russian point of view is similar to its Western counterpart in the sense that the essence of the action is aimed at shaping the strategic calculation, strategic choices and strategic behavior of the opponent. However, apart from that, the Russian approach also shows certain differences and dissimilarities in relation to the Western concept. Theorists point to three important differences, in terms of the etymology and logic of the term, as well as its scope.

First, Russian concepts of deterrence have not been properly translated into the Western lexicon, which usually speaks of two types of coercion strategies: deterrence and coercion. The most commonly used Russian term for deterrence (russian: сдерживание) is closer to what is understood in the West as "restraint". The more specific Russian term, "forceful deterrence" (russian: силовое сдерживание), is better understood as deterrence through the
limited use of military force. Meanwhile, deterrence by causing fear or intimidation (Russian: устрашенье) explicitly means deterrence through coercion, and the intended effect is discouragement through fear of consequences. Finally, another Russian term (Russian: принуждение), expresses coercion in the form of coercion to change the opponent's behavior, rather than deterrence (Туркин et al, 2008).

Second, in terms of internal logic, the interpretation of this term in the Russian strategic lexicon is much broader than the meaning that Western experts have in mind. Deterrence from the Russian point of view means the use of threats, sometimes accompanied by limited use of force, a) to preserve, maintain the status quo ("deterrence" in the Western language), b) to bring about a change in the status quo ("coerce" in the Western language), c) to shape the strategic environment within the interaction with other strategic factors, and g) to prevent escalation and lead to de-escalation. In Western usage, the term "deterrence" implies a more reactive modus operandi, while the term "compellence", i.e. compulsion in Serbian, has a more proactive connotation (Adamsky, 2020).

Finally, in terms of the scope of this activity in strategic interaction, the term is used to describe activities before and during military conflict, and includes all phases of war. Therefore, this term in the Russian discourse includes several types of deterrence at once: not only to prevent hostilities in general (broad deterrence), but also to prevent specific moves within hostile activities, or narrow deterrence (Paul, 2009). As such, the Russian interpretation of deterrence is closer to the Western conceptualization of "coercion" in its pre-war and intra-war form (Adamsky, 2020).

4. EVOLUTION OF THE RUSSIAN THEORY AND DOCTRINE OF DETERRENCE

The first phase in the theory's development lasted from the collapse of the Soviet Union until roughly the early 2000s, and focused on the notion of deterring potential aggression by nuclear means, strategic and non-strategic, in regional conventional warfare. In developing deterrence theory, they adapted terminology and strategic theory from the US, and introduced doctrinal innovations that mimicked theoretical postulates from the international relations literature on limited nuclear war (Arbatov et al, 2011). The nuclear dimension of deterrence, at that time, was the only viable option in Russian military practice. The consensus was that military non-nuclear forms of strategic influence were beyond Russia's capabilities and therefore any discussion of them would be somewhat premature (Gerasimov, 2013).

The second phase in the theory's development dealt with non-nuclear deterrence. It started in the mid-2000s, coinciding with the military modernization of the conventional armed forces, mostly after 2008. Theoretical development has progressed in two main directions: the direction of "pre-nuclear" or conventional deterrence (до - ядерное сдерживание) and the direction of informational (cyber) deterrence, which branches into cognitive-psychological and digital-technological aspects of informational deterrence (Adamsky, 2017a, b). Conventional or "pre-nuclear" deterrence was considered as a prelude to nuclear use. The concept suggests "improving credibility by increasing the level of escalation, through the threat of launching long-range conventional weapons and strikes with high-precision weapons of high destructive power." Selective damage to military and civilian infrastructure should signal the last warning before the limited use of lower-level nuclear weapons." However, given the slow acquisition of advanced conventional munitions at the time, experts predicted that this type of deterrence was far-fetched and saw no non-nuclear alternative to deter conventional aggression.
The third and current stage of theory development is related to the concept of "strategic deterrence". It started around 2014 and led to the merging of the above two concepts into an integrated whole - the general theory of "strategic deterrence" (Sterlin et al, 2019, Ponomarev et al, 2019). The emergence of this theory coincided with the further evolution of ideas about the current character of war, i.e. new generation of warfare (Russian: новое поколение войны). Emphasizing a systemic mix of military and non-military forms of strategic activity in several domains, referred to by the West as the "Gerasimov doctrine," Russian strategic deterrence is a repertoire of interrelated influence efforts in all domains consistent with Russia's current understanding of the nature of war. In all these cases, this is not a brute force strategy, but coercion aimed at manipulating the opponent’s perception and influencing his strategic behavior.

In short, the current Russian military theory of deterrence is an integrated complex of non-nuclear, information and nuclear types of influence contained in a single multi-domain program. Strategic deterrence has aligned nuclear capability, without diminishing its role, with other means of coercion, particularly within the non-nuclear and information (cyber) domains.

5. NON-MILITARY MEANS WITHIN THE CONCEPT OF STRATEGIC DETERRENCE

As noted, the Russian concept of "strategic deterrence" classifies approaches to shaping adversary decision-making into violent and nonviolent categories (Буренок, 2011). Non-military means broadly include political, informational (psychological and technical), diplomatic, economic, legal, spiritual/moral, and humanitarian measures (Chekinov, Bogdanov, 2011, Gerasimov, 2013a). Common examples include, but are not limited to, implementing economic sanctions, imposing economic blockades, forming coalitions and unions, severing diplomatic relations, and waging information warfare. (Gerasimov, Feb 2013b).

Theorist Kondakov further notes that the use of non-military means varies depending on capabilities, the political situation at a given time, and the current position in the conflict spectrum (Кондаков - 2004). According to authors Chekinov and Bogdanov, non-military measures offer a number of advantages in peacetime conditions including deterring armed conflicts, stabilizing the international system, strengthening relations between states and eliminating possible threats from adversaries. In the midst of a political-military conflict, non-military measures act to reinforce military actions by acting as a force multiplier, serving to weaken and reduce the strength and capabilities of the adversary, and even eliminate the military threat altogether. Russian officials and analysts also often state that achieving a military objective may depend on coordination between military and non-military assets (Chekinov, Bogdanov, 2010).

From the perspective of Russian military strategy, states mainly use non-military means and indirect approaches to achieve political goals. Russian military writings also reveal two broad categories of activity in the evolution of contemporary regional or large-scale conflict: the pre-conflict period involving non-military means, psychological warfare, subversion, and the like; and an intense initial period of war characterized by the use of advanced military technology in the air/space, at sea, on the ground and, most importantly, across the information spectrum (Serzhantov et al, 2019). Hence, the Russian military seeks to offer answers to what the state perceives as forms of undeclared warfare, containment and coercion. However, the nature of war is understood as one in which non-military means are effective because they are supported by technologically advanced military capabilities.
Russian military strategy is about the integration of non-military, conventional and nuclear means in the conduct of war in search of effective strategic deterrence. Strategy connects and unifies strategic operations, which are considered the highest form of operational art, with the political goals of war. A strategic operation, a series of operations linked by common purpose and organization is the highest form of operational art in the Russian army. Military strategy directly directs strategic operations, which include coordinated tasks, strikes, operations and combat actions that are carried out according to a unique scheme and plan to achieve strategic goals. The concept of "strategic operations" became the focal point of Soviet and then Russian military planning.

It can be stated that the Russian articulation of the deterrence strategy continues to evolve. There is a strong desire to shape the cognitive space, emphasizing psychological rather than just material means of warfare. Therefore, the Russian military places an emphasis on military cunning, technical means to shape the opponent's decisions according to the desired actions, and the functional defeat of the opponent's information systems. The psychological aspect is also an important aid in the war effort. Military strategy remains the highest form of military theory, while strategic operations is the highest method of operational art. Numerous trends, especially the mass application of information and communication technology in conflicts, continue to influence the development of military theory and strategy in the Russian armed forces. Russian military strategy posits that deterrence should be based on shaping the adversary's perception of costs and convincing them that the cost of aggression would exceed any desired gains. The emphasis is on the application of non-nuclear means and the strategy of indirect actions, especially during periods of peace and crisis. In the initial period of the war, Russian military strategy continues to place a strong emphasis on informational confrontation and combat. In war, the goal is to secure a decisive victory in the initial period of the war and convince the opponent that further conflict will result in costly losses.

6. CONCLUSION

The current concept of strategic deterrence, which represents the third phase of the evolution of Russian theory and practice of deterrence, unequivocally indicates the increased importance of non-military and within them informational deterrence measures, which, together with military measures, represent an integrated and holistic concept for shaping the adversary's decision-making. Believing that non-nuclear weapons (precision weapons, ballistic and cruise missiles) and information (cyber) capabilities create battlefield and deterrence effects compatible with nuclear weapons, Russian experts have increasingly emphasized deterrence as a function of non-nuclear, hard and soft military capacities and weapons. The 2014 doctrine ultimately codified ideas then established in Russian military and scientific discourse. As discussed, current Russian military deterrence theory is an integrated complex of non-nuclear, informational, and nuclear types of influence contained within a single, multi-domain program. Strategic deterrence has aligned nuclear capability, without diminishing its role, with other means of coercion, particularly within the non-nuclear and information (cyber) domains. Although it may seem that the concept of strategic deterrence relies too much on the application of non-military measures, which would be in line with the modern trends of military thought in the Russian Federation, it leans heavily towards the military or violent, especially in the armed phase of the conflict, as can be seen from the positions of the highest Russian military leaders, but also in numerous texts in Russian military magazines. In this regard, it can be specified that, despite the demonstrated interest of Russian military theorists in non-military means, the management of escalation or the concept of deterrence within war is consistently positioned as based on force measures, relying on force without which other approaches prove impotent or ineffective. On the other hand, the Russian theory states that the phase of strategic deterrence before the outbreak of an armed conflict should significantly rely
on the application of non-military and informational deterrence measures, which will further influence the development of the concept of strategic deterrence.

REFERENCES


Adamsky, D., (2017), From Moscow with Coercion. In Journal of Strategic Studies 37.1:33-60,


Буренок, В.М. Печатнов, Ю.А., 2011. Стратегическое сдерживание, Москва Граница.
CHALLENGE RISKS AND THREATS TO INFORMATION SECURITY

Hatidza Berisa¹, Tamara Gajic², Jovan Prelic³

¹University of Defence in Belgrade, National Defense School, Veljka Lukica-Kurjaka Street No. 1, Belgrade, Republic of Serbia, hatidza.berisa@mod.gov.rs
²J-6, General Staff of the Serbian Army, Belgrade, Republic of Serbia, tamara.gajic@vs.rs
³University of Defence in Belgrade, National Defense School, Veljka Lukica-Kurjaka Street No. 33, Belgrade, Republic of Serbia, jovqan.prelic@mod.gov.rs

Received: 14th July 2022
Accepted: 24th September 2022

Abstract: Extremely rapid scientific and technological development, the diffusion of modern scientific achievements and technology and their growing impact on all areas of social life in countries around the world increase the complexity of the strategic environment. In this context, there will be greater potential for achieving a positive impact on the economic development of countries, through the application of innovative technological solutions that will contribute to improving the use of resources and accelerated productivity growth. Systems based on information and communication technologies are another subsystem of the strategic environment whose task is to manage information or uncertainty and thus improve and accelerate the decision-making process. However, they also significantly affect other characteristics of the strategic environment, making it more dynamic, complex, unstable, nonlinear, and especially uncertain. The authors start from the rapid scientific and technological progress, which causes various dangers, so the focus is on possible challenges and risks, which are manifested through the threat to information security.

Key words: security, social life, technology, information, information security

1. INTRODUCTION

The need to know the environment as well as the certainty of what will happen in the future forced man, from its inception until today, to collect data from them, draw the necessary information and then learn and think about how to achieve the set goals. As man became aware of his environment, his need for additional knowledge grew, which necessarily led to the development of both society and various scientific fields. Through its development, human society has gone through various stages, given the amount of information that is now available to us, and that we need, we can say that we live in an information society. The development of information technologies, networking and the global computer network have made real-time information available to us from anywhere in the world.
Today, IT equipment and access to high-speed Internet are available to the majority of the population at very reasonable prices, so that users whose IT knowledge is modest can perform various activities on the Internet from their home, street or other place where the Internet is available. They can establish video communication, make money transactions, monitor the movements of their children and monitor the house and household appliance. Through social networks, they can express their views on various issues as well as comment on the views of others; they can work and learn from home, they can access various Internet presentations and databases. Also, in order to optimize business processes, most public and private companies perform certain business processes from remote locations using information and communication technologies. These can be tasks such as control and supervision of fuel tanks, management of locks, control and supervision of the power system, traffic management, health information systems, banking information systems, command information systems and others. In these activities on the network, a huge amount of data is recognizable, which is exchanged between network communication devices through various telecommunication channels and can be the subject of abuse.

In just one human generation, information and communication technologies have revolutionized the way we live, learn, work and have fun. Information and communication technologies are increasingly transforming the way people, companies and public institutions (Strategija razvoja informacionog društva u Republici Srbiji do 2020. godine) interact, at the local, regional and global levels. In addition to orientation in a strategic environment, the goal of information is continuous progress, which can only be achieved if you have the necessary knowledge with the application of strategic thinking. The mere possession of modern technologies without the necessary knowledge and awareness of their use, shortcomings and shortcomings necessarily lead the system to ruin with inestimable damage. In addition to space and time, speed is another quantity in a strategic environment, the limits of which one cannot see at this stage of development. The speed of information flow ensures timely and accurate manifestation of the effects that change the strategic environment. Some systems in a strategic environment are not able to keep up with rapid and imposed changes, which put them in a state of general insecurity and danger to survival. However, contrary to expectations that the level of responsibility of all involved entities will be increased in terms of using scientific achievements in the general interest and for the benefit of all mankind, it is estimated that the development of science and technology will continue to be subject to various abuses (Tatomir, 2018).

Given the importance of information and information power in the strategic environment, the fact arises that information security is key to achieving strategic goals (Berisa, 2016). Recognizing the benefits of information and communication technologies, the security of personal information becomes very important for the security of every individual in society.

The Republic of Serbia has recognized the need to improve the security of citizens, the state and society and through the National Security Strategy has set priorities: "In the field of cyber security warfare in the information and cyberspace. Significant attention will be paid to the further development of the general security culture of all citizens in order to raise awareness of the need to increase the security of individuals and society (Nacionalna strategija odbrane u Republici Srbiji, 2019).

2. CONCEPT AND DEFINITION OF INFORMATION SECURITY

In theory and practice, we encounter concepts such as: data protection, information security, information security, information protection, cyber security and others. The definition of these terms usually depends on the degree of scientific and technological development of the country at the time when it was created as well as the context of the definition. It is a common
occurrence that, given the rapid technological development and coverage of information and communication technologies, the definitions of these terms have changed several times in a very short period of time.

In the last decade, the terms information security and cyber security have often been used interchangeably. However, considering the environment of action, it is considered that there is a difference between them, which leaves room for further development of scientific discussions. In order to better understand and reflect on this problem, it is necessary to consider Figure 1. In general, looking at all information, we can divide it into analog and digital, with the development of information and communication technologies, there is an increasing digitalization and translation of analog into digital information. (Explanation: Digital information can be considered information that is transmitted, stored or processed using information and communication technologies, ie information that is used to manage and use (software) other systems (hardware) also using information and communication technologies. While we consider all other information as analogous). If we consider the data in a certain context, it becomes information and gets a higher value, so in certain circumstances, and especially if it is about national security, it needs to be protected. In terms of security threats, information is the most common means by which a goal is reached, so that its value also depends on the value of the goal.

Looking at Figure 1, we can conclude that information security refers to the protection of information and information in ICT systems, cyber security refers to systems that are vulnerable through ICT systems, while ICT security refers to the protection of ICT systems. According to the Law on Information Security, the information-communication system (ICT system) is a technological-organizational unit that includes: electronic communication networks; devices or groups of interconnected devices; data that is kept, stored, processed, searched; organizational structure through which the ICT system is managed and system and application software.

However, it is difficult to imagine a system that does not depend on information, and thus on information security, without being vulnerable through the ICT system. In a general sense, information security is a more general term and refers to analog and digital information, while
cyber security refers to the protection of values that can be violated through digital information. Information and cyber security should therefore not be viewed in the relation of a subset to a set, but as a relation of two different systems of reality, of which cyber security has an additional dimension related to the protection of security features and other information resources (The concept of cyber defense of the Serbian Army, 2018).

In the Law on Information Security, information security is defined as a set of measures that enable data handled through ICT systems to be protected from unauthorized access, as well as to protect the integrity, availability, authenticity and irrefutability of that data in order for that system to function. Availability is a property that means that data is available and usable at the request of an authorized person when they need it. Authenticity is a property that means that it is possible to verify and confirm that the data was created or sent by the person for whom it was declared that he performed that action. Irrefutability is the ability to prove that a certain action has taken place or that a certain event has occurred, so that it cannot be subsequently denied. Provided, when provided and under the control of an authorized person. A very important property of data or information is secrecy, which means that the data is not available to unauthorized persons. Depending on the value that is protected, the degree of secrecy is determined, and thus the level of security protection.

The most common international standard ISO / IEC 27000 defines information security as: preserving the confidentiality, integrity and availability of information, noting that other properties, such as authenticity, responsibility, non-repudiation and reliability may be included (ISO/IEC 27000:2018(en)). Information security is a very important segment of national security which provides secure and uninterrupted communication, storage, transmission and processing of data of state bodies and other subjects of social life in performing activities to preserve national values and achieve national interests. Information security is also the right of every citizen to inviolability and secrecy of communication as protection of personal data.

3. NORMATIVE AND LEGAL FRAMEWORK IN THE FIELD OF INFORMATION SECURITY

Twenty years after the connection of the Republic of Serbia to the global computer network, in 2016 the Law on Information Security was adopted, which, together with the Law on Ratification of the Convention on High-Tech Crime from 2009, represents the legal framework in this area. The adoption of the Law on Information Security is also envisaged by the negotiating Chapter 10. Information Society and Media in the Process of Accession of the Republic of Serbia to the European Union, but also by the Strategy for the Development of the Information Society until 2020. In 2017, the Government of the Republic of Serbia adopted the Strategy for the Development of Information Security in the Republic of Serbia in the period from 2017 to 2020, which defines the key directions and goals of action in the field of information security. The mentioned strategy envisages five priority areas, of which the fourth Information Security of the Republic of Serbia is given to the Ministry of Defense. An Action Plan for 2018 and 2019 was adopted to implement the strategy.

The Law on Information Security envisages the establishment of the Team for Coordination of Information Security Affairs in order to achieve cooperation and coordinated performance of tasks in the function of improving information security. The team includes, among others, representatives of the Ministry of Defense and the security services. It is also envisaged to establish the National Center for Risk Prevention in the ICT System of the Republic of Serbia (National CERT) as well as CERT authorities, independent operators of ICT systems and special CERTs. The National CERT performs the tasks of coordination of prevention and protection against security risks in ICT systems at the national level, while other CERTs perform the tasks of prevention and protection against security and risks in ICT systems in
their jurisdiction. The Ministry of Defense and security services, as independent operators of the ICT system in terms of the Law on Information Security, have the obligation to establish CERT.

The Ministry of Defense and the Serbian Army, following the normative legal regulations of the Republic of Serbia, have so far developed the Concept of Cyber Defense of the Serbian Army, Instructions on ICT System Security in the MoD and Armed Forces, Instructions on Using the Computer Network of MoD and Armed Forces Commands, and VS as well as through procedures related to information security. In addition to the above documents, the legal framework in the field of information security is regulated by the Law on Critical Infrastructure, the Law on Electronic Communications, the Law on Data Secrecy, the Law on Personal Data Protection, the Criminal Code and other laws and legal acts.

Knowledge and application of the international standard ISO/IEC 27000 is also important. This standard provides a series of best practice recommendations on information security management. It is applicable to organizations of different shapes and sizes, encourages organizations to assess information risks and to control them in accordance with their needs. The organized process of building the operational and legal framework of information security has begun, and the adopted laws represent a good foundation for further improvement of information security. This process will take place through the development of digital culture of all citizens, continuous monitoring of contemporary ICT and training of professional bodies, application of international standards, application of practical experience, continuous development of information security systems at the legal, organizational and technical level and risk assessment and information security threats.

4. METHODOLOGY OF PERFORMING RISKS AND THREATS TO INFORMATION SECURITY

Given the complexity of the strategic environment, it is not possible to provide full protection of information, awareness of the challenges, risks and threats to information security allows us to manage risks and act preventively on potential threats. Based on the insight into numerous researches of the concept of security and its content, a significant discrepancy is noticed about what is specifically meant by security risks. The persistence in practice that this term is most often used simultaneously with the term challenge and threat creates a basic dilemma regarding their definition as synonyms or terms of different levels of generality (Tatomir, 2018). A challenge, as a concept of a higher level, refers to a phenomenon or process that is possible and probable, initially indefinite and value-neutral. If a negative value prevails, the challenge becomes a risk and the probability of adverse impact on a particular security facility gradually increases. Risk is a notion of a lower level of generality than a challenge and can be defined as a possibility, i.e. as a certain degree of probability of occurrence of an event or action with unfavorable consequences, where its elimination or reduction depends on the level of knowledge of the phenomenon.

The international standard ISO / IEC 27000 defines the risk to information security as the potential by which a given threat will exploit the vulnerability of an asset or group of assets and thereby harm the organization. According to the Law on Information Security, risk means the possibility of violating information security, i.e. the possibility of violating the secrecy, integrity, authenticity or inviolability of data or disrupting the direct functioning of the ICT system. A threat is, in the broadest sense, a conscious intention to cause damage to a value. According to the international standard ISO / IEC 27000, a threat is a potential cause of an unwanted incident, which can lead to damage to the system or organization. Information security threats are most often related to the vulnerabilities of an ICT system or organization.
Information security risk management should be an ongoing process. The process begins with establishing an internal and external context, followed by risk assessment, risk management, and risk acceptance. During the process, the risk is continuously monitored and reviewed with constant communication and consultation regarding the risk. In this part of the security risk management process, we can recognize the role of CERTs.

![Information security risk management algorithm](image)

**Figure 2. Information security risk management algorithm**

*Source: (Information security risk management ISO/IEC 27005:2017)*

As shown in Figure 2, the information security risk management process can be repeated to assess risk and risk management activities. The repetition of the risk assessment and management process deepens and increases the details in the risk management approach itself. The establishment of the internal and external context for information security risk management implies the setting of the necessary criteria for risk evaluation, the criterion of the impact of risk on the system or organization and the criterion for risk acceptance. Next, it is necessary to determine the subject and area of application, i.e. to define all values / assets that are taken into account when assessing the risk and to determine the limits so that we can identify where the risk comes from. When we say assets that means Values or assets in terms of information security include business processes and activities, information, hardware, software, networks, staff, location and structure of the organization. A very important part of this phase of the process is the establishment and maintenance of the organization and responsibility for information security risk management.

Information security risk assessment is the second phase of this process and includes the following steps: risk identification, risk analysis and risk evaluation. Risk identification is a comprehensive and detailed process that should determine the events that may lead to potential damage as well as to determine how, where and why the damage may occur. Risk identification includes detailed identification of assets, identification of threats, identification of existing controls and identification of consequences. Risk analysis is conducted for varying degrees of detail, depending on the criticality of the asset, the extent of known vulnerabilities, and previous incidents that have occurred in the organization. It is realized through the assessment of the consequences and probability of the occurrence of incidents. The last step in this phase
is risk evaluation, which is a procedure in which the level of risk should be compared with the criteria for risk evaluation. At the end of this phase, a list of risks ranked by priorities is obtained; the assessment can be conducted in several repetitions.

Dealing with information security risk is a procedure where by taking appropriate measures, in an economical and efficient way, the existing risk is affected so that it becomes acceptable. There are four non-mutually exclusive risk management options: risk modification, risk retention, risk avoidance and risk sharing. If the risk management is not satisfactory, it is possible to return the process to the beginning or to the risk management again.

Risk acceptance is often not a simple determination of whether residual risk is within the criteria for risk acceptance. In some cases, it is necessary to return the criterion for accepting the risk of finishing. Communication and consultation on information security risk are activities that are agreed upon on how to manage risk. Effective communication is very important and can significantly influence decision-making; it takes place in two directions between all stakeholders. Monitoring and reviewing information security risks are an essential activity to identify any changes in the environment that affect existing risks and values. Risks are part of the environment and in that sense you are not static, their nature is dynamic, non-linear and it is necessary to constantly monitor them. The mentioned methodology can be applied to organizations and systems of different shapes and sizes, as well as to their individual parts. Risks and threats to the system and organization in terms of security of information by origin can be divided into deliberate cyber-attacks, accidental and natural. If intentional risks and threats are identified in the digital information environment or cyberspace, then we call them cyber attacks but the cause of natural disturbances is not a human factor but natural phenomena.

Some of the possible threats that could worsen information and the ICT system are:
- Physical damage due to: fire, flood, earthquake, etc.;
- Interference due to different types of radiation such as: compromising electromagnetic radiation, other electromagnetic radiation, electromagnetic pulse, etc.
- Compromising information such as: signal interception, eavesdropping, theft of documents or media, position detection, accidental or intentional disclosure, data from untrusted sources, manipulation of hardware and software, etc.;
- Technical failures such as hardware and software failure, power failure, etc.;
- Unauthorized actions such as: unauthorized copying of software, unauthorized use of equipment, use of counterfeit software, unauthorized intrusion into the system.

The most common sources of intentional human threats to the security of information and ICT systems are: hackers, computer criminals, terrorists, spies and insiders. Motivation for their activities can be: money, status, ego, rebellion, revenge, political gain, competitive advantage, curiosity, deliberate destruction of information, etc.

These are just some of the possible risks and threats that are always related to the vulnerabilities of the system and the organization and they can be the following:
- Hardware: poor quality of equipment, poor maintenance, lack of periodic replacement, lack of available protection, etc.;
- Software: absence or insufficiently tested software, wrong access rights, lack of documentation, non-logging out or leaving the workstation, incorrect dates, complicated user interface, widely distributed software, lack of backups, etc.;
- Network: unprotected and unreliable communication lines, poor connectivity, poor network management, only network monitoring, unprotected public connections, etc.
- Staff, lack of staff, insufficient training, lack of security awareness, inadequate selection of staff, lack of monitoring mechanisms, etc.;
- Location: lack of physical protection of the building or room, unstable electrical network and fire protection, etc.;
- Organization: lack of plans, policies and procedures, lack of control and verification, etc.

From all the above, it can be seen that risk management for information security is an extremely complex and continuous process of influencing risks in order to provide conditions for the organization to achieve the set goals in an efficient and economical way. The number of possible risks and threats is practically unlimited and is directly linked to system vulnerabilities. Through creative and critical thinking, it is possible to analyze and evaluate those risks and threats that must be addressed in order to ensure the functioning of the organization.

5. CONCLUSION

Considering the overall state of information security in the Republic of Serbia, it can be concluded that the process of institutionalization of this area is very slow. It seems that the foundation of the normative-legal framework was adopted with a considerable delay more as an obligation arising from the accession negotiations with the European Union and not as a need to establish an information security management system as one of the important elements of the national security system. The state of information security in the MoD and the Armed Forces is at a slightly better level, the use of a closed computer network with crypto security and defined security procedures in terms of staff selection, security and more, significantly reduces the possibility of information security breaches.

However, the level of information security is not satisfactory and requires additional efforts. It is noticeable that the normative legal framework has been formed in accordance with international standards and that such practice should be continued in the development of documents that regulate this area at the operational level. The stated methodology of risk management for information security is applicable to the mobile and stationary element of the telecommunication-information system of the MoD and the Armed Forces in peace, war and state of emergency. During 2020, the backbone of the administrative body for information security and cyber defense was formed in the Directorate for Telecommunications and Informatics of the General Staff of the Armed Forces, and it is expected that in the coming period there will be the formation of administrative bodies at the operational level. MO and VS. However, without the understanding and support of the responsible persons in managerial positions in the MoD and the Armed Forces, who should provide funds for the development of the necessary capabilities, it is not realistic to expect a significant improvement in information security. Also, a very important factor is the development of digital culture at the national level as well as raising awareness of all members of the MoD and the Armed Forces about the importance of information security. We live in a real cyber environment of the digital society, enjoying all its benefits but with an insufficiently built awareness of the risks and threats it carries. It is high time that we take responsible measures in order to protect national security and thus the security of citizens in cyberspace. The possibilities brought by the use of modern information and communication technologies to achieve positive or negative effects in a strategic environment are the greatest challenges of humanity at the beginning of the 21st century.
REFERENCES


Berisha H, Barisic I. Security challenges cyberspace and information warfare, Regional Scientific and Professional Conference ZITEH-16: Information Technology Abuse and Protection, June 1, 2016, Belgrade, Concept of cyber defense of the Serbian Army, Belgrade: Directorate for Training and Doctrine (J-7) of the General Staff of the Armed Forces, 2018


Information security risk management ISO / IEC 27005: 2017

Instruction on the security of ICT systems in the MoD and the Armed Forces, "Official Military Gazette", No. 24 of September 20, 2019


Mladenovic D. "Multidisciplinary aspects of cyber warfare", Doctoral dissertation, Faculty of Organizational Science

Nacionalna startegija odbrane Republike Srbije, Sluzbeni glasnik Republike Srbije, br. 94/2019.

Strategija razvoja informacionog drustva u Republici Srbiji do 2020. godine, Sluzbeni glasnik Republike Srbije, br. 51/2010,

Tatomir, D., "Assessment of challenges, risks and threats to the security of the Republic of Serbia in the function of planning the use of the Serbian Army", Vojno delo, spring 2011.

Zakon o elektronskoj komunikaciji, Sluzbeni glasnik Republike Srbije, br. 5/2018.

Zakon o kritičnoj infrastrukturi, Sluzbeni glasnik Republike Srbije, br. 87/2018.

Zakon o tajnosti podataka, Sluzbeni glasnik Republike Srbije, br. 104 /2009.

Zakon o zaštiti informacija, Sluzbeni glasnik Republike Srbije, br. 6/2016 2016
MONETARY POLICY RISKS ON THE DEVELOPMENT OF ENTREPRENEURSHIP

Milan Mihajlovic1, Srboljub Nikolic2, Aleksandar Savic3

1 University of Defence in Belgrade, Military Academy, Veljka Lukica-Kurjaka Street No. 33, Belgrade, Republic of Serbia, milan.mih83@gmail.com
2 University of Defence in Belgrade, Military Academy, Veljka Lukica-Kurjaka Street No. 33, Belgrade, Republic of Serbia, srboljub.nikolic@yahoo.com
3 Military Technical Institute, Ratka Resanovica 1, Belgrade, Republic of Serbia, aleksandar22071993@gmail.com

Received: 1st September 2022
Accepted: 4th September 2022

Abstract: The role of small and medium-sized enterprises is crucial for further economic growth and development. Monetary policy plays a major role in strengthening. Traditional financial instruments in the economy are increasingly suppressed by the use of new technological systems and replaced by new electronic payment systems, which led to the emergence of monetary policy risks, ie to the emergence of modern sophisticated tendencies of organized crime. It is known that the largest number of criminal acts with elements of organized crime are carried out precisely and excluded with the motive of acquiring property benefits. Money laundering is a derived form of criminality, that is, a criminal act, where prevention measures and detection procedures require special training, expertise, dedication, organization and coordination of the authorities dealing with its suppression. The term "money laundering" originates from the English word "money laundering", which means the legalization of capital acquired through criminal activity, through a series of different financial transactions, with the aim of concealing the true origin of money and other forms of capital on the market. The danger to society from money laundering consists in the consolidation of the economic power of organized crime, because it is enabled to enter legal economic flows. Recently, the Republic of Serbia has been facing numerous economic challenges in the complex process of transitional structural reforms and joining the European Union. In this context, the development of the sector of small and medium enterprises and entrepreneurship in Serbia is of great importance, not only for the adaptation of the national economy to the market economies of the European Union countries, but also for the improvement of the lives of its citizens. On the way to the European Union, in addition to the bad business climate, the prevalence of money laundering is one of the obstacles to the affirmation of entrepreneurship and the development of the private sector in the Republic of Serbia, as it contributes to legal uncertainty in the business operations of economic entities.

Key words: entrepreneurship, small and medium-sized enterprises, monetary policy risks, money laundering and legal uncertainty
1. INTRODUCTION

Money laundering, as one of the main risks of monetary policy, is a very widespread crime on a global scale. The peculiarity of this criminal offense consists in its variety of execution methods, sophistication, degree of organization, and finally its international character, which makes it a particularly specific criminal offense. At the same time, it is known that the largest number of crimes with elements of organized crime are carried out precisely and exclusively with the motive of obtaining property benefits, as the main motive, whereby money laundering is a derivative form of crime, i.e., an accompanying crime, in which prevention measures and detection procedures require special training, expertise, dedication, organization and coordination of the authorities dealing with its suppression. All this makes this crime one of the most dangerous and pernicious crimes of today, which from the point of view of legal science, in the opinion of certain analysts, has certain elements of controversy. There are numerous definitions related to the definition of money laundering. Although they are apparently different, in some of their elements they are to some extent identical, so basically there are no major problems with understanding and determining the content of the term money laundering. In principle, it best reflects the nature of the matter, that definition which determines that money laundering is a process that tries to make money coming from source "A" appear as if it comes from source "B".

Serbia is a country that has been going through a difficult and traumatic crisis period in economic, social and political terms for the last twenty years. That period led to the expansion of many negative phenomena, with implications for the entire society. Money laundering is certainly one of those phenomena, which has an unfavorable impact, especially on the economic system. Serbia strives for the harmonization of all social areas with the standards of the European Union, because this is a prerequisite for full membership in the community of European nations. Serbia, in particular, faces major economic challenges. In this direction, the successful creation of economic policy is very important, and in that part, the affirmation of the entrepreneurship sector and small and medium-sized enterprises is inevitable. The development of the new private sector is, in fact, the strategic creation of a better life for the citizens of Serbia. However, an inadequate business environment, legal uncertainty, but also phenomena such as corruption and money laundering, represent obstacles to creating a healthy business climate and investing, not only in projects, but also in a better life for citizens.

2. MONEY LAUNDERING AS A MONETARY POLICY RISK

The term "money laundering", as many authors apostrophize it, originates from the English word "money laundering", which means the legalization of capital acquired through criminal activity, through a series of various financial transactions, in order to conceal the true origin of money and other forms of capital on the market. Several authors point out that the term "money laundering" appeared for the first time in the nineties of the last century in the USA during the prohibition period (1920-1933), i.e., bans on the production, transport and sale of alcoholic beverages. In the mentioned period, the criminals presented the money obtained from the illegal production and smuggling of alcoholic beverages as earnings from their chain of laundry and car washes. Also, different opinions can be found in the literature, in which it is emphasized that the term money laundering does not originate, as is often underlined, from the time of prohibition in the USA, although even then many techniques of this "skill" were in circulation and elaborate. Furthermore, it is stated that the opinion according to which this name is derived from data on mafia ownership of laundries in the USA, does not fully correspond to the truth. Namely, Meyer Lansky, who earned the nickname "accountant" of the mafia, taught by Al Capone's example (the famous case in which Capone was convicted of tax
evasion), discovered and developed one of the first money laundering techniques, taking advantage of a large number of Swiss bank accounts.

In addition, it appears in the literature that the term "laundering" was promoted by the London-based "The Guardian" in the early seventies of the last century in connection with the famous Nixon affair "Watergate", where the subject of the dispute was the amount of 200,000 USD intended to finance the American Republican Party election campaigns (Ayodeji & Oluwole, 2018). That term was adopted by criminological science, expanding the very definition in accordance with the time and types of criminal activities appropriate to the present moment, and it took root not only in the USA, but also in the whole world, including professional circles. Definitions related to the concept of money laundering are numerous, but there are no significant problems related to understanding and determining the content of the concept of money laundering. In this regard, it is advisable to state the understandings of a certain number of authors on the conceptual definition of money laundering, as well as the definitions of relevant institutions and organizations that treat this still new and controversial phenomenon.

Money laundering refers to activities aimed at the legalization of money obtained by engaging in criminal activities (Osakwe et al., 2019, p. 403).

The content of the concept of money laundering refers to the activities of subjects, most often those from the field of gray economy and organized crime, which create the conditions for the legalization of illegally obtained profits, thereby concealing its criminal origin and creating the impression of legal activity. The operation called money laundering not only conceals illegally obtained income, but also the criminal activity of certain subjects who in everyday life present themselves as honest, respectable and economically powerful citizens. Money laundering is any concealment of the source of illegally acquired money, so that it can be used to perform some permitted activity or acquire property (Peng & Hu, 2018, p. 9). The essence of money laundering is the conversion of illegal money obtained illegally into legal money, i.e. money with a cover in a legitimate work or activity. In order to achieve this, it is necessary to achieve the legality of money in financial, banking or other business, through one, and most often several, seemingly unrelated transactions.

In the simplest terms, it is money acquired through the gray economy, arms trade, drugs and various financial machinations that is injected into legal flows. In 1995, the Interpol General Assembly defined money laundering as any act or attempted act that hides or disguises the illegal origin of funds, so that it appears as if they come from legal sources (Ezeaku et al., 2018). In 1984, the US President's Commission on Organized Crime defined money laundering as the process by which someone conceals the existence, illegal origin, or illegal use of income in order to present it in such a way as to appear legal (Presidents Commission, 1984). The Financial Action Task Force (FATF) is an international institution that was founded in 1989 at the conference of the heads of state and government of the Group of Seven most developed countries, with the main goal of the international fight against money laundering. This important institution adopted the so-called a working definition of money laundering that includes (Ashamu, 2020):

- conversion or transfer of property, knowing that it resulted from criminal activity (criminal act) with the intention of concealing, or helping any person involved in such criminal activity to avoid the legal consequences of his activity,
- concealing or masking the true nature, source, location, disposition, movement of property, knowing that it is the product of a criminal offense and
- acquiring, possessing, using or disposing of property, knowing at the time of its receipt, that it originates from a criminal act, or from participation in criminal activity.
The European Convention on Laundering, Search, Seizure, and Confiscation of the Proceeds from Crime provides that money laundering exists if the perpetrator has knowledge that it is an illegal gain, then do one of the following:

- acquires, owns or uses such property (Art. 6c);
- converts or transfers this property, or provides assistance to any person involved in the commission of a specific criminal offense, in order to avoid legal consequences (Art. 6a);
- conceals or masks the true nature and origin of this property (Art. 6b);
- participates in, joins or organizes a conspiracy to commit, attempt to commit, assist, encourage, facilitate or advise to commit any criminal offense determined in accordance with this Article (Art. 6d).

The working definition of the United Nations is very significant, which considers money laundering as a dynamic three-phase process that requires: first, the initiation of funds that are directly related to crime; second, covering up clues to mislead the investigation; and third, making money available to criminals again, with the geographic and occupational origin hidden from view.

The European Parliament and the Council of the European Union, in Strasbourg, October 26, 2005, adopted Directive 2005/60/EC on the prevention of the financial system for the purposes of money laundering and terrorist financing. For the purposes of this Directive, actions that are committed with intent and are considered money laundering are:

- conversion or transfer of property, with the knowledge that such property is derived from criminal activity or from participating in such activity, in order to hide or conceal the illegal origin of the property, or from assisting any person involved in the commission of such an act in order to avoid the legal consequences of his act;
- concealing or disguising the true nature, origin, place, location, right to, or ownership of property, knowing that such property derives from criminal activity or participation in such activity;
- acquisition, possession or use of property, with the knowledge at the time of receipt that such property originates from criminal activity or participation in that activity;
- participating in an association for the purpose of committing, attempting to commit and aiding, abetting, enabling and encouraging the commission of any of the previously mentioned actions.

Among the many definitions of that term that pretend to be comprehensive (whereby it is not even one), we believe that the one that best describes the nature of things is the one that determines that money laundering is a procedure that tries to make money coming from source "A" appear as if it comes from source "B". (Katusic-Jergovic, 2007, pp. 619-642). It is noted that any definition of money laundering should be taken into account, the purpose remains the same, which is to reduce or completely exclude the risk of confiscation of illegally obtained benefits, but also to punish the perpetrators for the crimes committed (Ghosh, 2019, p. 6). Namely, if we sublimate the seemingly different interpretations of the conceptual definition of money laundering, we can draw the conclusion that money laundering represents the inclusion of money acquired through illegal transactions or transactions in the gray economy into normal financial and economic flows, which means giving legality to illegally acquired cash, which first, by making a payment to a bank account, it changes to girala money, and then from girala money to cash (Hammed, 2020, p. 31). At the same time, money laundering also involves injecting into normal economic flows money originating from criminal activities (trafficking
in narcotics, weapons, people, smuggling, robberies, organized crime, corruption, tax evasion...) in order to make it impossible to discover its origin.

3. THE ROLE OF SMALL AND MEDIUM-SIZED ENTERPRISES IN THE EUROPEAN UNION AND THE REPUBLIC OF SERBIA

The importance of small and medium-sized enterprises (SMEs) in developed market economies is best illustrated by the example of the EU. There are 23 million small and medium-sized enterprises in the EU today. A small entrepreneur in the EU is one who has an annual turnover of 2 to 10 million euros and employs 10 to 50 people, while medium-sized entrepreneurs have a turnover of up to 50 million euros and employ up to 250 workers. It is a large market with 500 million potential customers, where small and medium-sized enterprises form the basis of entrepreneurship. Twenty-three million small and medium-sized enterprises in the Union account for 75 million jobs and 99 percent of all enterprises. Based on the principle of "think small first", the EU creates state aid rules that take into account the needs of small and medium-sized enterprises. The EU definition of small and medium-sized enterprises also includes artisans: "An enterprise is any body engaged in an economic activity, regardless of its legal form." About 99% of all economic entities in the EU are small and medium-sized entrepreneurs, and about 90% of them are companies with up to 10 employees. Twenty years ago, in March 2002, during the Summit of the Heads of Government of the European Union, held in Lisbon, the SME sector gained importance as one of the pillars on which the European Union will be based, in order to achieve the goal of becoming "the most competitive and dynamic economy in the world by 2020" (Nwoko et al., 2016, p. 201). In June 2002, the leaders of the European Union also adopted the European Charter for Small Businesses, which calls on the Member States of the European Union and the European Commission "to support and assist small businesses in a number of key areas, such as education and training of entrepreneurs, as well as creating a more efficient legislation, regulation, tax and financial system" (Banerjee et al., 2018, p. 7). That document absolutely recognized the importance of small and medium-sized enterprises and entrepreneurs as the most important area of development, competitiveness and solving the problem of unemployment in the European Union. The European Union adopted the "Strategy for smart, sustainable and inclusive economic growth Europe 2020", which builds on the "Lisbon Strategy" (2000 - 2010) and which defines the framework for the establishment of SME development policy. This long-term and comprehensive Strategy defines three priorities (European Commission, 2010):

- smart growth means strengthening knowledge and innovation, improving the quality of education, research, technology transfer and improving the conditions for access to finance for research and development;
- sustainable growth means building a more efficient, sustainable and competitive economy by more efficient use of resources and formulating an industrial policy for the era of globalization;
- inclusive growth means strengthening employment and education policies, social protection system, increasing social responsibility within the business community.

The priorities defined in this way are in the function of increasing employment, strengthening research and innovation, education, reducing gas emissions and strengthening energy efficiency and reducing poverty. The Framework Program for Competitiveness and Innovation (CIP) represents one of the most significant EU instruments for encouraging the development of SMEs (Shobande, 2019, p.100). The main goal of this program is to encourage the competitiveness of companies, the development of innovation and eco-innovation, the development of a sustainable information society, energy efficiency and new renewable energy
sources (Ufoeze et al., 2018). Despite the aspiration to harmonize these issues with the policy and standards of the European Union (Lawal et al., 2018, p. 18), it seems that the policy of a large gap between the normative and the real, that is, the proclaimed and the real, prevailed in our country as usual, in favor of which the results speak for themselves, which are still reflected in the small volume of production and the low purchasing power of the population, which in the Republic of Serbia is still approximately ten times lower than in the European Union. Namely, the implementation of the measures of the Strategy of Small and Medium-sized Enterprises did not make the necessary contribution to the development of the Republic of Serbia, there was no opening of a large number of new jobs, on the contrary, existing ones were closed. Also, there was no increase in wages and acceleration of regional development, which was reflected in the overall situation, which further deepened the economic and social problems in society.

4. STRATEGIC DIRECTIONS OF MONETARY POLICY DEVELOPMENT IN THE REPUBLIC OF SERBIA

The main strategic directions for the development of monetary policy in the Republic of Serbia, i.e. the main strategic directions for the development of small and medium-sized enterprises and entrepreneurship are: support for the development of small and medium-sized enterprises and entrepreneurship in priority economic sectors, institutional support and respect for the interests of the SME sector, removal of legal obstacles, constant improvement quality of work and efficiency of public services, reduction of business costs and reduction of state administration for the needs of the economy (therefore the tax burden). The main task of the Strategy for the Development of Small and Medium-sized Enterprises and Entrepreneurship in the Republic of Serbia is to create a framework for creating a sustainable, internationally competitive and export-oriented sector of small and medium-sized enterprises and entrepreneurship and thus ensure economic and social improvement for the Republic of Serbia, which is reflected in:

- increasing the standard of living and reducing the differences between average incomes in the Republic of Serbia and the countries of the European Union;
- significant increase in employment;
- stronger and more even regional development;
- strengthening of international trade ties, especially with the countries of the European Union and
- increasing available funds for other social sectors, primarily education, health and pension funds (Strategy for the development of small and medium-sized enterprises and entrepreneurship in the Republic of Serbia, 2003-2008).

However, although we have entered the tenth year since the adoption of the said Strategy, not only have we not implemented the set goals, but we have also stagnated, disavowing and degrading the possibility of achieving the defined strategic goals to a large extent. As a logical consequence of the non-implementation of the Strategy, in 2008 the Government of the Republic of Serbia adopted a document entitled Strategy for the Development of Competitive and Innovative Small and Medium-Sized Enterprises for the Period from 2008 to 2013 (Strategy for the Development of Competitive and Innovative Small and Medium-Sized Enterprises, 2003-2008). This document defines the strategic goals and directions of SME development, and it is based on the so-called "five pillars", which represent the basic development priorities, namely: promotion and support for entrepreneurship and the establishment of new companies, development of human resources for a competitive SME sector, financing and taxation of SMEs, development of competitive advantages of SMEs on
export markets, development of incentive legal, institutional and business environment for SMEs.

There are expectations that the successful implementation of this strategy will contribute to: the opening of a greater number of new companies, a higher rate of their survival in the first years of business and their faster growth and development through mutual cooperation and connecting into clusters, faster growth of micro-enterprises into small and small to medium-sized enterprises, improvement foreign trade balance, more even regional development, higher employment rate. The strategy for the development of competitive and innovative small and medium-sized enterprises for the period from 2008 to 2013 and the measures of the economic policy of the Government of the Republic of Serbia in this domain are harmonized with the European Charter for Small Enterprises and the Act on Small Enterprises (Small Business Act).

5. MONEY LAUNDERING AS A FACTOR OF DESTABILIZATION OF MONETARY POLICY IN THE REPUBLIC OF SERBIA

Money laundering is a serious problem in Serbia, despite the fact that the competent state authorities are committed to its thorough solution. Positive progress was achieved with the ratification of the European Convention on Money Laundering, Search, Seizure and Confiscation of Proceeds of Crime. However, cooperation between all state authorities must be improved, especially with regard to their obligations to provide feedback on persons involved in money laundering and their activities, as well as the effects of actions and measures taken (Vesic, 2008, pp. 5-17). Money laundering is a criminal offense of such a character that its prevention requires a whole series of synchronized measures and activities, from clues to establish a version of the committed criminal offense to adequate sanctioning, with continuous international cooperation, which is inevitable due to its movement through international financial flows. In addition to the above, which is undeniably important for the development of entrepreneurship and the new private sector in the Republic of Serbia, there are other, equally important aspects for the "healthy" development of these areas. One of them, certainly, is the treated phenomenon of money laundering, which renders the idea of individuals to engage in economic activity meaningless, and then even if they engage in the same, it carries and is fraught with numerous challenges and risks. Some of them are: abuses in the process of modern forms of business, (electronic business and electronic commerce, as a suitable ground for the development of modern forms of tendencies for money laundering), establishment and business with "phantom companies", (which exist solely due to fraud, money laundering and tax evasion) and legal uncertainty (Wang & Guan, 2017).

The provisions of the Law on Business Companies (Official Gazette of the RS, 36/2011) are harmonized with similar regulations in force in the countries of the European Union, where there is a legal framework by which the establishment of companies, their termination, as well as operations, should be easier, i.e. more modern. However, we are not a country with a developed market economy, orderly institutions, or an efficient, albeit reformed, judiciary. That is why the application of European regulations in our country will be particularly specific. Certain legal provisions can cost us dearly, because some of the news they bring is to a considerable extent conducive to the establishment and expansion of phantom companies that deal in fraud and money laundering. There is no doubt that Serbia, when harmonizing its legislation with European standards, must take into account the economic environment, which is stable within its framework, and with the real possibility of adequate application of legal solutions. Namely, the great powers possessed by states for the purpose of such great changes create various challenges and opportunities, which of course also implies abuses in the sense of favoring certain individual and group interests.
6. CONCLUSION

Money laundering, as the main risk of monetary policy, is not only a complex issue, but also a controversial issue from the point of view of legal sciences. Definitions related to the concept of money laundering are numerous. It is noted that any conceptual determination of money laundering to be taken into account, the purpose remains the same, which is to reduce or completely exclude the risk not only of confiscation of illegally obtained benefits, but also of punishing perpetrators for committed criminal acts. On a planetary level, money laundering as a criminal activity is one of the most widespread crimes. This crime is characterized by a particularly pronounced degree of organization, sophistication, variety of ways of its execution, its international character, along with the indisputable fact that the largest number of criminal offenses that have features of organized crime are carried out with the basic motive of obtaining material benefit, where money laundering is a derivative form crime, that is, the accompanying act, as the final stage of criminal activity. Money laundering has inextricable links, or rather, an organic connection with organized crime, so it poses an immeasurable danger to society, producing a wide range of negative feedback effects on the economic, political and social flows of every country. This danger to society is actually reflected and consists in the consolidation of the economic power of organized crime, because it is enabled to enter the legal economy. The threat is all the greater when you take into account some estimates that as much as a third of the money from world business is related to dirty money. Modern technological systems have suppressed traditional financial instruments and caused the creation of new electronic payment systems, which further encouraged the development and improvement of certain forms of money laundering, which creates difficulties for overall efforts to prevent and suppress this phenomenon.

The economy of the Republic of Serbia, of all the countries of the former SFRJ, is in the most difficult situation. Numerous circumstances have contributed to such a situation, primarily caused by the interruption of trade ties and the loss of markets, isolation due to international sanctions, the consequences of international sanctions, the consequences of a wrong macroeconomic policy, the delay in the processes of transition and Euro-integration, and above all, the uncertain political and economic environment. Already in 2003, the Government of the Republic of Serbia recognized the above-mentioned causes, and being aware of their implications for society as a whole, determined the main strategic goals, among others, those concerning the development of small and medium-sized enterprises and entrepreneurship, as a created framework, following the example of other countries EU, for the creation of a sustainable, internationally competitive and export-oriented sector, which can provide economic and social improvement for the Republic of Serbia. However, it has been shown that the strategies and legal regulation of certain areas, and not only in the economic domain, must, in addition to the declarative character, also have a strong character of "enforceability" from the normative to the real, i.e. real and "tangible". Serbia should devote itself to solving concrete answers to these questions and in general to the improvement of the economic environment that ensures predictability and security, instead of everyday uncertainty in the business operations of economic entities.

REFERENCES


Zakon o privrednim drustvima. Sluzbeni glasnik Republike Srbije No. 36/2011
APPLICATION OF ELECTRONIC CHARTS DISPLAY AND INFORMATION SYSTEM IN A RIVER NAVIGATION ON THE SHIPS OF THE RIVER FLOTILLA

Serif Bajrami¹, Nikolina Popovic Paunic², Svetislav Soskic³

¹ University of Defence in Belgrade, Military Academy, Veljka Lukica-Kurjaka Street No. 33, Belgrade, Republic of Serbia, bajramiserif@gmail.com
² River Flotilla, 1300 kaplara 11, Novi Sad, nikolinapopovici4@gmail.com
³ University of Defence in Belgrade, Military Academy, Veljka Lukica-Kurjaka Street No. 33, Belgrade, Republic of Serbia, cacaksole@yahoo.com

Received: 26th August 2022
Accepted: 1st September 2022

Review paper

Abstract: The problem of realistic and quality display of hydro navigation data that are necessary for realization of safe and secure sailing is a task that can be solved using modern information system, that is, electronic charts. One of such solutions is given exactly through the system of ECDIS. The mentioned system represents an efficient, information platform intended for successful planning, organizing and realization of navigation along river courses. It is about practical, efficient and useful system that provides necessary transparency, that is, river traffic visualization with all hydro navigation elements and the current situation on waterways. A working principle of ECDIS is based on data consolidation from electronic nautical charts, positioning device (GPS), thus contributing to more safe navigation and sailing in all hydro meteorological conditions.

The paper will present Inland ECDIS system and its importance for the ships of River Flotilla of the Serbian Army, especially when it is about their sailings along the international river courses.

Key words: navigation, sailing, electronic nautical charts

1. INTRODUCTION

Electronic Charts Display and Information System (ECDIS) is a modern solution for secure ship management, safe and reliable navigation. (Hrle, 2007). The implementation of mentioned system in the ships of the River Flotilla, in addition to reliable navigation, enables a number of benefits such as: transparency of the whole tactical situation in real time and availability of larger number of hydro navigation information generated according to the circumstances prevailing at the certain moment of sailing.
2. ELECTRONIC NAUTICAL CHART (ENC)

Geographic Information System (GIS) is a system of geographical coding of orientation data, in which all important objects are determined by the correct geographical coordinates (latitude and longitude). The existence of the GIS enabled creation of a digital chart (DC) on which platform are made electronic charts, and the so-called electronic nautical charts for the purpose of ship navigation.

ENC can be used in combination with almost every navigation instrument: GPS receiver, radar, gyrocompass, depth gauge… The real position is known at any moment with the use of electronic chart. Analog data can be written in digital form in two ways: raster and vector.

Raster chart represents an equivalent of a classic paper navigation chart by its content and volume of information. As a matter of fact it represents scanned version of a paper navigation chart which must be georeferenced due to its utility value in ECDIS, i.e. the coordinate for every raster pixel must be determined.

There is no possibility of layered display as with the vector charts and once you create a raster chart it cannot be updated.

Vector charts represent the base, the core for the information system of ECDIS with its database in which it is possible to place all necessary and useful data for safe sailing. They are aligned with the standards of IHO (International Hydrographic Organization) and IMO (International Maritime Organization). The creation of these charts consists in vectorization of the raster (the scanned variants of up-to-date paper navigation charts). Coastal lines, waterway borders, dams, ship locks, depth and, in general, all the data important for sailing on internal waters are vectorized.

Vector charts are “intelligent”, because thanks to the vector data it can predict situations in dangerous areas, mark a target object and warn the user of an imminent danger on time.

3. ELECTRONIC CHARTS DISPLAY AND INFORMATION SYSTEM

“Automatization and digital technique, except for the possibility of creation of electronic charts, also enabled combined use of electronic navigational charts with other navigation devices and instruments. There are multiple systems for the use of navigation charts, however the most used ones are Raster Charts Display System (RCDS) and ECDIS.

Raster Charts Display System is a system that is less common than the ECDIS. It is a base on raster chart and it is intended for medium and larger ships. The data are based on the content of the database and they are only visually available, a selectize selection of the data is not possible and it is not possible to turn off the redundant information. Only advantage is similarity with paper charts and a way of working that is more familiar to users (Soskic, 2016).

Electronic Chart Display and Information System represents computer system which serves for display and work on electronic nautical charts, travel monitoring and navigation planning. This system is able to present raster and vector charts.

ECDIS shows real situation on the navigation area. In other words, this system shows the position of its own ship as well as the position of other ships. The system receives navigational data about its own ship from GPS, while positions of other ships recieves from the Automatic Radar Plotting Aid (ARPA). The system shows similar to the radar, movement of the ship in relation to other ships (Soskic, 2016).

Display of electronic charts is just one of many aspects of ECDIS, because the ECDIS is also an information system. As an information system, the ECDIS enables the user to seek for
additional information about target object on the chart. For example, the lighthouse on the chart is marked with a proper symbol, system is able to provide every possible information about this object (height, work mode, is it served by man or automated, photograph etc.)

The core of ECDIS consists of: hardware, software and database.

Hardware of ECDIS (computer, monitor, computer case, keyboard and mouse) must be projected and produced so that it works in specific ship conditions, without reducing quality and reliability. All hardware components are placed in the wheelhouse, so they are protected from all weather conditions. The central component of the ECDIS hardware is a high-performance computer which is connected with other ship devices, through which it receives key information such as: gyrocompass course, turning speed from direction indicators, ship speed from the speedometer and ship position from GPS, which provides a constant stream of highly accurate position data via the National Marine Electronics Association (NMEA) interface, etc.

Software of the ECDIS system is projected, developed, implemented and tested in accordance with software requirements of valid international standards. It consists of user interface and the so-called ECDIS carnelian which enables reading the data and its display. The software, in addition to the chart image with information, also displays command keys, as well as keys for working on the nautical chart.

The ECDIS system uses the following databases (Raskovic, 2001):
- SECDB (System Electronic Chart Database) is a database to which the user does not have a direct access, i. e. it can only read data, however it is not able to change it.
- SENC (System Electronic Navigational Chart) is a database that is equivalent to the database of electronic chart, but it is designed so that the user is able to change it. More precisely, this base needs to be updated.

The main database of the ECDIS system is a vector chart which contains multiple data that are important for safe navigation.

Database of the charts is organized so that it covers the whole earth surface, without overlapping. All nautical cartographic objects are stored in it, as well as the objects created during system operation, such as: pivot points, notes, position of own ship and other ships position (Raskovic, 2001).

The chart is generated based on the read data from the database and then it is displayed on the screen. The user can open the data about depth around some shoal using the cursor, which enables us to provide the function for anti-stranding and collision avoidance. The computer continuously and automatically checks given parameters and establishes if the ship is on the course.

Electronic Chart Display and Information System has three basic work modes:
1. Navigation monitoring mode
2. Navigation mode and

Navigation monitoring mode is mandatory and works continuously in order to ensure adequate safety of the navigation and it enables the following:
- Continuous display and tracking of own ship
- Automatic recording of the movement of own ship and other ship
- Recording of the movement of targets given from the ARPA
- Keeping an electronic ship journal
- Graphic presentation of the overview of the accuracy of the ship’s position and plotted objects on the chart
- Collecting the data of the ship’s position in relation to the paths of the ship
- Getting the calculated vector of the current position of the ship
- Shows the current scale of electronic chart and
- Display of the data given from the auxiliary navigation sensors.

In case the ship gets near to some of the isolated hazards such as: the soil of a certain depth, underwater obstacle, oil platform, rock, well, shipwreck etc., the ECDIS automatically gives adequate warnings.

Navigation mode is the basic work mode of ECDIS. It shows the position of its own ship on the screen and simultaneously works with the navigation tracking part. This mode provides and displays the following data to the user:
- The position (symbol of the ship and motion vector ) and the path of its own ship
- An electronic chart with layers of automatic and manual corrections and special user information
- Secondary radar information in graphic form which are activated if necessary
- Targets obtained from GPS
- Results of the ship’s trial maneuver in graphic form
- Navigation planning on the chart and
- Displaying the sector of lights visible from the ship’s position, taking into account the visibility range.

![Picture 1. Navigation mode](http://gisforumdanube.org/ecdis/)

Navigation planning mode ensures two basic ways to create and modify the ship’s route and those are: graphic and tabular. In accordance with the IMO requirements, the possibility of checking the planned route must be applied due to eventual passes through the safe contours and dangerous areas. During such dangerous passes adequate warnings are activated. In
addition to this, the calculation of arrival to the turning point is also activated, considering the speed of the ship or the required speed, depending on the entered arrival time at a certain point.

4. APPLICATION OF THE ECDIS ON THE SHIPS OF RIVER FLOTILLA

Ships of the River Flotilla take trainings, exercises and other engagements on internal waters of the Republic of Serbia, and most of the sailings include international waterways and therefore, like all the other vessels, are subject to the Law of Navigation and Ports on Inland Waters.

Due to work on the development of safety and security of navigation, the defense system of our country saw the need for implementation of the Inland ECDIS system on the ships of River Flotilla, which facilitated the work on preparation of the ships for sailing and ensured safe and reliable ship navigation, as well as the timely informing of the crew about the conditions on internal waters.

Inland ECDIS is a system built in the ships of the River Flotilla in accordance with all valid international rules and standards that are important for navigation on international waters. The mentioned system, in addition to the image on the computer screen, shows the navigational environment in real time, and unifies various information necessary for safe navigation. Furthermore, the system is fully automated, continuously follows the position of the vessel in relation to the land, as well as the objects and obstacles on a waterway. Inland ECDIS reduces job volume of the crew in navigation preparation of a ship for sailing compared to the traditional preparations and informing methods. It contains all important cartographic and additional information that can be useful (data function) for navigation.

Inland ECDIS is used in one of the four configurations (Soskic, 2016):
- Independent equipment of Inland ECDIS without the radar
- Independent equipment of Inland ECDIS with the radar
- Inland ECDIS equipment with the radar and a common monitor and
- Independent radar equipment with integrated equipment of Inland ECDIS.

In the first configuration, only work in information mode is possible, while in the other three it is also possible in the navigation mode, with the fact that only the end result is different (output to one or more monitors, integrated radar image or not). In the second configuration, the radar function is included, with the fact that the radar image is on the separate monitor. In the third configuration, the radar function is also included, and the radar image can be displayed via the chart or independently, without it, and all that takes place on the common monitor. (There is a switch for the video output from the radar and ECDIS.)

Inland ECDIS found its application on the ships of the River Flotilla in the domain of the navigation information system (NIS) which represents a subsystem of a command information system (KIS). Furthermore, the navigation information system consists of navigation devices that are interconnected and software integrated into a single system.

The basic parts of the NIS are:
1. River navigation radar,
2. Automatic identification system,
3. Information system for display of electronic charts (Inland ECDIS),
4. Global Positioning System (GPS),
5. Devices for optical navigation-cameras and laser distance meters,
6. Navigation sensors:
- Depth gauge-echosounder,
- Compass,
- Speedometer,
- Wind speed and direction sensor
- Yaw rate sensor.

What especially characterizes Inland ECDIS is a possibility of storing large number of data which is directly connected with the navigation safety, because with more information it is easier to guide the ship through the navigation dangerous areas. Furthermore, the advantage of this system is that it also enables display of unlimited number of information for different objects in continuity. The application of this system on internal waters is huge, because it gives the data about target objects-their radio frequency, size, volume, capacity, audio images etc. (the example of the ship lock, where by clicking on the lock all the necessary data from the base are listed) (Soskic, 2016).

5. TENDENCIES OF FURTHER ECDIS DEVELOPMENT AS A PART OF THE NIS SYSTEM ON SHIPS OF THE RIVER FLOTILLA

There is an idea about the development of NIS navigation information system that is complicated and requires bigger resources, but it is a multidecade solution. To be specific, we have to think about the development of a completely independent system for navigation on internal waters that would at least partially rely on the products that would originate in the River Flotilla itself. If there is no possibility in the domain of information engineering to make separate software for navigation on internal waters, that would be compliant with prescribed standards, then the possibility of creation of ENC could be considered.

Considering that there is a Multibeam echosounder in the River Flotilla, and that there is a hydrographic staff within Republic of Serbia that would do hydrographic recordings using the Multibeam echosounder, we could say, with a certain dose of enthusiasm, that in the future, with adequate resources, we could become an important manufacturer of ENC by valid standards.

The River Flotilla in the navigation domain can claim its own prosperity in the future. We can even think about the creation of ENC by valid standards, that in the second step of creation would be filled with the data useful for the River Flotilla and the Army of Serbia and to which database only entities from the defense system would have access.

6. CONCLUSION

ECDIS information system facilitated modern navigation where it went one step further in terms of availability of valid and important information for the navigation itself, respecting traditional values and maritime specifics. The use of ECDIS does not exclude the use of commercial marine charts, but it provides a new dimension for safe and reliable ship guiding (Bistorovic and Komorcec, 2015).

The system is very rational, efficient, reliable and applicable. In terms of navigation, the system offers more options than navigating on classic paper charts, and an update of data is very simple and practical. A system like this contains all conditions for guiding navigation on a safe, efficient and secure way. Storing the data is much easier with the possibility of a constant expansion of vector bases in which useful information for navigation are placed. Easy planning and control of a chosen route, constant display of own ship and surrounding ships, availability of all important data for safe ship navigating (speed, course, distance from
neighboring ships or objects) are just a part of recommendation for application of this practical information navigation system.

These characteristics make ECDIS almost mandatory on the bridge of every ship. What is necessary and very important is constant updating data on ENC, because the electronic charts are the basis of this system. The system follows prescribed international standards and provides safe navigation even in dangerous navigation areas using updated and concise electronic charts. Considering that it is about one information system, it is to be expected that in the future the ECDIS, based on new software solutions, will be even more improved and will make planning and performing navigational activities even easier.

REFERENCES


Raskovic, M., (2001). Terestricka i elektronska navigacija, University of Montenegro, Faculty of Maritime Studies, Kotor.

Abstract: The constant search for the most rational solution to achieve the goal of armed conflict with minimal losses of forces and assets, and the defeat of the enemy’s forces in the shortest possible time, necessarily throughout the history of warfare imposed the need to create the most expedient design that would identify all influential actors and use the most suitable tools for shaping operations. This work explains the operational design of the EU ATALANTA-Somalia naval operation based on the personal experiences of the author, but with the previous connection of the operational design with the operational skill (operatics, in domestic military theory) which, by considering it within military theory and introducing it into military practice, has changed doctrinal approach to operations, connecting concrete tactical and abstract strategic levels of war, all through a comparison of approach to the problem in domestic and foreign military literature.

Although the operational design is related to the operational and strategic level of operations planning, it is very important to see its order to have a clearer idea on the basis of which and how the operations design is developed, as well as the processes that initiate the planning and execution of operations at the tactical level.

Key words: navigation, sailing, electronic nautical charts

1. INTRODUCTION

Operational art is in practice determined as a factor in the success of war, because it represents an essential link between strategic goals and tactical capabilities. The transition of the Western consideration of military operations from a two-component view of strategy - tactics to a three-dimensional dimension of strategy, operatics and tactics, is necessarily consequentially expressed in the need to increase combat power through the level of operational skill. The doctrinal concept of long-term enemy attrition and massive strikes against a static enemy has
been replaced by the concept of focusing on force maneuver which basically considers the assessment of effects.

In parallel with obtaining the appropriate place and role of operational skill in the framework of Western considerations of the doctrine of operatics, there was also a need for adequate tools that would enable the continuous connection of tactics and strategy, which are often distant from each other. Therefore, the operational design together with the identified centers of gravity of own and enemy forces, the ultimate desired state, defined lines of operation, estimated decisive points as a kind of modeling tools, tends to present a way of overcoming the gap after understanding all influential factors between tactics and strategies.

2. THE SIGNIFICANCE OF THE OPERATIONAL MODEL FROM THE ASPECT OF DOMESTIC AND FOREIGN MILITARY THEORY

Russian military theoreticians (Trandafilov, Svecin and others) at the end of the 19th century made a significant contribution by expanding the meaning of the original concept of operation, because in addition to the previous movement of forces, the operation began to include the battle itself, that is, combat action. Then, the Polish military theoretician Mosor is very significant due to the fact that he considered the operation for the first time through the time dimension of the duration of several mutually coordinated battles on several directions, thus laying a kind of foundation for the modern understanding of operations. However, in his theoretical considerations of operations, the first beginnings of the creation of an operational design can also be recognized, because he states that "the combination of action in several directions towards one goal by means of several groups of various strength and composition represents the basic feature of the operation". In the contextual sense of the above, discrete outlines of the operational design can be observed, primarily due to the consideration of a systemically organized process in which there are elements of different characteristics placed in certain mutual relationships in order to achieve a common goal. The correspondence of the above can be seen through comparison with the model, which can be defined as the presentation of a certain system or process through the understanding of all individual elements and their mutual relationship, with the undeniable possibility of changing structural parts and managing the whole.

In the Western military literature, operational skill is defined as the thought process of commanders and staffs, supported by their skills, knowledge, experience, creativity and judgment in the development of strategies, campaigns and operations, as well as the engagement of military forces in accordance with integrated objectives, the most likely variants of use and available resources. The operational design expands the vision of the operational skill with a creative methodology helping commanders and planners to define the objective, the adequate way of use, the rational use of resources and the recognition and management of risks (Planner's Handbook for Operational Design Vers.1, 2011). For the purpose of the above, two types of thinking are emphasized: critical thinking as a constant analysis and evaluation during the modeling process for its extension and improvement, and creative thinking as a process of constant innovation and definition of newer ideas that lead to problem solving (UOPiRK, 2017).

The definition of the operational model has also found a place in domestic doctrinal documents, and in the Doctrine of Operations it represents "The visualization of the commander's basic ideas for the execution of operations", in the Doctrine of Planning it represents "the elaboration of the commander's basic ideas for the execution of operations", and in the Instruction for operational planning and the work of commands The Serbian Army is presented as "a presentation of the commander's basic idea (ideal idea) for the preparation and execution of the operation-campaign". If we ignore certain minor conceptual
inconsistencies, it can be stated that the operational model and the very process of modeling the operation found its place and role in domestic military documents based on Western sources that consider the process of planning operations. However, one gets the impression that in our doctrinal documents and instructions for operational planning, not enough attention is paid to the importance and role of operational skill, as well as its relationship with the operational model and all its elements, that is, together with the operational structure (operational process, operational framework and elements of combat power) represents organized efforts within the framework of understanding the constructive part of a specific operation (ADP 3.0, 2016).

3. PRESENTATION OF THE OPERATIONAL DESIGN WITHIN THE CONCEPT OF NAVAL OPERATION ATALANT - SOMALIA

The creation of an operational model in the process of planning the naval operation ATALANTA - Somalia is initiated by the conceptual idea of the commander of the operational command that fully supports graphic visualization and is processed in the point "Execution" of the main text of the operational plan, with further upgrading through the concept of the operation.

The beginning of the planning is based on the understanding of the basic goal of the mission that the ultimate desired state of the EU naval forces (EUNAVFOR) must be unequivocally reached, which implies the implementation of military activities in order to achieve a maritime effect focused on the protection of ships within the framework of the UN World Food Program and other endangered ships, as well as deterring and ending Somali piracy at sea. The commander's vision was: "My intention is to maintain pressure on the pirate model of operation by deterring and disrupting pirate activities and preserving what has been achieved to date." I will apply intelligence-led operations to understand potential piracy activities, and where possible I will disrupt any active piracy group in the area of operation. The legal end remains my highest priority. I seriously intend to shake the confidence of the piracy model of operation during the next period as a preventive measure aimed at reducing the possibility of earning from piracy activities. In the sense of the above, I intend to create trust between humanitarian and international civil navigation through conditions that ensure the re-establishment of navigation safety. I will achieve the above in cooperation with the UN World Food Program and civil navigation."

In addition to the mission's main role, EUNAVFOR is also part of a "comprehensive approach" to managing the crisis and causes of Somali piracy. The ultimate desired state of the EUNAVFOR mission is precisely the function of this broader approach in solving the Somali problem. With that, the second part of the commander's idea contained the following: "I will provide support in an acceptable environment with other EU missions and other entities that carry out operations in Somalia under other mandates in order to support the realization of a wider anti-piracy end desired state." Other supporting tasks will not affect or reduce the effectiveness of the primary mission. Other tasks include the coastal part of the territory which was approved by the Political and Security Committee through the Chairmanship of the EU Military Committee, and approved by the Somali authorities. Support must be provided until the end of the mission's mandate."

In the framework of the operation concept, the commander's idea is upgraded with decisive conditions which are grouped along the lines of operation divided by phases in order to reach the final desired state. The essence is that the concept of the operation is to search for the enemy's center of gravity while simultaneously protecting EUNAVFOR's own center of gravity.
Before the start of the modeling, the ultimate desired conditions were clearly defined as the basis for planning operations, i.e. the political and military situation that will end the mission. The EU's ultimate desired state is presented as part of European policy efforts, which will look in detail at coastal regions, maritime crime and piracy, Somali land and sea based on capabilities, governance and economy. The ultimate desired state of EUNAVFOR is a tolerant level of piracy and armed robbery that allows freedom of navigation for humanitarian and other international ships in the zone. The mentioned implies reducing the pirate threat without including the ATALANTA mission.

Progress towards EUNAVFOR's ultimate desired state was realized through a series of deciding conditions, which are updated with each revision of the operational plan (OPLAN), so that certain ones remain the same while others change partially or completely. The decisive conditions within EUNAVFOR's basic anti-piracy role are developed on two lines of operation, the first with the task of protecting the ships of the UN World Food Program and other endangered ships and the second with the task of rejecting and interrupting piracy activities at sea. According to the doctrine of the Western countries, in terms of the types of operations in the operation zone, the above can be seen as a decisive and shaping operation, while the supporting operation can be considered the EUNAVFOR support role for which no decisive conditions have been developed.

At the time of the development of the operational model in question (revision of OPLAN No. 4), the mission realized the 1st phase - establishment and the 2nd phase - maintenance, in which the focus was on the development of an appropriate tactical military response by encouraging civil navigation activities in order to apply of maximum pressure at sea against the model of action of Somali pirates. The evident activity of Somali pirates at sea, but with a decrease in success, necessarily imposed the need to maintain pressure through intelligence-led operations aimed at adjusting the activities of pirates to new security-threatening phenomena (organized crime, smuggling of people, narcotics and weapons), as well as pressure through insistence on to the legal conclusion which implied persistence in bringing the pirates to final justice. During the 3rd phase - improvement, the development of the capabilities of the regional police and maritime forces to assume responsibility in the fight against Somali pirates in accordance with the comprehensive framework of the EU anti-piracy policy was presented, in terms of enabling the operability of local forces at sea while other support tasks would be carried out on request local authorities within the available forces and capabilities of EUNAVFOR. For the 4th phase - handover, it is envisaged to break the Somali pirates' model of action and the acceptable level of piracy and robbery that enable the free navigation of World Food Program ships and other vessels in the zone. In this phase, EUNAVFOR withdraws in accordance with the mission's mandate after handing over responsibilities to local authorities (Picture 1).
Centers of power are presented as the primary strength for participants that must be reached as a goal. The own strategic center of power represents the member states participating in the anti-piracy EU mission, while at the operational level it is reflected in the member states' ability to provide the necessary ability, credibility and forces of appropriate training and adequate strength to carry out the anti-piracy operation. The enemy's strategic power center represents the situation and perception in Somali society that piracy is a sustainable and legitimate way of life, and at the operational level represents the ability of pirate leaders to carry out acts of piracy and control the perception of risk versus gain and recklessness.

**5. MONITORING THE PROGRESS OF THE MODELED CAMPAIGN AND INITIATING THE TACTICAL COMMAND IN THE PLANNING AND EXECUTION OF THE NAVAL OPERATION ATALANTA - SOMALIA**

The progress of the campaign (Picture 2) is constantly monitored and evaluated, so that the degree of progress towards the final desired state is regularly reported to the Political and Security Committee of the EU (PSC) and the Military Committee of the EU (EUMC). The campaign assessment methodology (Campaign Assessment-CEA) implies the establishment of control measures to monitor the progress of the mission. Campaign progress and evaluation are regularly evaluated in the operational command using the Operational Analysis (Operational Analysis-OA) cycle, which is designed to evaluate mission progress and identify mission risks in order to timely inform the commander of the Operational Headquarters-OHQ. Progress towards the final desired state and mission exit strategy is thus subjected to constant evaluation in accordance with the control measures for each decisive condition, and is reported to the Military Staff (Military Staff-MS) on a six-month periodical cycle (June and December, Six Month Report-6MR). At the same time, the operational order (OPORD) directs the Commander of the Tactical Maritime Command (Force Headquarters-FHQ) with the assignment of new tasks and operational priorities for the next six months. Operational analysis (OA) consists of campaign effects assessment (CEA) with risk management (Risk Management-RM) and risk assessment (Risk Assessment-RA). The goal of operational analysis is to improve the quality and efficiency of operational planning and operation execution. The above is achieved through quantitative and qualitative assessments of key statistical and other data.
The Decision Board (DB) process plays a key role in focusing command for planning and executing military operations (Picture 3). The decision process board is formed before designing the model, as an initial direction through two or three phases depending on the nature of the planned operation. The above is working in cooperation with European External Action Service (EEAS) and the forces of the participating countries (Troop Contributing Nations-TCN) as part of the approval process. The output of the Decision Board Process, after the second and third stages, should be an authorization to perform the operation.

The sequence of the mentioned process implies that in the 1st phase, planning is initiated with an initial directive, where the main focus is on the analysis of the mission, namely the first level of situational awareness, which practically implies the consideration of political implications, risks, public influence, legal aspects, the possibility of engaging forces and others key factors. The phase ends with the delivery of the Supplementary Order (Fragmentary Order-FRAGO) to the tactical command, which contains all relevant data in terms of criteria and guidelines for the purpose of initiating tactical planning. Immediately before the planned start of a certain operation, the 2nd phase is realized, in which the planning is approved. The commander of the tactical command submits for approval the prepared Tactical Plan.
(TACPLAN) based on the Supplementary Order, which meaningfully considers the operational risk in terms of political and strategic influences on the operation, because the main implications should be considered at this level. If the situation is favorable and the assessments indicate the progressive support of the operation in all fields, the command determines the execution of the operation (yes/no criteria), that is, the commander of the Tactical Command is approved for the final preparations and/or execution of the operation. The last 3rd phase is the initiation of the operation, which in principle can include logistical support, updating data on the security or political situation, and a final threat assessment. It is performed immediately before the start of the operation, approximately 24 hours after the yes/no criteria.

6. CONCLUSION

The operational model as a combination of understanding tactics and consolidation of operations represents the comprehensive operational level of conducting and directing modern warfare. It expresses its essence through operational skill, in which military theory and practice of planning, organizing and executing campaigns and major operations to achieve strategic goals are considered.

In domestic doctrinal documents and planning instructions, not enough attention is paid to the orientation of the operational model towards operational skills, which together form a kind of bridge between strategic plans and tactical engagement in a specific environment, and with their elements contribute to planning and directing the operation through established control mechanisms, through constant analysis of the achieved effects. The identified deficiency along with the example shown points to the need to develop special instructions that would improve this area and bring it closer to staff officers in our army during their participation in planning operations.

REFERENCES

Army Doctrine Publication No. 3-0 (ADP 3.0), (2016), Headquartes Department of The Army, Washington DC.


Uputstvo za operativno planiranje i rad komandi Vojske Srbije-privremeno (UOPiRK), (2017), Generalstab Vojske Srbije, Beograd.
REQUIRED KNOWLEDGE NECESSARY FOR SECURE
AND SAFE REMOVAL EXPLOSIVE REMNANTS OF
WAR

Jovica Milicevic¹, Bojan Glamoclija², Jelena Krstic³
¹ University of Defence in Belgrade, Military Academy, Veljka Lukica-Kurjaka Street
No. 33, Belgrade, Republic of Serbia, jovamilicevic74@gmail.com
² Mine Action Centre Republic of Serbia, st. Vojvode Toze 31, 11050 Belgrade, Serbia,
bojan.glamoclija@czrs.gov.rs
³ Mine Action Centre Republic of Serbia, st. Vojvode Toze 31, 11050 Belgrade, Serbia,
jelena.krstic@czrs.gov.rs

Received: 10th August 2022
Accepted: 1st September 2022

Professional paper

Abstract: Republic of Serbia, because of its geopolitical position, it was the scene of numerous conflicts, which consequences have been resulted by a large number of explosive remnants of war. The development of the industry and the geospatial location imposed the need for a defence industry and a large number of ammunition storage facilities. The consequences of accident situations in production facilities and depots have been shown with large number of unexploded ordnance in contaminated areas. The imposed danger conditioned the necessity of a systematic approach to the removal of found residual explosive devices. The legal framework in force needs to be constantly innovated. The existing capacities for mine action operations need to be modernized and developed in accordance with identified and anticipated needs. The main authority of mine action operations is the Serbian Mine Action Centre which coordinates and controls the demining works and compliance with safety measures. Taking into account the modern trends in the development of capabilities in mine action, the paper presents the approach of defining the necessary knowledge that each element in mine action should adopt in order to achieve certain capabilities, with an emphasis on EOD-1 and EOD-2 operators. Capability development needs to be designed through staff training in several segments: for engagement in demining tasks; for engagement in tasks of organizing work in preparation and demining; for engagement in implementation of quality control of conducted works. The paper presents an approach to defining a model of staff training for demining purposes level EOD-1 and EOD-2.

Key words: mine action, demining, training, organization, quality control

1. INTRODUCTION

The geopolitical space of the Republic of Serbia has always been interesting for various conquerors, everyone wanted to control the crossroads between east and west, north and south, this space has always been a kind of border between civilization which resulted with a large
number of conflicts. The consequences of the conflict can be viewed in two ways, the first - during the conflict and the second - after the conflict. The consequences were expressed in human losses and material damage. Subsequent consequences are expressed through the consequences caused by residual contamination, mine contamination, air bombs, as well as other ammunition of all calibers.

The large number of unexploded ordnance (UXO)\(^1\) and explosive remnants of war (ERW)\(^2\), which causes threats to the security of all segments of society, in this way it directly affects social and economic development. There are many examples where ERW have either slowed down work or cost lives, both of the civilian population as well as the people who carried out works of removal ERW.

The dangers by ERW caused existence of institution that will deal with this issue, which will cooperate with other relevant institution in the country and abroad on the project clearance of ERW and returning land and premises to usable condition.

2. POSSIBILITIES OF THE REPUBLIC OF SERBIA IN MINE ACTION

At the level of the Republic of Serbia, was established the "Mine Action Centre of the Republic of Serbia", whose main task is the coordination and control of mine action on the territory of the entire Republic of Serbia. The work of the center is regulated by law, one of the tasks of the center is cooperation with other structures in the country and abroad for the comprehensive improvement of mine action. In addition to the organization of scientific and professional gatherings, training for the needs of mine action and improvement of capacities, one of the basic directions of the development of the center is to improve mine action at the state level. On the basis of the achieved cooperation, the center is recognized as a perspective factor in mine action in the region.

The legal framework for mine action activities in the RS is covered by the "Decree on protection of unexploded ordnance („RS Official Gazette”, No. 70/13). Mine action is a system, which, based on the experience gained in the world, evolves and improves over time, in accordance with international standards. International Mine Action Standards (IMAS - International Mine Action Standards) are successfully implemented in the work and training of the staff who are engaged in this work.

The Republic of Serbia is recognized as a part of the region that is interesting for investments by domestic and foreign investors, which imposes the need for appropriate infrastructure. The construction of the mentioned infrastructure requires ensuring safety during the implementation of the works as one of the crucial requirements. One of the important documents for the construction of new facilities is the confirmation of the achieved safety of the works at the given location, i.e. that there are no residual explosives or other means that threaten safety at the site. The authority that issues the certificate is the Mine Action Centre of the RS, which is responsible for the organization and control of demining works, in whose domain is also the control of the implementation of safety measures during the implementation of demining works.

\(^1\) UXO (unexploded ordnance explosive ordnance that has been primed, fuzed, armed or otherwise prepared for use or used. It may have been fired, dropped, launched or projected yet remains unexploded either through malfunction or design or for any other reason), https://www.mineactionstandards.org

\(^2\) ERW - UXO and AXO (explosive ordnance that has not been used during an armed conflict, that has been left behind or dumped by a party to an armed conflict, and which is no longer under control of the party that left it behind or dumped it. Abandoned explosive ordnance may or may not have been primed, fuzed, armed or otherwise prepared for use) https://www.mineactionstandards.org
The current expansion of construction activity increases the number of requests for issuing the necessary certificates on the clearance of ERW and UXO in certain locations. Due to the volume of work, the existing capacities should be strengthened so that they can successfully respond to the expressed needs.

3. ONE SEGMENT OF CAPACITY DEVELOPMENT FOR MINE ACTION

Strengthening the mine action capacity in the Republic of Serbia is reflected in the development and improvement of the demining center's capabilities, primarily in personnel and infrastructure development. Necessary personnel resources the focus should be on training personnel to work according to IMAS. In this way, protection against unexploded ordnance would be greatly improved.

One of the possible ways to achieve these ideas are:

- To provide trained and certified personnel for demining and destruction of unexploded ordnance. Through the implementation of the plan to strengthen the center's capacity, the training of training instructors for training of staff, who will be engaged in the classes that will be implemented in due course;
- Development of a plan for faster demining of locations contaminated with unexploded ordnance. In this way, would be improved the safety of people and property, conditions would be created for faster and safer implementation of infrastructure projects, which are a prerequisite for future investments in the Republic of Serbia.

In accordance with the aforementioned, the Republic of Serbia continued to record results in the implementation of obligations from the Stabilization and Association Agreement (SAA).

Cooperation with domestic and foreign institutions, from the beginning is the implementation of the project „Improving the capabilities of the Republic of Serbia in the field of demining and destruction of unexploded ordnance”.

The subject project included providing training for instructors and equipping them with modern equipment, in accordance with international standards, which together realize Ministry of defence Republic of Serbia and Mine Action Centre of Republic of Serbia. This project certified a number of instructors who can successfully implement training at the level EOD-1 and EOD-2. With this model of working and achieved cooperation with Army of Serbia, Mine Action Centre can successfully train and keep skills on high level for the realization work, at the mentioned level. A further direction of the Center’s development during capacity building would be to provide training for instructors for the next levels of mine action (http://www.czrs.gov.rs). The mentioned development of training, conditions the improvement of the infrastructure and training base, which would be in the service of quality and safety in training. The European Union has an active participation in the implementation of the standards through the financing of the mentioned capacity building project, as well as organizations of cooperation with relevant actors in mine action.

Considering that a part of improving the capabilities of the Republic of Serbia has already been realized, the next goal is the purposeful use of acquired knowledge through the organization of training. One of the possible directions of development skills, needs to be conceived through staff training in different segments, such as:

- To engage in demining tasks;
- To engage in the tasks of work organization in the preparation and implementation of demining;
- To engage in quality control in demining.
Training plans and programs for levels EOD-1 and EOD-2 are currently being prepared, which would include training of new staff and keep skills of already trained staff. The plans are designed in accordance with the necessary and planned scope of knowledge that is needed for the successful implementation of demining works.

When accepting candidates, it is necessary to establish how much prior knowledge they come with. Based on the candidate's level of training, it is necessary to plan the level and extent of realization of the topics, and adjust the duration of the course to the specific situation. During the implementation of both mentioned courses, all participants must partially renew the acquired knowledge or acquire new ones in accordance with the level for which they are being trained. At the beginning of the training, the participants should be introduced to the teaching tools they will use when carrying out demining works (which the center owns and which are used in the world). They should acquire knowledge about the teaching tools that will be used for destruction, familiarize them with explosives, initiating explosives, the effects of the explosion and safety measures at work. During the implementation of the mentioned contents, the participants should acquire knowledge about explosives and initiating explosives that are used in the Republic of Serbia and in the world. When the whole is finished, an exercise is practically realized that will consolidate the acquired knowledge. Emphasis in training should be on compliance with the prescribed safety measures when working with explosives, as well as other forms of manipulation with explosives. In the second segment, already acquired knowledge should be harmonized with the IMAS. As part of that, candidates should be taught to recognize markings according to NATO and other standards, for the sake of safe and correct identification of found UXO and EOR. In the next segment, the necessary knowledge to be acquired depending on the level of the course is about mines, the largest number of UXO and EOR are various types of mines (antivehicle and antipersonnel). Treat mines from the most represented countries, especially focus on mines that are used or have been used in conflicts in the surrounding territories. The next in terms of representation is the grouping of artillery, tank and mortar missiles, depending on the level of the course to familiarize candidates with the characteristics and methods of identification. Air bombs and other missiles that are fired from the air should also be processed, how to recognize them and what amounts of explosives are involved. And in these cases, special emphasis should be given to the means that were most often used on the territory of the Republic of Serbia and the surrounding countries. Improvised mines and booby trap mines should be processed to the required extent. As one of the indispensable segments, the transport of explosives needed for destruction, for storage or transportation to the place of destruction, should be processed. A very important segment of training is medical training, every participant must know what to do in the event of an accident at the fields, every moment is precious. With this approach to the implementation of the training, a successfully completed and completed process, preconditions are created to reduce possible unfortunate events to the smallest possible extent.

Depending on the level of training that the participants undergo, knowledge must be acquired or expanded on the method of survey and data collection. An important segment of the training is to train participants in the proper organization of the fields, the way of organization and formation of sectors in the fields. That, based on their level of training, each demining participant knows exactly his place and role in the work process. After successfully mastering the mentioned contents, the participants are trained to work independently on demining tasks. With proper and comprehensive training, the possibility of emergency situation is reduced to a minimum, which increases the safety of all participants in demining operations. In addition to the basic training, conditioning of already trained EOD-1 and EOD-2 operators can be realized. The scope of the required knowledge is aligned with the degree for which the trainees are being trained.
Also, by strengthening personnel and infrastructural resources, new directions of international cooperation are opened, in the exchange of acquired experiences or training of demining operators. In cooperations with Geneva international center for humanitarian demining (GICHD), successfully implementing training in quality management in the area of mine action (http://www.czrs.gov.rs). Given this perspective of development and possibilities, Mine action centre in the further coming time will have the tasks of clearance floating way in the river Danube. Considering the specifics of the realization of the mentioned task, the experiences that will be gathered can be very useful for improving the training, improving capacities and improving international cooperation.

4. CONCLUSION

The obvious consequences of the conflict in the country indicate the need to develop and improve the capacity for mine action. The holders of developing is the Mine Action Centre of Republic of Serbia, as a responsible institution, recognized the need to integrate all available capacities of the defense system in the service of mine action with the aim of creating the necessary conditions for economic growth. Capacity development is reflected in the training of staff to engage in tasks: demining, work organization in the preparation and implementation of demining; quality control in demining.

The set goals are realized in cooperation with relevant authorities in the country, institutions in the world and partner countries. All these factors require that the training is carried out with the highest quality, because only well-trained demining participants do not pose a danger to themselves and others. As a segment of the paper were defined the basic knowledge of the direct participants in demining, without which they should not be engaged. All participants must know the working tools, whether it is various detectors, protective equipment or explosives and initiating explosives. They must know well the ordnance they will find in a given situation (mines, explosives, grenades, aerial bombs and other projectiles fired from various ordnance), they must recognize those same ordnance based on the markings found on UXO or ERW. Particular emphasis should be given to the ordnance used in conflicts on the territory of the Republic of Serbia in neighboring countries. It is necessary to know the organization of data collection, the organization of work sites by sector and to know your place and role in the complete demining work. Since all this work is risky and prone to accidents due to various reasons, a very important segment is to know well the manner of the aid and the place of each participant during the medical evacuation. It should be borne in mind that only well-trained personnel during demining do not pose a threat to the safety and security of other participants. In the demining, there is no right to make a mistake, so knowledge should always be refreshed and supplemented, based on one's own and others’ experience, and should be passed on, as a prerequisite for the safest and most secure work possible. In the Republic of Serbia, this is the basic task of the Mine Action Centre as an entity that coordinates the work of all other elements of mine action and takes care of implementation of safety measures during their work.

REFERENCES


Abstract: Bosnia and Herzegovina is a country with a very high risk of floods, which is documented in Vulnerability assessment, where it is defined that "floods represent the greatest danger for community and its population". Due to climate changes in recent decades, floods have become one of the most serious forms of threat to the population and material assets.

After signing the Stabilization and Association Agreement with the EU in 2008, BiH accepted obligation to harmonize its legislation with the EU acquis communautaire, which also includes water legislation. The complex constitutional arrangement and unfavorable socio-economic situation make it difficult to fulfill assumed obligations, as well as protection and rescue system normal functioning on state territory.

This research subject is protection and rescue system analysis, assessment of the adequacy of existing measures and current flood risk management techniques in BiH through a comparative analysis with practice of flood risk management in the EU.

Key words: flood risk management, protection and rescue, complex governance structure

1. INTRODUCTION

Bosnia and Herzegovina (BiH) is a country rich in surface and underground water where, as a result of global climate changes, in the last two decades floods have become one of the most frequent and serious threats to the population and material goods. After signing the Agreement on Stabilization and Association with the European Union in 2008, Bosnia and Herzegovina is obliged to harmonize its regulations with the EU acquis.

One of the directives that forms the core of the EU acquis in water protection field is Directive 2007/60/EC of the European Parliament and the Council of October 23, 2007 on assessment and management of flood risk (Directive). This Directive defines methodology for flood risk management plans creation and measures to prevent the impact of floods. It also confirms public rights to access information and to participate in planning process. The implementation of the Directive is mandatory, although this issue is primarily a domestic priority and is not
conditioned by the requirements of the EU acquis, to a certain extent it must be implemented urgently (Environmental Approximation Strategy of Bosnia And Herzegovina EAS – BIH, 2017). The EU Directive did not provide instructions or strictly defined a model for flood risk management. Respecting the different state regulations, it gave each state the right to choose the best way to manage flood risks.

In January 2015, the Council of Ministers of BiH adopted the Action Plan for flood protection and river management.

At the BiH level, the Framework Law on the Protection and Rescue of People and Property in the Event of Natural or Other Disasters in B&H has been adopted ("Official Gazette of BiH", No. 50/08), and protection and rescue system management at the state level is reduced to the coordinating positions of the highest state bodies in relation to two Entities and one District. The legal framework in Bosnia and Herzegovina's water sector is harmonized with the constitutional organization of BiH, and consists of: the Constitution of BiH, Entities constitutions, BrCko District of Bosnia and Herzegovina (BD) Statute, laws and by-laws adopted at the level of the state, Entities, District, cantons, cities and municipalities.

Floods that have occurred in Europe during the last 2 decades have shown all destructive power that this natural disaster can have. Countries that had an inadequate and inefficient protection and rescue system suffered the greatest damage or needed the longest time to recover.

In this paper, a comparative analysis of the structure and effectiveness of protection and rescue system in context of flood risk management in BiH - a transition country, and the Republic of Croatia - a member of the European Union was carried out.

2. PROTECTION AND RESCUE SYSTEM

Protection and rescue system at the level of BiH is regulated in accordance with the Framework Law on the Protection and Rescue, which defines principles and framework of protection and rescue system. The principles of cooperation and international cooperation in this area, as well as the system of coordination and competence of individual bodies in protection and rescue system, are also defined.

Figure 1. An overview of the protection and rescue system in Bosnia and Herzegovina

Source: (The Structure, Role and Mandate of Civil Protection in Disaster Risk Reduction for South Eastern Europe)
The first elements of protection and rescue system at the state level in BiH appeared in 2003 with the Ministry of Security of BiH establishment, which was entrusted by the Council of Ministers with the mandate to coordinate protection and rescue in the country. Through the Protection and Rescue Sector, this Ministry performs professional and other administrative tasks in this field. At the state level, the Coordinating Body of BiH was established as a professional operational body of the Council of Ministers. It has a primarily coordinating role at the state level and coordinates protection and rescue activities throughout the state, while lower levels are in charge of management (Figure 1). Within the framework of the Ministry of Security, the Operational Communication Center-112 was established. The second level of the organization is actually the operational level, which consists of the Civil Protection authorities of the Entities and the BD.

During the disaster, it is often impossible to adequately respond with own assets, so international assistance is necessary. The Council of Ministers of Bosnia and Herzegovina decides on request for international assistance at the proposal or request of the Coordinating Body, the Ministry of Security, competent authorities or institutions of Bosnia and Herzegovina, Entities and District.

In the Republic of Croatia (RH), the Civil Protection service has been an integral part of the Ministry of the Interior since 1994, and what can be singled out as a significant period in protection and rescue system evolution is year 2005 when the State Protection and Rescue Administration (DUZS) was established, and 2018 when the Ministry of the Interior took over the DUZS tasks (as the central body of the state administration responsible for civil protection tasks). On the way to full membership in the EU, Croatia had to pass new legislation, and implement all EU regulations, standards and principles in civil protection field and thus build a European model of civil protection.

Activities in protection and rescue system of the RH are regulated by the Civil Protection System Act (Official Gazette 82/15), and its amendments from 2018, 2020 and 2021. This Law regulates the system and operation of civil protection, the rights and obligations of the state administration, local and regional self-government units, legal and natural persons, as well as training for the needs of the civil protection system, financing, administration and inspection supervision.

The civil protection system is set up on three levels, i.e. local, regional and state in order to connect resources and abilities of participants, operational forces and citizens into one whole with the aim to reduce the risk of disasters, also to provide a quick and optimal response to threats and dangers, and mitigation of major accidents and disasters consequences.

In 2005, the DUSZ was established in the Republic of Croatia to prepare, plan and manage operational forces, and coordinate the activities of all protection and rescue entities with the help of its regional offices in all counties and the city of Zagreb together with its central body.

In 2019, the Directorate of Civil Protection was established in the Ministry of the Interior following the Government's decision to abolish the DUZS. This decision was made after an analysis of civil protection, where „the need for a unified system of leadership and command in major accidents and disasters, faster information flow, normative regulation, enhanced preventive and educational activities, early warning system improvement, division of roles and responsibilities for effective civil protection system functioning from the state to the local level.” (www.civilna-zastita.gov.hr).

The new organization aimed to raise the level of system functionality, and to eliminate perceived deficiencies through linking functional areas, positioning the CP system in the
concept of homeland security, and strengthening the personnel structure and material equipment.

1. COMPARATIVE ANALYSIS OF FLOOD RISK MANAGEMENT IN BOSNIA AND HERZEGOVINA AND REPUBLIC OF CROATIA

Bearing in mind increasingly frequent occurrences of extreme hydrological conditions that increase the flood risk in many areas both in BiH and the RH, as well as the necessary cooperation for certain transboundary watercourses, a comparative analysis of the protection and rescue system functioning through flood risk management was carried out. Considering that one state is a EU member and the other one is trying to become a member, the structure and functionality of two protection and rescue systems were analyzed. Two specific local communities were chosen for research sites as very representative in terms of pronounced flood risks and floods recorded in the past: Zivinice in the FBiH, and the municipality of Gunja in the RH.

3.1. Flood risk management in Bosnia and Herzegovina

Bosnia and Herzegovina, which consists of Entities: the Federation of Bosnia and Herzegovina (FBiH) and the Republic of Srpska (RS), and the special administrative unit Brčko District of Bosnia and Herzegovina (DB) has a very specific system of water law in relation to neighboring countries with a unique system of legal norms governing water management. Contrary to contemporary, globally accepted beliefs of science and profession that water knows no borders, and that waters are managed at the level of the river basin, as well as that administrative borders should not be an obstacle to the development of such management systems, a management system based on the opposite principles has been developed in BiH.

Jurisdictions for water management are in accordance with the Constitution of BiH and the constitutions of the Entities, as well as the arbitration decision on DB, under the jurisdiction of the Entities and the District (Water Management Strategy of the Federation of Bosnia and Herzegovina (2010 - 2022).

In both Entities, the Water Law has been adopted, and in DB the RS law is being applied, while a new law is in the adoption phase. Operational flood defense plans are being adopted by Entities ministers from competent ministries, and in BD by the Government. In accordance with the constitutional and legal framework of the FBiH, water management issues are responsibility of the Federation and cantons. According to the FBiH Constitution, the Federation and cantons bodies have joint competence in regulating environmental protection policy and use of natural resources (Article 3 of the FBiH Constitution). Water regulations in the FBiH are adopted at the level of the Federation and cantons. According to the FBiH Water Law (Official Gazette of the FBiH, no 70/06), there are two agencies: the Sava River Basin Agency, with headquarters in Sarajevo; and the Adriatic Sea Watershed Agency, with headquarters in Mostar.

BiH has its own dynamics of creating circumstances and fulfilling the legal prerequisites for taking over and implementing the Directive on assessment and management of flood risk, which for FBiH is shown in Figure 2.

In the FBiH, key steps and activities from the Directive were taken over by the Regulation on types and contents of plans for the protection against harmful effects of water (Official Gazette of FBiH, no. 26/09).
The structure of the country and the legal framework contribute to the fact that current approach to planning preventive measures is not efficient, since there is no complete and clear division of activities at the Entity and Cantonal levels of government, and they are not harmonized in one river basin. The State of Bosnia and Herzegovina does not have a single methodology by which all activities could be harmonized, which makes it difficult to implement measures and activities.

There are also problems in preventive measures implementation because sufficient funds have not been invested nor have they been adequately distributed between different levels of government. The determination of priorities is decentralized, and due to the division and dispersion of responsibilities in Bosnia and Herzegovina, they are difficult to determine. Due to inadequate coordination between competent authorities, situations occur where cantons are waiting for orders from the federal ministry responsible for water management and the Agency, and the federal ministry and the Agency are waiting for information from the cantons. Such cooperation and communication is inadequate, more precisely, it is not in accordance with good practice, and good practice is the basis for integral planning in the river basin.

How complex BiH is is also shown by the event of May 2014, when unprecedented floods occurred, which took lives, caused great material damage, and activated thousands of landslides. The chronology shows how late the authorities were one after another in declaring a natural disaster: the Government of FBiH declared a state of natural disaster on May 15, 2014, on the territory of FBiH, while the Government of the RS declared a state of emergency only on May 17, 2014 on the entire territory of RS, while state of disaster has not been declared on state BiH level.
In its Progress Report from 2013 (http://www.mvteo.gov.ba), the European Commission assessed that the lack of real political support for BiH's EU program results in very limited progress in terms of harmonization with EU laws and standards.

3.1.1. The city of Zivinice (FBiH) in the floods of 2014

The City of Zivinice is located in the northeastern part of BiH. The city itself has approximately 10,500 inhabitants; the greater area covers 291 km² and at the end of 2013, about 57,762 inhabitants lived there. Larger rivers that flow through this area are Spreča, Gostelja and Oskova, and among the smaller ones, Toplica is important. During heavy rainfalls, many of them leave their beds, and flood surrounding areas. Total area of the water courses is 7.40 km² or 2.54% of the total area, and the total length of all the courses is 109.8 km. The Spreča River is 83.6 km long, of which 30.3 km passes through Zivinice. It has a characteristic water regime, nival-pluvial. It is a distinctly lowland river that forms a funnel-shaped delta at its confluence with Lake Modrac. The problem of underground water level is related to „Sprečko polje“ area.

In the spring of 2014, weather-extreme occurrences of the highest water levels on all watercourses were recorded, which reached the historical maximum of daily precipitation recorded at the Tuzla measuring station. In addition to heavy rainfall, following factors also had a major impact on floods:
- Many years of continuous filling of Lake Modrac with coal dust and river drift, which significantly reduced receiving volume of the reservoir,
- Illegal construction of buildings on the watercourses or expansion of individual households at the expense of narrowing the watercourse and filling up the banks,
- Insufficient river courses maintenance, in terms of channel profiling and removing vegetation that obstructs the flow,
- Poor management of river basins, that is, river flows in terms of knowing the behavior of watercourses and taking measures to prevent the overflow.

During the period from 20th April until 17th May, 2014 cumulative precipitation ranged between 250-400 l/m², and only in period from 14th to 17th May up to 250 l/m². At some measuring stations, the measured amounts of precipitation for mentioned period were 2-3 times higher than the usual average precipitation for that period of the year and the highest ever recorded in the last 120 years.

This hydrological condition caused a dramatic increase in all watercourses in observed area, which caused flooding of 605 residential buildings, 13 commercial and other buildings, traffic interruption on two sections of the main road M18, and the regional road R-455a. The railway line Tuzla - Banovici also suffered major damage. Major damage, partial and complete destruction of all local roads in the area of Zivinice, complete destruction of 7 pedestrian bridges and more severe damage to one traffic bridge. Two residential buildings were completely destroyed, and 974 buildings suffered minor or major damage. During the floods, about 350 people left their homes. The basic features and lessons learned from this flood are given in Table 1.

For one of the proposed solutions to reduce flood risks in the area of Zivinice, the problem is „territorial border”, despite the EU Directive norm implemented through the FBiH and RS Water Law, that is, mutual cooperation for the common good. In 1996, Institute for Water Management developed the conceptual solution for the „Osmaci” reservoir as a solution to the problem of surface flooding in Spreča river valley. The reservoir would be located near Osmaci settlement (Kalesija). Up to date, nothing has been done because of the „territorial border”,
that is, the dam of the reservoir would be on the territory of the FBiH, and the reservoir itself would be on the territory of the RS.

In conditions of decentralized prioritization, it is difficult to expect good results. The financing methods and the ratio of investments in preventive measures in relation to investments in remediating the consequences are far from reasonable and well-founded. The problem is also insufficient supervision and analysis of the situation in planning and implementation of preventive measures, as well as the disconnection of inspection supervision with the institutions responsible for the field of water management.

3.2. Flood risk management in the Republic of Croatia

In accordance with the Water Law (Official Gazette, No. 66/19 and 84/21), flood protection in RH is managed by Croatian Waters. The operational management of flood risks and the immediate implementation of flood defense measures are regulated by the National Flood Defence Plan (Official Gazette, No. 84/10) and Main Implementation Flood Protection Plan (Croatian Waters, July 2011). Croatian Waters also prepare planning documents for flood protection, which is foreseen by the Water Law. The River Basin Management Plan enables a systematic approach to the development of flood defense and flooding risk reduction for the territory of the RH.

The National Flood Defense Plan plans all the necessary preparatory work and immediate activities in the event of a flood, for the entire area of Croatia. In addition to the detailed organizational elaboration of activities and activity holders for individual areas, it also elaborates prevention measures, early warning, planning, study work and monitoring of water regimes.

According to the provisions of the National Flood Defense Plan, a central operational unit for the management of regular and extraordinary flood defense at the level of the RH, called the Main Flood Defense Center, has been established within Croatian Waters (Proceedings of the Workshop on Flood Risk Management measures & links to EU WFD, Zagreb Croatia, 2015). Main Implementation Flood Protection Plan describes the flood defense operational plans for the entire territory of the RH in detail according to the territorial principle, as well as according to the principle of the management hierarchy.

The Water Management Strategy (Official Gazette, No. 91/08) established a strategic goal of protection against the harmful effects of water, which foresees reaching the functionality of the flood protection system to a level of about 87% by the end of 2023 and up to 100% by the end of 2038. The goal will be achieved through the gradual implementation of works on facilities rehabilitation and reconstruction, and development projects realization. Half of the planned works will be completed in the period until 2023, and the other half in the period until 2038.

Institutions responsible for water management, as well as flood risks, are the Ministry of Environmental Protection and Energy and, as a legal entity, Croatian Water. The RH has two river basin districts: the Adriatic river basin and Danube river basin.

3.2.1. Municipality of Gunja (RH) in the floods of 2014

Gunja is located in the Vukovar-Srijem County in its southern part, on an area of approximately 31 km². According to the 2011 census, 3,732 inhabitants lived in the municipality territory. Significant road corridors pass through the territory of the municipality. The land altitude in the Vukovar-Srijem County ranges from 78 m to 204 m, which makes it an extremely low plain area. Along the border with Bosnia and Herzegovina, Sava river flows in a length of 15 km. In addition to the Sava, the Bosut River is also important in the „BiDj-
Bosutsko polje”, with the largest tributary being the BiDj River. Watercourses that cross the municipality are Cupinica, Pakaca and Zalogito.

Achieved level of flood protection in the BiDj - Bosut field is high, due to construction of a large number of hydrotechnical facilities. The Sava defense embankment is protected from the overflow of high waters in such a way that the elevation of embankment crown is designed and constructed 100-120 cm above the 100-year high waters. The village of DJurici has the greatest safety from flooding in defended area, while the most threatened places are Strosinci, Gunja, Vrbanja and Spacva, and partially threatened places are Racinovci and Drenovci.

Sava river embankment breached in the night from May 17 to 18, 2014 near Rajevo Selo, while Rajevo Selo, Racinovci, Gunja and several other places were flooded. The embankment broke in a length of 30 m. For the break of the embankment and the flooding in Posavina County, the Republic of Croatia, that is, Croatian Waters, was declared responsible (https://www.jutarnji.hr). The basic features and lessons learned from this flood are given in Table 1.

The floods from Gunja pointed to another very important aspect in flood risk management - interstate cooperation and especially good communication and information exchange. The poor cooperation between two neighboring countries (BiH and RH), which is defined by the Framework Agreement on the Sava River Basin (Article 13, Point 1), is illustrated by a statement from this period: ".. The flood in Cvelferija was caused by the exceptionally high water levels of the Una, Vrbas and Bosnia, while we had no information from Bosnia and Herzegovina about the amount of water coming to us in Croatia," stated the General Director of Croatian Waters (https://balkans.aljazeera.net/teme/2019/5/19/pet-godina-nakon-poplava-gunja-raseljena-i-zaboravljena).

2. OVERVIEW OF PROTECTION AND RESCUE SYSTEM BASIC CHARACTERISTICS AND FLOOD RISK MANAGEMENT

A comparative analysis of significant aspects in flood risk management in two countries (BiH and RH) with reference to the analyzed local communities is given in Table 1.

<table>
<thead>
<tr>
<th>FLOODS / FLASH FLOODS</th>
<th>BIH</th>
<th>RH</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ADMINISTRATION AND COMPETENT AUTHORITY</strong></td>
<td>MINISTRY OF SECURITY OF BIH (LEVEL 1) IN MATTERS INCLUDING STRATEGIC PLANNING, COORDINATION AND INTERNATIONAL COOPERATION</td>
<td>CIVIL PROTECTION - LEGAL RESPONSIBILITY OF THE GOVERNMENT STATE – LEVEL 1</td>
</tr>
<tr>
<td></td>
<td>FBiH AND RS IS LEVEL 1 ADMINISTRATION</td>
<td>- 20 COUNTIES, PLUS CITY OF ZAGREB, THE CAPITAL – ADMINISTRATIVE UNITS LEVEL 2</td>
</tr>
<tr>
<td></td>
<td>BD, CANTONS OF THE FBiH AND REGIONS OF RS ARE LEVEL 2</td>
<td>TOWNS AND MUNICIPALITIES – LEVEL 3</td>
</tr>
<tr>
<td></td>
<td>MUNICIPALITIES ARE LEVEL 3 ADMINISTRATIONS</td>
<td></td>
</tr>
<tr>
<td><strong>FINANCING (AVERAGE ANNUAL FOR CIVIL PROTECTION)</strong></td>
<td>TOTAL FUNDING LEVEL 1: APPROX. 1.3 MIL EUR</td>
<td>LEVEL 1: 8.3 MIL EUR</td>
</tr>
<tr>
<td></td>
<td>LEVEL 2 &amp; 3: APPROX. 7 MIL. EUR</td>
<td>LEVEL 2 &amp; 3: 41.7 MIL. EUR</td>
</tr>
<tr>
<td></td>
<td>NOTE: INCOMPLETE INFO</td>
<td></td>
</tr>
</tbody>
</table>

Table 1: Comparative analysis of significant factors for protection and rescue and flood risk management in BiH and HR (adapted, sources: https://www.unisdr.org/files/9346_Europe.pdf, www.preventionweb.net/countries/bih/data/)
<table>
<thead>
<tr>
<th>FLOODS / FLASH FLOODS</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMPORTANT FACTORS</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>HUMAN RESOURCES</td>
</tr>
<tr>
<td>DURING „EMERGENCY PERIODS“</td>
</tr>
<tr>
<td>AVG. ANNUAL FLOOD LOSS</td>
</tr>
<tr>
<td>FLOOD RISK FREQUENCY</td>
</tr>
<tr>
<td>LEVEL DEALING WITH EVENT</td>
</tr>
<tr>
<td>DEGREE OF IMPACT</td>
</tr>
<tr>
<td>PREPAREDNESS</td>
</tr>
<tr>
<td>PREDICTION SYSTEM</td>
</tr>
<tr>
<td>VULNERABILITY MAPS</td>
</tr>
<tr>
<td>ALERTS/ WARNINGS</td>
</tr>
<tr>
<td>PROCEDURES</td>
</tr>
<tr>
<td>EFFICIENCY</td>
</tr>
<tr>
<td>PUBLIC PERCEPTION</td>
</tr>
<tr>
<td>RESPONSE/ SEARCH / RESCUE</td>
</tr>
<tr>
<td>PROCEDURES</td>
</tr>
<tr>
<td>EFFICIENCY</td>
</tr>
<tr>
<td>PUBLIC PERCEPTION</td>
</tr>
<tr>
<td>FLOODS 2014</td>
</tr>
<tr>
<td>BASIC FEATURES</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>LESSONS LEARNED</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

The protection and rescue system in the RH is in many aspects more functional and organized than the existing one in BiH, although there are some shortcomings that need to be corrected. From the aspect of protection and rescue in the domain of personal prevention and protection, the basic remark can refer to the necessary greater involvement of the population in reducing the risk of disasters.
During every disaster, it is necessary to keep records - a log of activities that includes information about what was done and the way the disaster was managed. This information would provide insight for subsequent analyses of the lessons learned and answers to the questions: what turned out to be good, what needs to be refined, and what needs to be changed urgently? At some BiH institutions that did such analyses, the implementation of proposed measures to improve protection was started, but they were not fully completed. On the other hand, RH has a special register of flood events that can be used as good guideline for flood risk management.

3. CONCLUSION

In BiH, protection and rescue system functioning, as well as the flood risk management, is limited by constitutional and legal provisions, and in addition to that all, bad social, economic and political environment, makes the system as it is today, inadequate.

The flood protection system in BiH is fragmented without clearly defined responsibilities of different levels of government. The lack of a unified methodology in the planning of preventive flood protection measures and without harmonizing priorities in one river basin cannot produce good results. One of the major shortcomings is poor coordination of institutions responsible for preventive measures implementation, and only partial supervision and monitoring of its execution. The floods of 2014 showed that there was no synergy between the bodies that manage water, and thus the flooding risks, and the bodies that deal with the protection and rescue of people and material goods.

On its path and transition, Bosnia and Herzegovina is slow in regulating and harmonizing its legislation with the EU, insufficiently invests in prevention and most of the money is usually spent on remediation of the consequences.

By adopting and incorporating European regulations into Croatian, there are gradual changes and significant improvements in protection and rescue system and flood risk management, which has improved flood defense to a much higher level than in Bosnia and Herzegovina.

Also, the Republic of Croatia has „inherited” unresolved problems (such as illegal construction) from an earlier period, due to which it still suffers major consequences from floods. It is evident that the Republic of Croatia invests much more in civil protection financing at all levels and that it has significant human resources at its disposal (Table 1). Here, the number of volunteers involved in emergency situations is particularly highlighted, for which there is no verified and available data in Bosnia and Herzegovina. Nevertheless, the material damages caused by the catastrophic floods in 2014 in the Republic of Croatia are extremely high.

Unlike Bosnia and Herzegovina, which did not learn significant lessons from difficult experiences or made substantial improvements, the Republic of Croatia, after 2014 floods, adopted special law in order to compensate the entire damage or a portion of it. RH as well established the Directorate of Civil Protection of the Ministry of Internal Affairs with the aim of overcoming anomalies identified by a systematic analysis of civil protection.

It is expected that BiH soon becomes a full member of the EU Mechanism for Civil Protection what could be a good moment to work on system improvement since this should significantly strengthen state capacities and readiness for efficient response to disasters. Another benefit of this membership is the opportunity for protection and rescue institutions to be equipped, trained and qualified according to EU standards as well as to get support from other state members when needed.
REFERENCES

Civil Protection System Act. Official Gazette 82/15. RH.


Environmental Approximation Strategy of Bosnia And Herzegovina EAS – BIH, 2017 (http://www.mvteo.gov.ba)

Fahreta, Zepic, 2022. Comparative Analysis of Flood Risk Management Systems in Bosnia And Herzegovina And The European Union, Master thesis, Faculty od Mining-Geology and Civil Engineering, University of Tuzla, BiH

Framework Law on the Protection and Rescue of People and Property in the Event of Natural or Other Disasters in B&H (Official Gazette, No. 50/08) (BiH)

Regulation on types and contents of plans the protection against harmful effects of water (Official Gazette, no. 26/09) (FBiH).

The Structure, Role and Mandate of Civil Protection in Disaster Risk Reduction for South Eastern Europe, www.unisdr.org/files/9346_Europe.pdf


www.preventionweb.net/countries/bih/data

TWO FLOOD RISK ASSESSMENT METHODOLOGIES FOR THE TERRITORY OF NOVI SAD

Cveta Lazic¹, Srdjan Kolakovic², Slobodan Kolakovic³

¹ University of Novi Sad, Faculty of Technical Sciences, Trg Dositeja Obradovica 6, Novi Sad, Republic of Serbia, cvetalazic@uns.ac.rs
² University of Novi Sad, Faculty of Technical Sciences, Trg Dositeja Obradovica 6, Novi Sad, Republic of Serbia, kolak@uns.ac.rs
³ University of Novi Sad, Faculty of Technical Sciences, Trg Dositeja Obradovica 6, Novi Sad, Republic of Serbia, kolakovic.s@uns.ac.rs

Received: 5th August 2022
Accepted: 17th August 2022

Abstract: Preliminary flood risk assessment for the settlement of Novi Sad and disaster risk assessment for floods were created by applying the regulations of the Republic of Serbia. Analysing the past floods, the probability of future floods, the terrain and the hydrological characteristics, the preliminary risk assessment determined that more than 80% of the territory of the Novi Sad is exposed to floods. By disaster risk assessment is founded that the risk of a flood with a return period of 1000 years is moderate (acceptable). A review of the methodologies for both risk assessments revealed that there is a lack of methodology for assessing the harmful effects of floods in dinars/euros, so that the assessments would be realistic.

Key words: flood, risk assessment, prevention

1. INTRODUCTION

Floods represents rising and overflowing of a body of water, especially onto normally dry land, which can threaten people’s lives and health, material goods and environment (Directive, 2007/60/EC). Human activities, such as the growth of settlements in the flood area, and climate change contribute to the probability of flooding and their consequences (Directive, 2007/60/EC). Novi Sad was flooded several times in the past, 1770, 1876, 1940 i 1965. This paper describes the floods in 1940 and 1965, during which the stage of the Danube was 706 and 778 cm. In this paper, the flood risk assessment for the Novi Sad was carried out using two different methods. Preliminary flood risk assessment was done according to regulations related to flood protection, and disaster risk assessment for floods was made according to legal regulatons for disaster risk reduction and emergency management. Preliminary flood risk assessment is document which is created to assess existing and potential risks, analyze past flood and factors that increase flood risk. The goal of creating a disaster risk assessment is to identify the risk of catastrophic events and their consequences for people’s lives and health, material goods and the environment.
2. BASIC INFORMATION ABOUT NOVI SAD

Novi Sad is a city in the Republic of Serbia, in the central part of the autonomous province Vojvodina (Local economic development office, 2010). Most of it extents on the Pannonian plain, at altitude of 72 to 80 m, and lies on the Danube bank at 1255 km of its course (Local economic development office, 2010). It consists of three morphological units: alluvial terrace (altitude of 78 to 80 m), loess terrace (altitude of 82 to 83 m) and former inundation area (altitude of 75 to 77 m) (Milosev, 2005). Inside the settlement area, space is intended for public areas, housing, business, agricultural, forest and other purposes (General plan, 1999).

3. PRELIMINARY FLOOD RISK ASSESSMENT FOR NOVI SAD

The preliminary flood risk assessment is a document that creates the Ministry of Agriculture, Forestry and Water Management for the territory of the Republic of Serbia, according to the Water Law (“Official Gazette of the Republic of Serbia”, no. 95/2019) and Rulebook on determining the methodology for the preparation of preliminary flood risk assessment (“Official Gazette of the Republic of Serbia”, no. 1/2012), which defines their content.

3.1. Description of past floods

In Novi Sad, on March 23, 1940, flood defense began at a stage of +586 cm, and on April 5, a new absolute maximum of +706 cm was reached (Milosev, 2005). During this flood, the city districts of Adamovicevo naselje (Telep) and Podbara (figure 2) were flooded, 714 houses were demolished and about 3000 residents ended up homeless (Milosev, 2005). The emergency defense lasted till April 21, and the regular defense lasted till the beginning of May (Milosev, 2005).

In 1965, flood defense in Novi Sad lasted 128 days, and the stage reached over a level of +778 cm, which exceeded the previous maximum from 1940. (Milosev, 2005). Every meter of the embankment was in danger, especially Novi Sad and places on the alluvial terrace (Milosev, 2005). When the water level reached +650 cm and had intention to rise further, on May 26, the adult population was mobilized and the city headquarters for flood defense was formed (Milosev, 2005). A day later, there was a breakthrough of the embankment near Celarevo, but even before the breakthrough there was a danger that a breakthrough could happen, and that the former inundation area of the Danube and part of the alluvial terrace next to the canal would be threatened, so localization embankments were built (Milosev, 2005). Due to the hard work of all participants in flood defense in 1965, Novi Sad was saved from floods.

3.2. Probability of future floods

In this paper, the probability of future floods was determined by applying a series of maximum annual stages in period from 1916 to 2020. The probability was calculated using the logPearson III distribution, with HEC-SSP 2.0 software. Research has determined that the maximum stage and flow feature has a logPearson III distribution, and the US Water Resources Council (WRC) has declared this distribution as the basis for high water calculations (Kolakovic, 2017). The computed results are shown in table 1.

Table 1: Statistical analysis of the maximum annual stages of the Danube from 1916 to 2020

<table>
<thead>
<tr>
<th>Probability (%)</th>
<th>Computed Curve Stage (cm)</th>
<th>Expected Prob. Stage (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0,01</td>
<td>993,50</td>
<td>1021,60</td>
</tr>
<tr>
<td>0,1</td>
<td>887,39</td>
<td>902,71</td>
</tr>
<tr>
<td>0,5</td>
<td>809,09</td>
<td>817,93</td>
</tr>
<tr>
<td>1,0</td>
<td>773,64</td>
<td>780,29</td>
</tr>
<tr>
<td>Probability (%)</td>
<td>Computed Curve Stage (cm)</td>
<td>Expected Prob. Stage (cm)</td>
</tr>
<tr>
<td>-----------------</td>
<td>---------------------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>2.0</td>
<td>736.70</td>
<td>741.47</td>
</tr>
<tr>
<td>5.0</td>
<td>684.57</td>
<td>687.36</td>
</tr>
<tr>
<td>10.0</td>
<td>641.36</td>
<td>643.01</td>
</tr>
<tr>
<td>20.0</td>
<td>592.69</td>
<td>593.48</td>
</tr>
<tr>
<td>50.0</td>
<td>509.65</td>
<td>509.65</td>
</tr>
<tr>
<td>80.0</td>
<td>438.27</td>
<td>437.69</td>
</tr>
<tr>
<td>90.0</td>
<td>405.05</td>
<td>404.01</td>
</tr>
<tr>
<td>95.0</td>
<td>379.52</td>
<td>377.98</td>
</tr>
<tr>
<td>99.0</td>
<td>335.91</td>
<td>333.06</td>
</tr>
</tbody>
</table>

From the table, we see that the 1% probability stage is 773.64 cm, and the 0.1% probability stage is 887.39 cm. We can conclude that the probability for stage of 706 cm (1940) is ~3.77%, and the return period is about 26.5 years. The return period of the stage of 778 cm (1965) is approximately 100 years, i.e. the probability is 1%.

### 3.3. Maps of floodplains

Using the Quantum GIS (QGIS) software tool, a map was created showing the location of the flood in 1940, i.e. the floodplains during it (Figure 1). During the flood of 1965, parts outside the settlement of Novi Sad were flooded, so it is not shown on the map.

![Figure 1. The floodplain of Novi Sad in 1940](image-url)
In order to determine the locations of possible future floods, we take into account the stage during previous floods, as well as the stages determined by statistical analysis, characteristics of the terrain and the flood protection system. Considered water levels for future floods are in Table 2.

**Table 2. Considered stage for future floods**

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Stage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flood in 1940</td>
<td>706 cm (78.79 m n.J.m)</td>
</tr>
<tr>
<td>Flood in 1965</td>
<td>778 cm (79.51 m n.J.m)</td>
</tr>
<tr>
<td>T=100 years</td>
<td>773.64 cm (79.47 m n.J.m)</td>
</tr>
<tr>
<td>T=1000 years</td>
<td>887.39 cm (80.6 m n.J.m)</td>
</tr>
</tbody>
</table>

The embankments in Novi Sad are dimensioned for a flood with a return period of 100 years with additional 1.2 m. Based on that, we can conclude that its height is higher than the stage of the return period of 1000 years defined in this paper. Despite this, the function of the embankment may fail, and Novi Sad is threatened by floods, and their consequences must be considered.

Comparing the previously mentioned stages of the Danube (table 2) and the altitude of the terrain, we conclude that the floodplains include the inundation area and the alluvial terrace, because all the mentioned stages exceed the altitude of the inundation area and are in the range of 78.79 to 80.6 m, approximately as alluvial terrace. In all 4 scenarios, the stage exceeds 77 m, which means that in all scenarios the entire inundation area would be flooded.

Using QGIS, floodplains were marked on the map (Figure 2).

**Figure 2. Floodplain in Novi Sad**

### 3.4. Harmful effects of floods

By calculating the area of floodplain using QGIS, we conclude that about 83% of the urban area of Novi Sad is threatened by floods, that is, the area of the inundation area and the alluvial terrace.
The population of the Novi Sad settlement is 258,543 (Local economic development office, 2010), and since the non-threatened part of the settlement is mainly an industrial zone, we can consider that the entire population is at risk. Residential, commercial and public facilities are at risk, and basic infrastructure may also be damaged.

In the Rulebook on determining the methodology for the preparation of preliminary flood risk assessment ("Official Gazette of the Republic of Serbia", no. 1/2012), the methodology for assessing the possible harmful effects of future floods is not specified, it is only stated that they are determined based on the topography of the terrain, type and ways of land use, hydrological characteristics of watercourses, efficiency of flood protection systems, location of populated areas and areas of economic activities, long-term development plans and the impact of climate change. It is very important to carry out a detailed assessment of the possible harmful effects of future floods in dinars/euros, so that they can assess the risk.

4. DISASTER RISK ASSESSMENT FOR FLOODS IN NOVI SAD

The disaster risk assessment is prepared in accordance with the Law on disaster risk reduction and emergency situation management ("Official Gazette of the Republic of Serbia", No. 87/2018), Instructions on the methodology of preparation and content of the Disaster risk assessment and the protection and co-operation plan ("Official Gazette of the Republic of Serbia", No. 80/2019). Data on Novi Sad necessary for the assessment are briefly listed in chapter 2.

4.1 Event scenario

For the purposes of risk assessment, a scenario was created for a flood in Novi Sad with the most undesirable harmful effects, according to the criteria from the regulations, which is briefly presented below.

The Danube reached a stage of +887.39 cm, i.e. a stage with a probability of 0.1%, as a result of which the dike's function failed and the water flooded about 80% of the area of the Novi Sad settlement. Residential, business and public buildings are at risk. Flood defense lasted from March 30 to May 15. According to the reports of the Republic Hydrometeorological Institute, intense rains and an increase in the stage of the Danube were expected.

During the flood, 5 people lost their lives, 60 were injured, and 5,000 people ended up homeless. The entire population of Novi Sad was at risk. Harmful consequences for the economy, ecology and social stability exceed 10% of the budget of the local self-government unit.

4.2 Determining the level of risk

Probability statement and assessment of consequences for human life and health, economy/ecology and social stability was carried out according to the methodology, whereby it was determined:
- the probability is less than 1% - negligible,
- consequences for people's lives and health - catastrophic,
- consequences for the economy/ecology - catastrophic,
- consequences for social stability - catastrophic.

The above data were entered into risk matrices, where it was found that the risk is moderate for all segments (life and health of people, economy/ecology and social stability). After determining the risk for individual protected values, the total risk was determined using the
matrix (Figure 3). The overall risk is moderate and acceptable, so risk treatment measures are not necessary, only regular maintenance of existing flood protection systems is required.

Figure 3. Total risk (Instructions, 80/2019)

4.3. Risk map

After determining the level of risk, the obtained results are shown on the map (Figure 5). A threatened area is marked, where the yellow color represents a moderate (acceptable) risk of flooding with a probability of 0.1%.

Figure 4. Risk map
5. ANALYSIS OF RESULTS OBTAINED BY RISK ASSESSMENTS

The preliminary risk assessment accurately determines the probability of future floods and maps of the floodplain, which is very important when creating a disaster risk assessment for flood. However, during the preparation of the preliminary assessment, the methodology for assessing the harmful effects of floods was not defined, which is necessary for further analysis. During the creation of scenarios for disaster risk assessment for floods, data related to the harmful effects of floods on human life and health, the economy/ecology and social stability expressed in dinars/euros are necessary, but neither the Instructions on the methodology of preparation and content of the Disaster risk assessment and the protection and co-operation plan ("Official Gazette of the Republic of Serbia", No. 80/2019) have not defined how to determine these effects, nor from which sources to take the values. It would be desirable to determine the harmful effects in the Preliminary Flood Risk Assessment, and to use the obtained results when preparing the disaster risk assessment for floods.

The detailed methodology for assessing the harmful effects of floods should be defined by the Rulebook on determining the methodology for the preparation of preliminary flood risk assessment ("Official Gazette of the Republic of Serbia", no. 1/2012). In the following, the procedure for assessing the harmful effects of floods is briefly described, taken from the written material for the preparation of the textbook author Asst. Prof. Slobodan Kolakovic. It is necessary to determine what the harmful effects of floods include and collect the necessary data (Kolakovic, n.d.). Finally, it is necessary to calculate the flood damage by calculating the risk in €/year, according to equation (1) (Kolakovic, n.d.).

\[
\bar{S} = \int_{P_o}^{P_{max}} S(P) dP - \sum_{i=1}^{m} \frac{S_i + S_{i+1}}{2} \cdot \Delta P_i
\]

where in:
- \(\bar{S}\) – expected average damage in €/year,
- \(S(P)\) – individual damage of the planned flood probability of occurrence \(P\),
- \(P_o\) and \(P_{max}\) – the probability of the smallest and largest flood that caused damage (Kolakovic, n.d.).

6. CONCLUSION

In this paper, the flood risk assessment for the settlement of Novi Sad was carried out using two different methodologies, i.e. using different regulations. A preliminary flood risk assessment was made, which determined the probability of future floods and the floodplain during them. The probability was determined using the HEC-SSP software tool, logPearson III distribution for a series of maximum stages from 1916 to 2020. The 1% probability stages was found to be 773.64 cm and the 0.1% probability 887.39 cm. Analysis of the above results, floods from the past, terrain characteristics and hydrological characteristics determined that about 80% of the Novi Sad settlement is threatened by floods in the event of failure of the embankment function. By disaster risk assessment, through the creation of scenarios and the analysis of the harmful effects of floods, it was determined that the risk of a flood with a return period of 1000 years is moderate (acceptable).

The same problem appears in both assessments, the methodology for assessing the harmful effects of floods is not defined. For flood risk assessments, we need data on damages expressed
in money (dinar/euro), so it is necessary to define the procedure for determining them. In the assessments, the determination of the amount of damage is attributed to the expert team that prepares them, without defined requirements on the method of their determination.

ACKNOWLEDGEMENT

The research has been conducted within the project "Scientific research and improvement of educational process in the field of civil engineering", developed at the Department of Civil Engineering and Geodesy, Faculty of Technical Sciences, University of Novi Sad, Serbia.

REFERENCES


THE ASPECTS OF THE DIPLOMATIC PROTOCOL THROUGH THE PRISM OF THE RUSSO-UKRAINIAN CONFLICT

Sande Smiljanov

1 Ministry of Interior, Str. “Dimche Mirchev” No. 9, Skopje, North Macedonia, ssmiljanov@gmail.com

Received: 3rd August 2022
Accepted: 14th August 2022

Abstract: Europe is living its hardest moments since the end of the Second World War. Open conflict on the continent was considered to be impossible, not only by the security experts and the European heads of states, but also according NATO strategic documents. February 24th, 2022 changed it all – Russia launched a full-scale invasion on Ukraine (designated as a special military operation by Russia), that threw the continent in chaos and disbelief. Although none of the European authorities believed that there is a possibility for substantial change in the European security architecture, there are some subtle signs that the situation will escalate, signs only visible in the eyes of the diplomatic protocol specialists. The paper focuses on the diplomatic protocol and its essence, the communication and public diplomacy theory and practice, and on an analysis of the most intriguing high level diplomatic events in this period that outline the relations between Russia and other states, from the perspective of the diplomatic protocol.

Key words: Russia, Ukraine, conflict, diplomatic protocol

1. INTRODUCTION

The diplomatic protocol for centuries now has been considered to be the blood flow of the organism called international relations. It has been defined as the “gold standard” in how high officials interact at ceremonies or in official contacts with one primary goal – mutual respect, and understanding between the countries in the global community.

The Diplomacy and protocol are two areas interlinked together in an unbreakable tie. The essence of protocol is actually the practice on which diplomacy stands. Protocol is a combination of good behavior and logical reasoning, with one basic goal – to create an efficient communication channel between the diplomats, and in that context it is not only science – it is art. Moreover, it is a mixture of subtle science and art in which the smallest deviations can have major impact on diplomatic relation throughout the world. Etymologically, the term “protocol” comes from the Greek term relating to marking documents. In more details, protocol comes from the word „protókollon“, a mixture of the words “protos” and “kólla” meaning first and glue, respectfully. It literally means the first glued paper (Smiljanov, 2020). Maybe the simplest definition of protocol is that it is a “set of rules for good behavior at
ceremonies and in official purposes by dignitaries and officials from the governments and nations of the world” (Smiljanov, 2021). Protocol gains its form during the old Egyptians, which in the so-called Maxims of Ptah-hotep set the basics of what protocol represents as a science and as practice. These instructions were written in 2,000 BC and they still are the oldest proof that protocol existed even two thousand years ago. The French terms „protocole diplomatieque“ and „protocole della chancellerie“ in the XIX century marked ceremonial rules during official meetings.

Although the diplomatic protocol has its roots deep in humankind history, it is important to focus on its relevance today, especially during the open conflict that burdens the European continent. In that context, considering that in diplomacy as in every other aspect of life, verbal and nonverbal communication go hand in hand, diplomats must be extremely conscious on their behavior at all times. This is very important concerning the nonverbal communication, which represents 60-70 percent of the entire communication process and includes eye movement, gesticulations, body movement, facial expressions, touch, distance etc. (Kurbija, Slavik, 2001). The percentages vary and may up to 93 percent in favor of the nonverbal communication in the entire communications process, which leads to the sole conclusion that the nonverbal communication drives the communication itself, and the verbal element only adds up to it.

As a continuation to the above mentioned, for public personas it is highly important to keep to the rules for good behavior and good manners that are part of the protocol, especially when the eye of the public is pointed at them. To note, the diplomatic protocol is apolitical, meaning that the set rules and regulations are in force no matter the country, no matter the political option, no matter if one is in power, or part of the opposition. If a politician or an official looks to build credibility, he or she must be (or look as they are) competent, calm and clear and concise. That spurs confidence in them at home and in the international relations (Deutch, 1958).

Here are some important parts of the nonverbal communication:

**Eye contact:** a primary nonverbal signal that brings strong emotional impression. If an eye contact is missing, most likely the entire communication process will come to a halt.

**Mimicry and facial expressions:** nonverbal signals that are deeply connected to our personal feelings and as a result can only be partially controlled. The strong emotional impact automates our facial expressions and turns them to a reflex that cannot be controlled (ex. Skin redness).

**Gestures and hand movements:** The movement of the hands is connected to the state of mind at the given moment and in that context it has to be connected in context of the other nonverbal and verbal elements of the communication. Looking at them alone brings the possibility of misinterpretation. As an example, the hand that touch each other may mean both stress and boredom.

**2. THE NEW GEOPOLITICAL REALITY IN EUROPE**

Russia’s geopolitical maneuvers both on a global scale and on the European continents have been analyzed extensively over the years. What is common in many of the analyses is the fact that none of the experts truly considered the possibility for an open conflict on the European continent or an open Russian aggression using conventional forces. A December 2016 European Council on Foreign Relations edition published Mark Galleotti’s analyses on the Russian diplomatic practices, named “Heavy metal diplomacy: Russia’s political use of its military in Europe since 2014”, which is focusing on the fact that “since 2014, Russia has mounted an extensive, aggressive, and multi-platform attempt to use its military and the threat of force as instruments of coercive diplomacy, intended to divide, distract, and deter Europe.
from challenging Russia’s activities in its immediate neighbourhood”.

This analyses states that there is an increasing willingness on the part of the Kremlin openly to threaten military consequences – even thermonuclear ones (Galeotti, 2016) and that was a very realistic scenario among the academia, but not among the political decision makers.

The paper also states that “Russia lacks the capacities or even a reason to launch an offensive in Europe” (Galeotti, 2016) and that the aggressive stand toward the European countries is a form of coercive diplomacy that seeks to compel certain actions and to deter others.

According to the analyses done eight years ago, there are so-called “4 Ds” behind the Russian “heavy metal diplomacy” – Divide, Distract, Dismay and Dominate. Getting into more details, the first “D” is focused on the relations between NATO and the European Union – a military – political and a political organization far more powerful than Russia itself. Sheer numbers show that in 2021, considering the crisis on the European continent, EU’s GDP totals 17.09 trillion $, while Russia totals at 1.78 trillion $. In defense spending, NATO’s defense budget has seen a continuous rise in recent years. It totaled 1.2 trillion $ in 2021, while Russia that same year spent 65.9 billion $, which is incomparable.

“Distract”, the second “D”, focuses on taking actions that can confuse the “enemy”, and one clear example is what happened in 2015, when Russian cruising missiles hit Syrian targets, while at the same time there was a spike in the fighting intensity in the region of Donbas in Ukraine.

These distractive steps alone bring out the fear that war is inevitable and that the sole quest for the diplomacy now is the search for a peaceful resolution to the differences. That may have been an element of distraction on the path of Sweden and Finland to NATO – something that now is under way (or in the phase of ratification between the 30 NATO Allies).

The Russian unpredictability and the everlasting possibility of an open conflict between Russia and the West is in the center of the Russian diplomatic strategy for decades now, and the military exercises conducted on the European East only adds to the Russian diplomatic style presented throughout the years. We have seen numerous examples of the “Diplomacy of the metal”: the series of exercises named “West”, a Russian exercise in March 2016 when 33.000 troops simulated an offense on Denmark, Finland, Norway and Sweden. The Baltic States are also in the area of interest, especially since Lithuania borders the Russian exclave of Kaliningrad. As an example, in October 2016, close to 5.000 paratroopers exercised near Pskov, close to the Russo-Estonian border, while an additional 2.500 paratroopers simulated offensive activities. In comparison, the Estonian armed forces have around 6.400 personnel.

The situation in the last months changed dramatically. It is not only the “diplomacy of the metal” Europe should be worried about, but the metal itself. Nothing is the same regarding the security architecture on the “old continent” after February 24th, and that is clear to the EU authorities, as well as to NATO. The Russian president Vladimir Putin in the morning of 24 of February announced that a “special military operation” in Ukraine is underway and that the sole goal of this special operation is to “demilitarize and denazify” Ukraine. The military capacities until then used only in the purposes of exercising and showing strength, were now entering Ukraine from many directions (Yeung, Renton, Picheta, Upright, Sangal, Vogt, Macaya and Chowdhury, 2022) all while Russian officials were adamant in their public statements that there are no Russian troops on the ground, only precision air strikes targeting military installations. The attacks were conducted on the so-called northern front from neighboring Belarus towards the Ukrainian capital Kyiv, on the northeast toward Kharkiv, in the south from previously annexed Crimea an on the southeast from Donbas. After numerous issues in the north, the Russian troops retreated from the area around Kyiv and by mid-April,
the fighting was mostly focused in the area of Donbas.

This may very well be the bare minimum on the situation unfolding in Ukraine at the moment, needed to go deeper into the diplomatic protocol and the signs that can be interpreted as a possible warning that the situation is unfolding in an unwanted direction.

3. THE PRACTICING OF THE RUSSIAN DIPLOMATIC PROTOCOL THROUGH EXAMPLES

As mentioned above, the diplomatic protocol is apolitical, and its rules are in force no matter the country, the entity, the political alignment. Having that in mind, the Russian diplomatic protocol often through not-so-subtle means shows their officials’ attitude toward their counterparts. One of the greatest examples is the finals of the World Cup in 2018, organized by Russia, when Vladimir Putin was the host of Emmanuel Macron and Kolinda Grabar – Kitarovic, the presidents of France and Croatia which teams were playing in the finals. The World Cup and especially its finals is a planetary event, grabbing the attention of billions of people from around the globe and in that sense it is the perfect place and time to showcase international politics. Grabar – Kitarovic as an experienced diplomat made a perfect presentation of her own country, but what captured the attention of the world press was not only the game itself and the president of Croatia, but the fact that there was only one umbrella and when it started to rain heavily, it was used for the Russian president. From the aspect of protocol this represents major error in judgment, but it may very well be seen from the perspective of intentionally humiliating two other highest officials and showing them “who is in charge” and what is the real opinion of them and their countries. That protocol mishap is even more interesting for the public if we take into account that it is between two major European powers, Russia and France that have a long “love and hate” relationship.

![Picture 1: The presidents of Russia, Putin, France, Macron and Croatia, Grabar – Kitarovic at the ceremony after the final match between France and Croatia, held in Russia in 2018.](https://www.express.co.uk/news/world/989248/world-cup-final-france-vs-croatia-emmanuel-macron-rain-vladimir-putin)

In terms of the Russo-Ukrainian conflict, only two weeks before the start of the open aggression, the British Secretary of State for Foreign, Commonwealth and Development Affairs, Elizabeth Truss made an official visit to Moscow, but was the witness of the crudeness of the Russian minister of foreign affairs, Sergey Lavrov. There were a couple of mishaps
throughout the visit that clearly pointed to the strong intolerance that this high ranking Russian official had toward its British counterpart. These protocol mishaps started right after Liz Truss landed at the Moscow airport, where she was greeted only by Embassy officials, but not by members of the Russian government. Later on, when Truss’s motorcade arrived at the Russian Ministry of foreign affairs, the British MFA wasn’t allowed to exit the vehicle up until it was parked away from the entrance (down the street), which made her walk over to the entrance by foot. Maybe the clearest show of power and intolerance could be seen at the joint press-conference on which after Truss pointed that minister Lavrov at the meeting said that “Russia has no plans to invade Ukraine”, Lavrov bluntly pointed that the British minister came to the meeting unprepared and that it was like “taking to a deaf man” and left the press-conference, leaving Liz Truss alone with the media.

4. THE POWER GAME BETWEEN ERDOGAN AND PUTIN BEFORE AND DURING THE WAR IN UKRAINE

As seen from the examples above, Vladimir Putin has a long history of using protocol gaffes to show his true opinion of his counterparts. That was the case with the Turkish president Recep Tayyip Erdoğan when during a visit to Moscow in 2020, was left in the hallways waiting to enter Putin’s office for two whole minutes, which is unprecedented for a high level visit as that one.
The Turkish president wasn’t amused by the long wait. He showed signs of impatience, and he even sat down before entering Putin’s office. According to Russian expert Cenk Başlamış, in an analysis for Medya Günlüğü, “only the Russians know whether the two-minute wait was an “ordinary” or a “particular” situation”. What is even more interesting is that the Turkish delegation appeared in front of a portrait of Aleksandr Suvorov, a Russian commander who fought and won battles against the Ottoman Empire. The fact is that the portrait has been hanging there for a while but what is interesting is that a reporter was directing viewers toward the portrait.

![Image of the Turkish delegation entering the hallway](https://www.duvarenglish.com/diplomacy/2020/03/10/what-is-the-significance-of-putin-making-erdogan-wait)

This behavior by Vladimir Putin is nothing new. Putin made former US Secretary of State John Kerry wait for a meeting for three hours, while former US President Barack Obama waited “only” 40 minutes. In 2014 former German Chancellor Angela Merkel waited for hours, and even the Queen of England waited (in comparison) mere 14 minutes.

After the war in Ukraine started, some tables have turned, or it may appear so by focusing on the details in protocol rules and regulations. The Russian President had to wait almost an entire minute for his Turkish counterpart before a meeting this July in Teheran, Iran. Many speculate that this is a way of paying Putin back for the meeting in Moscow in 2020, and since the media were present in the room, it can clearly be seen that Putin is not amused. If we look carefully for the nonverbals, the movement of the legs, the facial expressions and the gestures with his hands at the moment Erdoğan enters the room, we can easily see aggravation, nervousness and disbelief.

![Image of Putin waiting in Teheran](https://a1on.mk/world/video-ostaven-da-go-cheka-erdogan-najdolge-50-sekundina-putin/)

This behavior by Vladimir Putin is nothing new. Putin made former US Secretary of State John Kerry wait for a meeting for three hours, while former US President Barack Obama waited “only” 40 minutes. In 2014 former German Chancellor Angela Merkel waited for hours, and even the Queen of England waited (in comparison) mere 14 minutes.

After the war in Ukraine started, some tables have turned, or it may appear so by focusing on the details in protocol rules and regulations. The Russian President had to wait almost an entire minute for his Turkish counterpart before a meeting this July in Teheran, Iran. Many speculate that this is a way of paying Putin back for the meeting in Moscow in 2020, and since the media were present in the room, it can clearly be seen that Putin is not amused. If we look carefully for the nonverbals, the movement of the legs, the facial expressions and the gestures with his hands at the moment Erdoğan enters the room, we can easily see aggravation, nervousness and disbelief.
The National News Senior Correspondent and Adjunct Professor at George Washington University, Joyce Karam commenting on Twitter said that Putin’s long wait for Erdoğan shows how things have changed after the invasion of Ukraine and that this is the perfect “sweet revenge” after their 2020 meeting in Moscow.

5. CONCLUSION

The diplomatic protocol sets a set of rules that make international relations work. There are numerous examples of breaches of protocol, but one has to be fluent in protocol to be able to analyze whether it is just an error, or the situation sends a political message. The continuous examples of Putin’s behavior with many world leaders clearly shows that he asserts himself as the power holder in the room. The absence of a more prominent reaction on Putin’s part is a clear example that the power has shifted and that the invasion of Ukraine has lowered Moscow’s ability to project strength through the rules of the diplomatic protocol. At the same time, the last two events with the Turkish president can be easily defined as the rise of Turkey’s position in the international community, serving as a bridge between the East and the West, whilst at the same time being a full–fledged NATO member. And, all of that in front of the eyes of the public and the media that covers every movement, every gesture and handshake. It is Warren Buffet that said “it takes 20 years to build a reputation and five minutes to ruin it. If you think about that, you'll do things differently” and that applies to every public persona, including heads of state and government representing country politics in every given moment or situation.

REFERENCES


Improvisation during manufacturing mine explosive ordnance and control of precursors as an element of state security

Jovica Milicevic¹, Bojan Glamoclija², Jelena Krstic³

¹ University of Defence in Belgrade, Military Academy, Veljka Lukica-Kurjaka Street No. 33, Belgrade, Republic of Serbia, jovicamilicevic74@gmail.com
² Mine Action Centre of Republic of Serbia, Vojvode Toze 31, Belgrade, Republic of Serbia, bojan.glamoclija@czrs.gov.rs
³ Mine Action Centre of Republic of Serbia, Vojvode Toze 31, Belgrade, Republic of Serbia, jelena.krstic@czrs.gov.rs

Received: 30th August 2022
Accepted: 11th September 2022

Abstract: Contemporary society is permeated by conflicts in all segments, new warfare techniques are inevitably introduced, the goal is to keep the opposing side in a constant state of tension and readiness. Stakeholders resort to different ways of fighting, starting from conventional, through guerrilla methods and up to terrorist activities. Actions under a "false flag" as well as spontaneous terrorism are a special item. One of the points of contact of all the mentioned forms is the lack of material resources, resorting to improvisation when making explosive ordnance, needed for the realization of certain tasks. For the successful production of the mentioned means, good knowledge and the materials from which they will be made are needed. Materials that can be used to make improvised explosive devices can be found on the free market, these materials are called explosive precursors. One part of this paper deals with improvised explosive devices (IED). The second part of the paper deals with precursors and legal regulations related to the control of production and circulation of these items in the EU and the Republic of Serbia as an important element of security.

Key words: improvisation, IED, training, precursors, control

1. INTRODUCTION

Modern times, huge progress of civilization, but what is the price to pay?

The price is expressed in the spilled blood of innocent people, destroyed nature and stolen natural resources. A common example is organizing various actions for the purpose of destabilization or achieving their own goals. Instead the progress of civilization being reflected in prosperity, it is reflected in constant conflict, whether it is wars or terrorism. In order to send a message and destabilize countries or regions, explosive ordnance used very often, due to their effect on the masses. The abuse of explosive ordnance is characteristic during terrorist activities, or the execution of actions under a "false flag", in both cases it is about improvised devices manufactured in the homemade. The aim of this work is to show the possibilities for
improvisation when making IED, to indicate possible precursors, and to pay attention to the control of precursors. According to the EU Regulation, precursors are substances and mixtures that can be misused for the illicit production of explosives and that can be found on the free market (EU 2019/1148). We distinguish, ‘Restricted explosives precursor’ and ‘Regulated explosives precursor’. Restricted explosives precursor means a substance listed in Annex I that is at a concentration higher than the corresponding limit value set out in column 2 of the table in Annex I, including a mixture or another substance in which a substance listed in that Annex is present at a concentration higher than the corresponding limit value. Regulated explosives precursor means a substance listed in Annex I or II including a mixture or another substance in which a substance listed in those Annexes is present, excluding homogeneous mixtures of more than 5 ingredients in which the concentration of each substance listed in Annex I or II is below 1% w/w (EU 2019/1148).

2. IMPROVISATION DURING MANUFACTURING MINE EXPLOSIVE ORDNANCE

Due to the execution of certain tasks with the use of explosive ordnance, the problem of limited resources or the impossibility of procurement on the market or on secret channels often arises. This conditions the need for improvisations when making explosive ordnance and mines. Untrained and uneducated subjects must not be engaged in this work. That is why in some units in the military and police structures, topics related to improvised mines and booby traps are dealt with. In order to use that knowledge during armed conflicts, and in peacetime conditions to use the acquired knowledge and experience to remove improvised devices. Improvised mines and Mine explosive ordnance are ordnance that are most often made by hand on the spot or in a homemade, from the ordnance that are available at a given moment (Seckovic V, 1972). These ordnance do not have to look like formational ordnance, but they can be the same or more destructive in terms of effect. All Mine explosive ordnance in the form of mines consist of some basic parts: fuse (mechanical, chemical, electrical or electronic), a detonator, an explosive charge, and a body (or elements that will throw off the explosive). When making improvised ordnance, there is a possibility of partial use of formation ordnance and the rest is improvised, another possibility is to completely improvise all ordnance. In order to get a better picture, all elements of improvised ordnance will be processed individually.

3. FUSES

The purpose of the fuse is to provide the initial impulse when activating the explosive chain. Fuses can be distinguished according to the principle of action: mechanical, electrical, chemical and a combination of the aforementioned methods (Seckovic V, 1972). With the development of technology and techniques, the cheap acquisition of various technical devices has been facilitated, they can be used or adapted for the successful activation of explosive devices. It is known that terrorists have perfected the technique of using mobile phones as fuses when carrying out terrorist acts. In addition, various portable computers were used to make explosive devices, especially in air traffic (Stankovic V, Stojakovic G, summer 2014). Various timers, communication devices or children's toys can also be used as fuses, which opens up a wide range of cheap fuses, which cannot be traced during investigations, and also import and traffic control cannot be carried out.

4. DETONATORS

Detonators are one of the most complex parts, especially because of their sensitivity to external influences. They are most often purchased in their original form, and they are rarely made at home. It is very risky to make and install an initial explosive. The process of synthesizing these explosives is very sensitive and it is difficult to ensure safety (Maksimovic V. Petar, 1981,
For the successful production of improvised Mine explosive ordnance, the safest way is to acquire original parts, whether they are detonators or electric detonators (Skarec Zeljko, 1979), or, more rarely, nonel systems. The acquisition of these items is a criminal activity, theft from mines, quarries, military or police warehouses and factories that manufacture these items.

5. EXPLOSIVES

Explosive substances (explosives) can be defined as metastable chemical systems (compounds and mixtures), capable of changing very quickly to a more stable condition under the influence of external influences (impulses), during which a large amount of energy and gaseous products are released, which are in a position to make a work on the environment in the process of expansion (Bajic Z, 2015).

Based on their characteristics (physical-chemical, explosive) and application in practice, explosives and explosive substances are divided into (more in Bajic Z, 2015):

- initial (primary);
- high explosive (secondary);
- propellant explosives;
- pyrotechnic mixtures

Explosives of all kinds are often used to make improvised devices, some can only be mixed with other explosives, some can be synthesized at home (Maksimovic V. Petar, 1981), and some can be made from non-explosive materials, which can by at the market. (so-called ANFO explosives). Commercial explosives can also be used (Jeremic R, 2/2006), compared to military explosives, they usually have a less explosive effect, but still enough to achieve the goal. The most frequently used explosives for carrying out terrorist attacks were plastic explosives from different manufacturers, or one type of ANFO explosive composed of artificial fertilizer and fuel oil (Skarec Zeljko, 1979). How prone artificial fertilizer is to detonation under certain conditions, an example is the detonation of a large amount of ammonium nitrate-based artificial fertilizer in Beirut on 08/05/2020. (https://vvv.bbc.com/serbian). In addition to the already mentioned possibilities, explosive is possible to provide from various mines (anti-personnel mines, anti-tankmines), mortar missiles, tank or artillery missiles, aerial bombs. Especially if an armed conflict was taking place in a certain territory or in the surrounding area, the acquisition of these items is facilitated.

6. BODY OF EXPLOSIVE ORDNANCE

The body of the explosive ordnance has the task of connecting the entire assembly into one functional unit. The most common role of the body is to explode due to the action of explosives and cause losses with its pieces (shrapnel). The body can be made of plastic, steel, wood or other available materials. A special place is occupied by the vests that are made for suicide bombers, instead of the body, they have packed explosives together with metal elements that are glued directly to the explosives in order to be thrown away. If formation mines, bombs and grenades are used, they already have a body that protects the explosive, and its basic purpose is also to explode and cause losses with its pieces. Binary explosives and explosives that consist of multiple elements as a body can even use the container in which they are mixed. This is current in acts related to air traffic, it is also the reason why airlines have prohibited bringing large quantities of certain substances in hand luggage (Stankovic V, Stojakovic G, summer 2014).
Taking all of the above into account, it is clear that today's technique and technology provide favorable conditions for obtaining the components needed to make an improvised explosive device that can endanger human lives. Such devices can have two effects: firstly they can endanger the one who makes them if he is not trained enough, and secondly they can endanger the one for whom they are made. Regardless of the threat, explosive devices will continue to be a source of danger in the future. They can be used for various manipulations of the masses and creating general insecurity, as evidenced by the large number of terrorist attacks around the world. Explosives are very suitable for creating fear in people, and it is known that throughout history, fear was one of the main factors that directed the course of history. The forerunners of the terrorists saw this in time, thus Hasan ibn el Sabah (1034 - 1124), the creator of the sect of assassins, realized in time how easy it is to manipulate the frightened masses, and he based his work on that. His guiding thought and the guiding principle of all other terrorists was "Fear is effective only if it is great and if it is constant". (Simeunovic Dragan, 2009, Terorizam). This is also followed by modern terrorists, only they have much more opportunities to create such fear, development in all spheres of society has given many opportunities. The most effective way is the use of explosives, they create terrible images after the effect, which through the media very quickly get on the ether and into the subconscious of the observer. This is the reason to implement rigorous control and ensure the safety of the individual and the state.

7. ITEMS THAT CAN BE USED FOR THE MANUFACTURE OF EXPLOSIVE SUBSTANCES - PRECURSORS

It is known that explosive substances are most often complex compounds that, under certain conditions, pass from an unstable state to a stable one, releasing a large amount of heat and gases (this process is called an explosion or detonation depending on the speed of the reaction). Most explosives are obtained under strictly controlled conditions, but some can be made at home. An example is ANFO explosives, which require ammonium nitrate, coal dust and diesel fuel (Maksimovic V. Petar, 1981). All these components can be found in free market, and in principle, as long as they are not mixed in certain quantities, they do not pose a danger.

Some of the basic components for making explosives are: concentrated nitric acid, concentrated hydrochloric acid, ethanol, mercury, lead nitrate, lead acetate, concentrated acetic acid, sodium hydroxide, hexamethylenetetramine (urotropin), acetone, sodium carbonate, glycerin, ethylene glycol, phenol, ammonium nitrate, potassium chlorate, sodium chlorate (Maksimovic V. Petar, 1981). Most of these components are not intended only for making explosives, they are found in a large number of devices used in the home or in commercial activities. Elements that can be found on the free market and that can be used to make explosives and explosive devices are called explosive precursors. In the Republic of Serbia, there is currently no legislation that regulates which precursors and in what quantity are subject to reporting to the competent authorities. Partial control of the procurement and import of precursors is carried out at customs, the document that regulates the work is the Decision on establishing the national control list of dual-use goods ("Official Gazette of RS", No. 18/2018). In this way, the import and procurement of certain elements is only partially regulated.

In the European Union, due to the terrorist threat, this problem has been recognized and efforts are being made to introduce order in the trade and market of certain substances, for example, in the Republic of Croatia, petrochemistry have the task of recording to whom and in what quantity they deliver their products (Petrohemija, 13). With its Regulation (2019/1148) on the placing on the market and the use of explosive precursors, the EU gave its members guidance on how to act and what should be included in the legislation, for the best possible control of precursors and risk reduction. The annexes to the regulation contain a list of substances, in
Annex 1: List of substances that are not made available to individuals, nor can they be possessed or used as such, unless their concentration is less than or equal to the values given in the table. Any suspicious transactions or disappearance must be reported within 24 hours.

Annex 2: List of substances as such or in mixtures for which suspicious transactions or significant disappearances and thefts must be reported within 24 hours (Regulation EU 2019/1148). This Regulation regulates the procedures and obligations during control, and the member states are given the authority to form authorized bodies for the control of the traffic of precursors throughout the territory.

8. CONCLUSION

The interests of the great or the response of the weak in the eternal conflict. Acting under a "false flag", carrying out terror or committing terrorist acts have a common feature (indiscriminate action using explosive devices). Why explosive devices? The answer to that question lies in the very core of the mentioned actions, they are theatricality and a psychologically strong message, which, due to the availability of media, is very quickly transmitted over long distances and to a large number of people. Explosives leave very impressive effects by their action, and are relatively easily available from various sources. One of the sources is described in this work, an improvisation that is done in case of shortage or lack of necessary funds. Explosives can be partially or completely improvised and made on site from available resources. Most of the terrorist acts were carried out with improvised explosive devices, where explosives of the ANFO type in combination with other explosives (car bombs), as well as plastic explosives (bomber vests and bombs in air traffic) are leading the way. The methods of activating explosive devices have reached a worrying level with the progress of technology, the availability of content on the Internet opens up a new sphere, spontaneous terrorism (Simeunovic Dragan, 2009, Terrorism). Anyone can with a little effort make an improvised explosive device and use it, with more or less success.

Due to the events of the previous period and the constant threat of terrorism on its territory, the EU passed a regulation regulating the traffic of explosive precursors. Based on the regulation, member countries should harmonize their legislation for the sake of common security. In the region of the Republic of Serbia, a lot of work is also being done to adjust the legislation in order to implement the provisions of the EU Regulation. Republic of Croatia has made the most progress in its domain, they adopted Law of implementation of Legislation (EU) 2019/1148 and the market and use of precursor of explosive, and amendment Legislation (EU) 1907/2016 and out of force Legislation (EU) 98/2013 and entry into force date 03.04.2021.

Given that there were no terrorist acts carried out with explosive devices in the Republic of Serbia, and EU regulations do not have a binding character, the issue of precursors has not been elaborated in detail. Precursor traffic is partially regulated by customs regulations, but internal traffic is not regulated. The danger to security in the Republic of Serbia due to possible misuse of precursors is evident. Looking at the possibility of acquiring and using precursors, without the control of the state and authorized state bodies, the question arises when someone will abuse it. With this approach, the overall security of the Republic of Serbia is called into question. One of the solutions, considering that it is striving to enter the EU, on the basis of the EU Regulation, adapt the legislative system to the prescribed provisions and Roadmap for a sustainable solution to the illegal possession, misuse and trafficking of SALW and their Ammunition in the Western Balkans by 2024. Also, at the level of the Republic of Serbia, a body should be formed that will collect information, carry out controls and educate all participants (producers, traders and users of precursors). One of the possible authorities with territorial jurisdiction may be the Mine Action Centre of the Republic of Serbia, given that
mine action are under its jurisdiction. Given that mine action is under jurisdiction the Mine Action Centre of the Republic of Serbia, a part of the Centre could deal with prevention, and training (staff, other participants in the production, circulation and use of precursors). In this way, prevent action will be achieved and will raise awareness about all relevant data to the security of the Republic of Serbia regarding the mine explosive ordnance, whether they were left over from the conflict or there is a possibility that they could be misused. The safety of the Republic of Serbia and every one of its inhabitants is imperative, an important item in all of this is the establishment of precursor control on the entire territory.

REFERENCES

Bajic Z, 2015, Inicijalni i brizantni eksplozivi, AGM knjiga, Beograd,


Jeremic R, 2007, Eksplozije i eksplozivi, Vojnoizdavacki zavod, Beograd,

Jeremic R, 2/2006, Privredni eksplozivi i neki aspekti njihove prakticne primene, Vojnotehnicki glasnik, Beograd,


Simeunovic Dragan, 2009, Terorizam, Pravni Fakultet u Beogradu.

Stankovic V, Stojakovic G, leto 2014, Terorizam u vazdusnom prostoru, Vojno delo,

Seckovic Voislav, 1972, Improvizovane mine, Vojnoizdavacki zavod, Beograd.

Skarec Zeljko, 1979, Rusenje, Vojnoizdavacki zavod, Beograd.

https://eur-lex.europa.eu/legal-content/HR/TXT/?uri=CELEX:02019R114820190711#E0006

https://eur-lex.europa.eu/legal-content/HR/TXT/?uri=CELEX:02019R114820190711#E0006

https://petrokemija.hr/Portals/0/Dokumenti_Kompanija/OpciUvjetiProdaje01012022.pdf

https://www.bbc.com/serbian/lat/svet-53669251


https://www.zakon.hr/z/2788/Zakon-o-provedbi-Uredbe-%28EU%29-2019-1148Europskog-parlamenta
DRONE SAFETY IN U-SPACE USING DIGITAL TWINS

Tomaz Kramberger¹, Bojan Rupnik²
¹ University of Maribor – Faculty of logistics, Mariborska cesta 7, Celje, Slovenia, tomaz.kramberger@um.si
² University of Maribor – Faculty of logistics, Mariborska cesta 7, Celje, Slovenia, bojan.rupnik@um.si

Received: 22nd May 2022
Accepted: 23rd July 2022

Abstract: Although the use of drones in logistics is already close to reality, some obstacles remain unresolved. Drone technology per se is not enough, it needs to be upgraded and designed in a way that will allow a kind of drone shift, which means that it will allow the development of business models that were not possible without its upgrade. In the paper, we present a system of automatic control, management and control of drone traffic for flights over urban areas (UATM) managed in a digital twin. The system is designed according to the principles of U-Space presented in the EU Blue Book. The UATM system was designed as a digital twin of the real-life system pilot, drone and space where the digital part of the twin takes the lead and first performs a virtual mission and only later maps it into reality.

Key words: unmanned aerial vehicles, unmanned air-traffic management, digital twin, U-Space

1. INTRODUCTION

Recently, we have witnessed significant development and increasing use of drones (Unmanned Aerial Vehicles or UAVs) in many areas. The practical use of UAVs is hampered by problems that are not necessarily technical in nature and are not caused by the technology of the components involved (Gonzalez-Ra, et al., 2020). Among these challenges, the most important for us are the problems arising from the use of UAV in logistics distribution tasks, especially in the so-called "last mile" delivery.

Fast and free delivery has recently become a condition for the success of e-commerce. However, meeting this condition, which is a complex challenge, comes at a price. Deliverers must deliver to multiple addresses in multi-apartment buildings or to single-family homes in congested urban areas. Packages are available in a variety of uneven sizes and need to be delivered quickly throughout the all geographical area (Atkins, 2021).

In order to keep the price we have to pay for free fast delivery to the environment, society and the consumer as low as possible, experts and enthusiasts in the field of logistics are rapidly working in this field. They study various new business models and new technologies that enable these business models.
One of the promising technologies are drones or UAVs as we call them. Drone technology offers huge long-term potential to develop last-mile delivery. Today, however, there are still several obstacles to the day-to-day use of drones for economic purposes. There are a lot of administrative barriers, technological limitations, safety issues, and challenges in regards to public acceptance (Sharma, 2019).

As early as 2016, Wiley announced that today there are five major barriers to the use of drone systems for commercial purposes (Wiley, 2016). Despite the fact that some time has passed since then, later studies also show that there are no significant changes in this area. The study (Bhawes, et al., 2020) concludes that regulations and the threat to privacy and security are the most critical barriers to introducing drones into the logistics sector (Bhawes, et al., 2020). Therefore, the list of barriers to the use of unmanned aerial systems for commercial purposes, developed by Wiley, is still fully valid. The five main obstacles in the year 2016 according to Wiley, were the following (summarized by (Wiley, 2016)).

Spectrum of communication

Most current UAV operations are currently performed within the field of view using unlicensed radio spectrum. That won’t be enough for long. The forthcoming expansion of activities using UAVs out of sight (BVLOS) will require access to appropriate communication to transmit command signals and data to and from the aircraft.

One way to alleviate this burden is to use existing commercial wireless infrastructure and spectrum to provide command connections for most BVLOS low-altitude missions.

A patchwork of state and local regulation

For decades, there has been no doubt that sky control is solely a matter for the state and that the responsibility for regulating aircraft and air operations lies with state authorities, this is the case in the US as well as elsewhere in the world. But at a time when the use of UAV is expanding, it is necessary to think about new regulations in this area. Many city and local governments have begun to enact or consider new restrictions on where these aircraft can fly, who can fly them, and even what technical specifications they must meet.

But here the problem arises. The inconsistency of different local regulations with each other and with state ones can lead to unmanageable chaos

Rogue and irresponsible operators

A large number of commercial flights currently operated are operated without a certified operator. Even worse, it is on the side of recreational UAV users. They usually don’t even take the time to learn where they can (and can’t) fly. While most of these operators do not intend to endanger public safety, they are simply trying to shorten what they see as a laborious regulatory process. Nevertheless, the risks posed by these careless operators are important and must be taken into account.

Lack of resources of state agencies, inconsistent procedures, backlogs

Existing rules and procedures are mostly temporary substitutes that have been designed to act as a transition to the development and finalization of rules. The relatively low cost of entry and operation means that the use of UAVs will soon far exceed air operations with crew. The use of this technology will continue to grow and develop, while the relevant state agencies will continue to step on the ground, unless radical changes take place soon.
UAV Traffic Management

To date, there is still no plan in place to capture a broader consensus on how to enable and safely operate UAVs during flight in low-altitude airspace (at or below 500 feet) and, above all, out of the operator's field of vision. The lack and absence of certain “sky rules” for the use of UAVs at low altitudes increases the risk of collisions. Both between UAVs themselves, between UAVs and manned aircraft, and UAVs and property.

The development and establishment of a UAV traffic management system is urgently needed as it will enable the establishment and implementation of certain airspace rules for UAVs. The UAV traffic management system will thus be able to balance the need for national and regional security, the safe integration of UAV into the airspace and will at the same time enable the use of UAV for commercial purposes.

After reading the text above it becomes clear that the need for some sort of UAV flight control and management system was clearly expressed. It becomes clear that we cannot solve problems without focusing on all five exposed barriers at once. An incomplete approach and tackling only some of the barriers exposed cannot bring success in the desire to make the use of UAVs for commercial purposes truly possible.

Much has changed since then, but there is still no functioning system to address all of the above obstacles. However, big progress has been made by adopting European regulations EU Regulations 2019/947 and 2019/945 (The European Commission, 2019) which set out the framework for the safe operation of civil drones in the European skies. In accordance with this regulation, drone traffic management will be provided through the so-called U-space, which is a set of services deployed in the airspace where heavier drone traffic is expected, for example in urban areas.

2. CURRENT SITUATION IN THE FIELD

As we stated before, the EU answer to these challenges is so called U-Space which represents the European ecosystem of services and specific procedures designed to support safe, efficient and secure access to airspace for drone operations (Eurocontrol, 2020). The idea of U-space is designed to be able to ensure the smooth operation of drones in all possible operating environments and in all types of airspace (Single European Sky ATM Research 3 Joint Undertaking, 2017) to a Blue Book U-space will support the needs of all types of missions, concern all drone users and all drone categories. But the needs of individual missions can vary greatly. For example, filming a sporting event is not comparable to regular safety overflights. Both, however, cannot be compared to package delivery.

In the first case, a trained operator and an excellent director are needed, but there is no need for any pre-determined routes or automatic guidance. In the second case, there is already a need for a pre-prepared flight route, which is repeated cyclically, but is still static. The routine changes only in the event of an incident. In the third case, however, much more is needed. Pre-arranged flight routes are needed, but they can be constantly changing, depending on the reality in which we find ourselves at a given moment.

Urban logistics using air drones on a larger scale does not seem very credible at the moment. Drones are not energy efficient yet, as well as it is unlikely that the urban population will easily cope with the noise of air drones. But before we can solve these two problems, we need to deal with some of the more fundamental problems. The first is flying out of the operator’s field of vision. The acronym BVLOS describes this and stands for Beyond Visual Line of Sight. BVLOS is exactly what it sounds like, when your drone is in flight such that you can no longer see it.
And yet here is another problem. If we are flying in VLOS or even BVLOS we need one PIC (Pilot in Command) for every drone in the. However, this is not acceptable from a logistics point of view. Dealing with only one customer per flight is very inefficient compared to conventional delivery, where one van delivers packages to 10 or 20 customers. From a logistics point of view multiple drones on multiple missions operating by one PIC or even better multiple drones on multiple missions flying autonomously.

From this point on it is clear that some kind of automatization is needed. In order to be able to use drones efficiently for transport and logistics purposes, it is therefore necessary to enable BVLOS flights, with several drones at once, with one or, if possible, without a pilot in command.

If so far the excuse is shifting and inconsistent legislation, this is no longer the case. Regulation around the U-space allows the construction of efficient systems, the vast majority of which are up to the task.

Let’s take a closer look. A typical U-space drone mission consists of 4 consecutive stages, as follows: Preparation of the drone mission, Submission of a flight request and receipt of an acknowledgement, Execution of the flight, Mission completed.

Given that the adoption of such a system is demanding in a lengthy process, the EU Commission has planned it in several phases. These phases are also four and are timed over several years.

**Table 1: U-Space services framework**

<table>
<thead>
<tr>
<th>Phase</th>
<th>Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>U1 Foundation services</td>
<td>U1.1 e-Registration</td>
</tr>
<tr>
<td></td>
<td>U1.2 e-Identification</td>
</tr>
<tr>
<td></td>
<td>U1.3 Pre-tactical Geo-fencing</td>
</tr>
<tr>
<td>U2 Initial Services</td>
<td>U2.1 Tactical Geo-fencing</td>
</tr>
<tr>
<td></td>
<td>U2.2 Flight Planning Management</td>
</tr>
<tr>
<td></td>
<td>U2.3 Weather Information</td>
</tr>
<tr>
<td></td>
<td>U2.3 Tracking</td>
</tr>
<tr>
<td></td>
<td>U2.5 Monitoring</td>
</tr>
<tr>
<td></td>
<td>U2.6 Drone Aeronautical Information management</td>
</tr>
<tr>
<td></td>
<td>U2.7 Procedural Interface with ATC</td>
</tr>
<tr>
<td></td>
<td>U2.8 Emergency management</td>
</tr>
<tr>
<td></td>
<td>U2.9 Strategic De-confliction</td>
</tr>
<tr>
<td>U3 Advanced services</td>
<td>U3.1 Dynamic Geo-fencing</td>
</tr>
<tr>
<td></td>
<td>U3.2 Collaborative Interface with ATC</td>
</tr>
<tr>
<td></td>
<td>U3.3 Tactical De-confliction</td>
</tr>
<tr>
<td></td>
<td>U3.4 Dynamic Capacity Management</td>
</tr>
<tr>
<td>U4 Full Services</td>
<td>TBD</td>
</tr>
</tbody>
</table>

Each phase of the succession of the gradual implementation of U-space contains an additional set of services (table 1), and at the same time includes everything from the previous upgraded version of services. Each phase of the succession of the gradual implementation of U-space contains an additional set of services (ref. Table 1), and at the same time includes everything from the previous upgraded version of services.

The high-level regulation about U-space (EU 2021/664) has been in force since May 2021. However, U-space is still work-in-progress and still needs amendment by more detailed regulations. Once U-space will be fully operational it is expected to enable efficient,
automated, and safe operation of large and diverse fleets of drones. With services such as flight approvals, traffic information (on manned and unmanned aerial vehicles), remote aircraft identification, airspace management, weather updates and geographical awareness, it must at least approach, if not exceed, the safety of commercial civil aviation.

A central decision was to use a federated architecture which allow a high level of autonomy of service providers while defining precise rules and protocols for interaction between them. This is quite an opposite with the traditional monopolies of national Air Traffic Management (ATM) providers at civil aviation.

In such an imagined ecosystem, a large number of U-space service providers (USP or USSP) are expected to work together. Sometimes there should be several providers in the same area, and offer different functions, services and specializations tailored to their customer base. And then the main issue of U-space traffic safety, which is how to prevent two vehicles from occupying the same airspace at the same time, will come to the fore.

By contacting nearby USPs individual USP checks for conflicting flight plans. If such a conflict is detected the flight plan is modified until it is free of conflict. For low traffic densities, this is sufficient, but in the peaks, it gets harder to maintain a consistent view of the airspace. In a sudden increase of network latency or complete failure internet connection the USP can be detached from the others or even with the drone itself. Solving that kind of technical problems is complex, making it harder and more expensive or commercially infeasible for companies to become a USP in the first place. In that case U-space will be dominated by a very small number of financially very potent players?

Designing a next-generation air traffic management system from scratch is a really difficult task. As a result, more cycles of improvements to this new and complex technology are to be expected, but we run the risk that these cycles will be too slow or turn in the wrong direction. Thus, we run the risk of end up with a dysfunctional or overly complex and overpriced solution in which only a few big players can compete, or, similarly to civil aviation, national agencies.

We still don't know much or almost nothing about the future planned drone ecosystem. Civil aviation has needed decades of continuous development and improvement to develop the efficient and secure mechanism it uses today. A similar approach to U-space development would mean a simpler, less ambitious, less distributed design with fewer features that would be practical and commercially feasible today.

3. UATM DIGITAL TWIN

A digital twin is a virtual representation of a real-world system with the purpose of improving the performance or gain new insight. While the digital twins were first introduced in the scope of simulating and optimizing industrial system (Jones et al., 2020), its concept can be expanded beyond the initial purposes.

An unmanned air traffic management system is a necessity for ensuring safety with multiple airborne drones in a restricted area. While the planned U-space services provide guidelines for drone management, their implementation is not specifically defined. We propose a digital twin solution for management of drones that follows the U-space paradigm.

For this purpose, any real-world operations that either take place or are planned are directly translated onto the digital twin, which includes any U-space services. The digital twin must be designed in order to be able to emulate any real-world scenario and process it in virtual space first. A UATM system in this case no longer functions independently to govern specific drones, but is just a component of the digital twin. The digital twin must in this case to collect real
world data in real-time and provide an interface for the in-built UATM system. The main data that needs to be collected include:

1. Drone mission request
2. Active drone positions
3. Active drone battery status
4. Active Drone sensor activity status
5. Operator data
6. Weather information
7. Environmental status
8. Emergency service notifications

While most of the data is a requirement for the UATM within the digital twin the main advantage is that the digital twin allows forecasting of the events based on real-time data and detect or predict hazardous scenarios. The digital twin acts not only for collecting the data from the real world in case of successful simulation maps the decision into the real-world drone activities (see Figure 1).

As U-Space service providers can be multiple and allow for services of different offers to operators, compatibility of the services can be an issue, although those should be addressed through the Common Information Services (CIS), the approach via the digital twin allows testing at a level that goes beyond mere simulations. A digital twin must allow the integration of protocols and behave in a virtual environment in real-time as it would have in the real-world system.
Figure 2 displays a waypoint drone mission that is requested by the operator and approved by the digital twin UATM module. While the flight mission is taking place the drone is sending telemetry data including position, battery status among others for the UATM module to check whether the approved flight plan is being followed. In the case of a deviation from either from positional or temporal parameters, the digital twin detects a hazard and informs the operator about the situation.

The benefit of the digital twin as a virtual environment is that it enables testing the limits of the systems by allowing simulation of drone flights, hazardous events, and information flows. Within this scope, the UATM module can be tested against its maximal workload in order to analyse how many drone missions can be processed for requests, monitoring, hazard analyses, and other events. Not only can these be simulated in order to analyse the maximal workload, but using the digital twin approach, simulated events can be seamlessly integrated with real-world flights to check the behaviour of the system prior to actual events happening.

4. CONCLUSION

With the U-space paradigm is the set standard for the future development of drone activities in the European Union, the framework is set ambiguously enough to allow for various development directions, while maintain a firm direction that oversees the drone use in their current and future uses. The proposed digital twin approach allows not only a virtualized analysis of air traffic management, but through it a safe way of testing the control system themselves without the requirement to launch and operate numerous drones. Safety and security can be maximized by simulating hazardous events and observing the behaviour within the digital twin in order to identify and redeem mend systemic hazards.

REFERENCES

Atkins, E., (2021). How startups are trying to solve the notorious ‘last mile’ challenges of home deliveries. [Online] Available at: https://www.theglobeandmail.com


CAUSAL RELATIONSHIP BETWEEN SOCIAL SECURITY AND EMERGENCY SITUATIONS

Nenad Komazec¹, Aleksandar Milic², Aca Randjelovic³, Zoran Lapcevic⁴
¹ University of Defence in Belgrade, Military Academy, Veljka Lukica-Kurjaka Street No. 33, Belgrade, Republic of Serbia, nenadkomazec@yahoo.com
² University of Defence in Belgrade, Military Academy, Veljka Lukica-Kurjaka Street No. 33, Belgrade, Republic of Serbia, milickm5@gmail.com
³ University of Defence in Belgrade, Military Academy, Veljka Lukica-Kurjaka Street No. 33, Belgrade, Republic of Serbia, aca.r.0860.ar@gmail.com
⁴ Public enterprise City cleanliness, Mije Kovacevica 4, Belgrade, Serbia, zoranlapcevic7@gmail.com

Received: 10th August 2022
Accepted: 21st August 2022

Original scientific paper

Abstract: Fulfilment of existential needs has been a top priority for human since its inception. Success in achieving this is conditioned by several different factors, which in different ways and with different consequences prevented people from fulfilling their needs. The result of the action of different forces was always the same, i.e., human suffered pain. Starting from natural disasters, which he did not understand, to other people who wanted to steal his prey, the environment became more and more dangerous. Joining different groups brought certain advantages in the field of joint action, against certain dangers, but at the same time new conditions of life and realization of life's needs. In social groups, new relationships were developing, which were driven by previously unknown forces, which represented new dangers. Therefore, human no longer had individual problems, but they were raised to the social level, and with that the level of complexity of mutual relations between people increased. Human is simply forced to protect his values in order to fulfil his needs. In order to realize this, he had to create an environment in which there is no danger, that is, a safe environment. The creation of such an environment was influenced by many factors, i.e., forces in nature and social groups.

Emergency situations are a significant danger to modern society. Observed in terms of intensity or consequences, the hazards that cause them generate significant problems for society. The last decades of the 20th century are full of an increasing number of emergency situations, which significantly disrupt social security, at the local, regional and global level.

Key words: social security, emergency situations
1. ELABORATION OF THE PROBLEM

Human history is full of events, with dramatic and devastating effects, due to which he suffered negative consequences. Events and situations that threatened human survival appeared in different forms, with different intensity and characteristics. In such a situation, during his evolutionary and socio-cultural development, human tried in various ways to remove the dangers in his environment that limited and hindered him in realizing his needs. Different events worked in different ways, but one thing was common, human suffered pain and was prevented from satisfying all his needs. The troubles that befell human were unpredictable, multidimensional, without time and space limitations, and the effects were disastrous. Various efforts to prevent or at least reduce events with negative effects have resulted in different measures that people have taken to achieve a certain degree of protection. Although scientific achievements are at a very high level of development, human and his social community are still threatened by the same or similar dangers, the effects of which are multiplied from the aspect of increasing the danger capacity due to technological development and the increase in the number of inhabitants per spatial unit.

A special place in the spectrum of dangers for human society is occupied by emergency situations. Contemporary views on the security of society give a significant place to emergency situations on the scale of danger, especially if we consider the number and frequency of the phenomena they include.

2. THE CONCEPT OF SOCIAL SECURITY

Man and society are in constant temptations related to ensuring their own survival. Consequences, whether designed or real, imply human suffering. Suffering, as a rule, has effects on society as well as on the individual. However, society is in a situation to always apply certain mechanisms for its protection, while the individual does not have that privilege, because in many cases it depends on society. Precisely, due to the necessity of the authority holder agreeing on the position of whether it is necessary to act in a certain situation, the individual remains deprived of help, at least for a while. Dangers that have long-term consequences, with an impact on part or the entire society, with disruption of the normal functioning of society, cause special conditions of society, that is, crises. In crisis situations, security becomes more important. Safety becomes a priority activity. Society becomes more sensitive to the effects of various dangers and wants to protect itself from them.

2.1. Contemporary security challenges

For a long time, the concept of security has been constructed in relation to military threats. However, the progress and development of the technical and technological capabilities of the modern world, in addition to the improvement of military threats, has reached a level where non-military security threats have also increased. So that security is no longer a primary understanding of the nature of threats, but also an understanding of the way in which a security threat is shaped and manifested. This approach arose out of the need to respond to an increasing number of threats in the security sphere. Due to major political and economic changes at the end of the 20th century and an increasing number of non-military threats to security, the center of gravity is shifted from a state-centric focus to the individual and society. (Hymans, 2006)

The diversity of social, political and economic factors in the new social context cast a shadow on the primarily social character of security, due to the inevitability of its technical aspect. This fact points to a more dimensional perception of security, arising precisely from the need to interpret that security is not just a presumption of fulfilling basic life functions and the survival and action of an individual or group.
By changing the consideration of the reference object of security, there is a change in the meaning of many concepts related to security. Among the mentioned concepts is the coin of security culture, which appears in a new light in the consideration of security, and indicates behavior in the context of security. However, this phrase had its foundation before, but now it gets its full meaning by placing the individual on the pedestal of the concept of security. (Joseph Nye, 2006) The unstoppable and permanent process of reshaping security has reflected changes in the perception of the concept of security. Thus, the state is no longer the main subject of interest in the study of security science. The primary place of the state was taken over by transnational and international organizations, nations, national minorities, various professional and marginalized groups, and as the most numerous factors of security - individuals. (Joseph Nye, 2006)

In light of attempt and intention to define the content of the concept of security, the phrase challenges, risks and threats was created. The justification for the emergence of such a phrase has its roots in the complexity and multidimensionality of security as a phenomenon. Efforts to identify and learn about all the causes that lead to the appearance of danger to the value of society have led to the emergence of security challenges. With reason, because the causes of danger have a direct connection with the threat to the same values, which are found in economic, ecological, political and other phenomena. There is a correlation between challenges and threats to society's values, with challenges being a more general term, which, according to the above, refers to all phenomena, regardless of whether they have a threatening character or not. The perception of phenomena that represent challenges is the moment that determines whether a phenomenon will receive the epithet of endangerment, depending on factors, causes and possible effects. Therefore, a challenge as a phenomenon represents a value-neutral concept, until the moment of establishing correlations between phenomena, which are the subject of security consideration.

Given that security challenges directly depend on the type and characteristics of the phenomena that determine and manifest them, it can be concluded that the characteristics and mode of action of the original phenomena determine the nature of the challenges to society's security. The forms and ways of endangering society are influenced by two groups of factors: the first are those which generate, enable and develop them, and the second are those which prevent, limit and disable them. (Kekovic, 2009) The fact is that these groups of factors act divergently on phenomena, that is, they indicate that phenomena can have a positive and negative character. Positive character is reflected in the absence of danger, and negative in its presence.

2.2. Vulnerability of society

The concept of vulnerability is most prevalent in the global change literature and disaster studies communities. Vulnerability stems from poverty, exclusion, marginalization and inequity in material consumption. (Barnett, 2001) At the social level, vulnerability can be seen as the inability to avoid danger, or being uninformed about an impending threat, or such political powerlessness and poverty that you are forced to live in conditions of danger. (O Riordan, 2001)

Vulnerability gains importance in the process of assessing the danger to society or an individual. Vulnerability can refer to the characteristics of a person or group in terms of their capacity to anticipate, cope with, be resilient to, and recover from the impact of natural hazards. (Blaikie et al., 2001) This approach includes a combination of factors that determine the degree to which some level of security is at risk from individual and isolated events in nature or society. In this sense, the term is used for cases of greater vulnerability. The opposite of
vulnerability, in this case, is the term resilience. In this approach to vulnerability, a time dimension is incorporated, considering that there is damage caused to the means of livelihood, not only to life and property, and the more vulnerable groups are those who reconstruct their life needs in the most difficult way after the realization of the threat. Vulnerability is closely related to socio-economic position.

Vulnerability can hardly be measured directly, but it can be estimated by applying certain, specially developed methodologies. Given that vulnerability serves as an indicator of certain system deficiencies, it automatically implies the existence of the possibility of increasing negative capacity with an increase in the number and intensity of deficiencies. Namely, every system, by itself, tends to change the existing state, regardless of its quality at that moment. The concept of vulnerability lies between potential danger and risk. Potential danger is characterized by elements that determine its movement and change of state, from positive to negative. The mixture of vulnerabilities of each separate element determines the overall vulnerability of the system. From the above, it can be concluded that vulnerability enables a more precise and easier determination of the risk level of individual events and portfolios of events.

2.3. The environment as a security threat

Many scientists agree with the thesis that security objects are not only states threatened by military threats, but also levels above and below the state. Therefore, there is a need to look at security as a phenomenon and function from different angles. This approach is caused by the fact that in crisis situations, a large number of victims and damages occur, even though, apparently, all protective measures have been taken. Protection measures were focused mainly on protection from military threats, so the security systems in the states were developed in that direction. National security had to be revised and expanded to include resources, environment and demographic topics. (Lonergan, 2001) National security is no longer only related to combat forces and armaments. It is linked to river basins, crops, forests, genetic resources, climate and other factors that are rarely seriously considered by military experts and political leaders, all of which together can be crucial to national security.

The impact of military activities on the environment and on environmental security factors, such as shared or extraterritorial resources that require mechanisms for non-violent resolution of conflicts over resources, also plays a very important role in observing the impact on the environment.

The connection between conflicts and the environment can be observed threefold:
- deterioration of the environment (space, atmosphere, biosphere, etc.);
- environmental degradation (due to poverty, injustice, population growth, etc.) and
- environmental degradation which reinforces itself (refugees, food riots, urban violence, etc.). (Holst, 1989)

New global challenges, intensified by demographic and ecological stress, bring certain societies to worrying limits of maintaining security, and therefore can become threats to national and international security.

3. THE CONCEPT OF EMERGENCY SITUATIONS

Scientific and technological progress had very positive implications for human well-being, however, along with the positive effects, there are also a number of negative ones that sharply increase the number of accidents and negative consequences. The causes are found in various phenomena, socio-economic, natural and technical-technological. Regardless of the cause of
the phenomenon, which has been declared as a threat, it has the capacity to cause far-reaching negative consequences, both locally, regionally and globally.

3.1. Specifics of emergency situations

There is confusion related to the terminological and conceptual definition of the phrase "emergency situation". There are several phrases in use, which are used to define a situation that implies a dangerous situation and the existence of negative consequences: emergency situation, extraordinary circumstances, state of emergency, disaster, etc. (Avramovic, Mladjan, 2012). Emergency situation is often equated and perceived as a synonym for a state of emergency. Somewhere, the generic concept of emergency situation also includes an state of emergency, which has a number of peculiarities, while in other cases both terms are used quite unevenly and without sufficient demarcation in parallel, but not always with a clearly distinct definition. It is not a rare phenomenon that the state of emergency is not used as a general term, but rather defines a certain type of exceptional state, that is, emergency situation. Multiple confusions arise especially when different terms from foreign languages are tried to be transferred into the Serbian language, and a particularly big problem is caused by English terminology, which is extremely delicate and specific in this regard.

In our language are found, not only in everyday vocabulary, but also in professional literature, terms such as: extraordinary measures, extraordinary circumstances, extraordinary cases, state of emergency, extraordinary conditions, extraordinary circumstances, emergency situation, public danger, extreme urgency, necessity of defense countries, immediate danger of war, serious unrest, state of siege, armed rebellion, war, time of war, state of war, state of grave emergency, state of extreme emergency, cases of emergency, state of readiness, etc. (Ciplic, 1999)

The complexity of the problem of defining emergency situations is obvious. It can be stated that the common denominator for emergency situations is specificity, extremity, special conditions of origin and development, large negative consequences, urgency of response. The mentioned special circumstances most often represent an increased degree of danger to the life and health of people, the normal functioning of systems in the state, property, cultural values, etc. It is about circumstances caused by the influence of various factors of natural, biological, technical-technological or social nature, which require special organizational, strategic, legal, financial, material and tactical measures in order to normalize the circumstances.

Therefore, in the most general sense, an emergency situation represents the totality of special conditions and factors that occur in a certain zone as a result of an emergency event. Emergency event is a set of circumstances or events of natural, man-made or social origin, in a certain territory, which indicates a deviation from the norms and principles of normal functioning of ongoing processes or phenomena and has a significant negative effect on people, property, the economy and the environment.

According to the mentioned facts, different approaches to the classification of emergency situations exist in contemporary literature. The criteria according to which emergency situations are most often classified are:
- the type and form of emergency events, which are at the basis of given situations;
- the spread of consequences of emergency events and
- the extent and level of engagement of human and material resources and the necessity of remediation of the consequences (Nikolic, Zivkovic, 2010).
3.2. Social assumptions of emergency situations

Emergency situations, which have occurred in recent decades, have brought to the fore many issues related to the safety of people and the environment. In addition to attempts to explain emergency situations as purely natural phenomena or purely technical and technological, there are more and more authors who try to explain them through the ever-increasing disruption of the relationship between nature and human society. Such an approach is explained by obvious phenomena in the modern world, such as: the growth of settlements, migration and population concentration, increase in waste, increased consumption of electricity, uncontrolled exploitation of natural resources, etc. There have been multiple attempts to take measures to reduce the negative consequences of the aforementioned phenomena. However, the effectiveness of those measures is being questioned because it is obvious that they are not fully effective. The reason for such a state of affairs lies primarily in human's limited knowledge of phenomena. Rapid technical and technological development contributes to the increase in the well-being of human society, but at the same time it also increases the number and consequences of negative events (Nikolić, 2007). Modern society, or as it is defined in recent literature, "risk society", implies the existence of an awareness of the ever-increasing need for research and finding ways to deal with emergency situations. A large number of countries and institutions have directed their activities towards researching phenomena that cause emergency situations and possible consequences for human society. The latest researches are directed towards reflection and consideration of emergency situations through the application of the concept of sustainable development. Namely, a large number of attempts in the past, which related to the provision of assistance and response after the realization of extraordinary events, showed that such an approach has a large number of shortcomings. The results of the latest research show that it is necessary to pay more attention to planning, coordination of all factors of society and their inclusion in the implementation of measures to prevent or respond to emergency situations, as well as to minimize the consequences for the environment.

4. CONCLUSION

The accelerated pace of scientific and technological progress, socioeconomic changes, pluralism of values and newly created living conditions in the modern world create an imbalance between needs and reality in all spheres of social life. The universal goal is a free human, in a free society, who fulfills his needs without restrictions, in any place and at any time. An imbalance of this kind results in consequences that have, very often catastrophic effects on the protected values of society, and in any case lead to different types of crises, which act exactly the opposite of the universal goal. Such, now changed conditions lead to permanent instability and uncertainty. Modern society is characterized by a distinct degree of fluidity and uncertainty. A large number of new dangers, combined with existing ones, turns modern society into a risk society. Such a statement has a logical basis in the fact that there are more and more dangers created by man without intention, which are the product of technical and technological development. Human society is generally unaware of the existence and consequences of such dangers, until they are realized. A large number of accidents, and the decreasing possibilities of influencing the reduction of the consequences, called into question the existing system of "response and assistance", and opened the way for new reflections on the security aspects of society. Various experts and scientists have realized that it is not enough just to provide help to the suffering values when the accident has already happened. A very important place is given to the principle of "preparation and prevention". Security of society has acquired a new dimension, that is, it is focused on managing risks, crisis and emergency situations. The global form of impact on crises, i.e. the model of behavior, acquires a structure with the elements of: identification, planning, response and stabilization of the situation and removal of consequences. The mentioned concept places the
human being in the foreground as the highest value and the close connection of all subjects, forces and means for managing crisis and emergency situations. The management of emergency situations, as an element of social security, is gaining importance and its application is being discussed at a high level, in the United Nations. Specialized agencies of the United Nations, regional and national bodies, direct enormous energy to create a universal model of behavior and response in emergency situations. The culture of security and emergency preparedness becomes a strategic principle at the world, regional and national level. Raising the security culture becomes the basis for thinking about a society ready for emergency situations, but also prepared for quick and proper response to emergency situations. Creating a safe and healthy environment implies permanent learning from crises and an organizational climate that promotes learning and motivates participation in security activities. This fact justifies the demands of society and the scientific and professional public that the security of society, materialized in the security system, be arranged on a new basis, where man will be in the foreground as the highest value.

The transformation of the traditional function of fighting against emergency situations into a modern role of public management related to the entire life of the social community implies the existence of knowledge, skills and abilities that are in the function of realizing new goals and tasks based on assessments of the threat of society and the state from emergency situations. Emergency management systems reflect the social and economic conditions and frameworks within which they function, which generates different approaches to solving this problem and different management systems. However, the main goal of the emergency management system is the development of preventive measures and activities, both in the integral security system and in the emergency management system.

REFERENCES

Avramovic, D., Mladjan, D. (2012), State of emergency and emergency situation-comparative, terminological and substantive aspects, from the project "Development of institutional capacities, standards and procedures for combating organized crime and terrorism in conditions of international integration". (No. 179045).


Military Lexicon, (1981), VIZ, Belgrade,


Nicic, B., Gostovic, D., Rajkovic, T., Ilic, I., (2007), Plan 985 - draft plan for treatment in mass accidents, Faculty of Occupational Safety, Nis


THE SUBJECT OF MILITARY SCIENCES IN THE SPECTRUM OF MODERN CRISES

Nenad Komazec¹, Svetislav Soskic²
1 University of Defence in Belgrade, Military Academy, Veljka Lukica-Kurjaka Street No. 33, Belgrade, Republic of Serbia, nenadkomazec@yahoo.com
2 University of Defence in Belgrade, Military Academy, Veljka Lukica-Kurjaka Street No. 33, Belgrade, Republic of Serbia, cacaksole@yahoo.com

Received: 27th August 2022
Accepted: 12th September 2022

Abstract: Military sciences have formally become an integral part of the review of scientific fields in the Republic of Serbia. Military activity is created by organizing the protection of human communities and practically represents the first organized human activity. In the Republic of Serbia, military sciences have long been in the scientific community and occupy an important place. Although scientific activity related to defence activity in the Republic of Serbia has been very pronounced since ancient times, scientists in the defence system had to find their way and classify the results of their research into other, then existing, scientific fields. The world and society, in which scientific research related to defence activities should be carried out, has changed a lot, which also has an impact on the constituents of military science. The paper examines the problem of the subject of military sciences modernity in relation to the current view that it is armed struggle (according to some authors it is also war, defense activity, etc.), that is, the reality that armed struggle cannot be viewed as an isolated phenomenon in relation to the environment. The new reality is crises, multi-polar, multi-causal, multi-consequential and multi-causal conditions in which war and armed struggle are just one drop. The presented views of the author, obtained from the analysis of the existing literature, represent a review of the key arguments and conclusions. The reaction of the scientific public to an innovative and out-of-the-box approach to determining the subject of military science will determine the direction and intensity of further research, that is, contribute to reducing the existing gap in views on the subject of military science.

The goal of the paper is not the analysis and elaboration of the approach to defining the subject of military science by the authors at the world level (this will be the subject of future research and the proof of this hypothesis), but rather a reasonable attention to the approach of domestic authors. Namely, the imposition of “armed combat” as a subject of military sciences made sense, until the emergence of hybrid warfare. With the emergence of hybrid war, the armed struggle becomes only part of the spectrum of the resulting crisis, and military capacities are engaged precisely in such an environment.

Key words: military sciences, subject of military sciences, crises, crisis management
1. INTRODUCTION

The controversy over the name and nature of the science(s) that would investigate phenomena related to military activity ended with the adoption of the official name "military science" and its inclusion in the list of scientific fields in the Republic of Serbia. It is very late, but the reality is like that. The question arises as to how much has been missed in the research of phenomena that have an impact on military activity and what are the implications for the defence capability of the Republic of Serbia.

Bearing in mind that a large number of patents, inventions and solutions in various areas of social life were generated in military research, and that the army was the driver of social development, it is interesting that all this happened under the aegis of other sciences. Will the military researchers manage to find their place in the scientific community, researching within the military sciences, bearing in mind that the subject of military sciences is not yet agreed upon among different authors. If this problem is viewed in the spirit of the fact that until the moment of establishment of military sciences, there was no "formal" scientific field that dealt with military topics, the amount of research results is very small. On the other hand, it is an undeniable fact that there is a huge fund of knowledge, created by the research of phenomena related to military activity, which can mean that it is only a lack of formalism.

Many authors believe that war and armed struggle are the subject of military science research. In parallel with that attitude, a number of authors view war as a broader and more complex social phenomenon, so they believe that it is not only a subject of research from the aspect of military participation. Whereas, armed struggle, i.e. armed conflicts, is something that is unique only to the army, and can be investigated by "primary military disciplines such as: tactics, operations, strategy, leadership and command, military logistics and methodology of military sciences" (Blagojevic et al., 2019). Other forces that are not "military" (police, volunteers, etc.) participate in "combat operations" within the framework of the armed struggle (police, volunteers, etc.), which do not have knowledge of these disciplines, and which are under military command.

The fact is that engagement of military capacities, in modern society, is not only aimed at the performance of combat operations, as the materialization of armed struggle, but at a much wider range of phenomena that are directly or indirectly included in the environment in which armed struggle is conducted. Also, the army does not carry out all its activities in military operations. Military operations are the primary way of engaging military capacities in different conditions of the operational environment. The complexity of phenomena in the modern operational environment, of military formations, corresponds to the definition of a state known and accepted as "crisis". The decision-making of military commanders is not only related to the execution of combat tasks, as if they happen in a vacuum, but monitoring, evaluation and decision-making, taking into account the spectrum of different phenomena in the operational environment.

The approach to the observation of the subject of military science, in this work, is based on the results of the multi-decade development of the defence system of the Republic of Serbia, in conditions when there was no formal "military science", but the research results were based on the postulates of other scientific disciplines. The result of that work is the existing quantum of knowledge about affairs in the field of defence and the defence system of the Republic of Serbia as the materialization of that knowledge.

2. MODERN CRISES

Elaboration of the assumption that modern crises are the basis for defining the subject of military sciences will be based on the modern definition of crisis, given by a group of authors...
led by Paul t Hart, that a crisis represents "a serious threat to the basic structure or fundamental values and norms of a system that under time pressure and highly uncertain circumstances require making vital decisions" (Paul t Hart et al., 2001). The above definition has its advantages and disadvantages, but it shows the essence of the situation we call "crisis". Bearing in mind the above definition, three characteristics are distinguished, which determine the character of actions in crisis situations: threat, urgency of response and uncertainty. These characteristics are also hallmarks of the operational environment in which military capabilities are engaged.

Modern crises represent ambivalent and dialectical states. The ambivalence of the crisis is reflected in the feeling and reality of success and failure, destruction and reconstruction, simplicity and complexity of the situation. Ambivalence has a significant impact on the perception of decision-makers in military formations, which can have implications for the success or failure of a military operation. In addition, the dialectical character of the crisis points to the existence of an opportunity and a threat. The very concept of the crisis points to a negativist approach, i.e. negative effects on military capacities and the values they protect. In essence, most of the effects of crises are like that, but opportunities are also created in parallel, the materialization of which depends on the degree of knowledge of the situation and the ability of military commanders to notice them. The crisis calls into question the basic values in the operational environment, the ways and methods of organization and realization of the set goals, it affects the organization of the forces necessary for the execution of the military operation. In such conditions, the crisis can have an impact on the military forces that will lead to the impossibility of realizing the set goals or be the initiator of new solutions for the situations that have arisen. The area of cohesion of ambivalent characteristics and dialectics can best be seen in the unity of the subjective perception of crisis attributes and the objective assessment of the state of the environment. Considering that environment for engagement of military capacities has precisely such characteristics, it is unequivocally clear that the knowledge of military decision-makers must be elevated above the phrase "armed struggle".

According to Holsti, there are four levels of crisis analysis: state level, organizational level, group level and individual level (Holsti, 2002). All four levels are characteristic and affect the execution of military operations. The responsibility of the military commander is to make assessments in all four levels, balance threats and opportunities, and make decisions that will ensure the execution of the set goals. The analysis of the factors and conditions for the engagement of military forces, therefore, implies a wide range of needs for considering the factors of the operational environment, which does not limit military operations only to the use of weapons and the execution of combat operations in armed conflicts. The engagement of military forces requires knowledge, analysis and decision-making in crisis conditions, with a very wide range of phenomena that affect the engaged capacities.

In addition to the elaborate reasons for engaging in armed conflicts, it is necessary to mention that the engagement of military capacities is carried out in different situations that represent a form of crisis situations, but with a more specific object of action. These are certainly emergency situations and the execution of peace-making tasks. Both groups have crisis prerogatives, but they are focused on more concrete phenomena.

The aforementioned elaboration of the concept and character of modern crises indicates that military sciences must include the research of all phenomena that have essential importance for the engagement of military capacities. It is evident that "crisis management" as a scientific discipline of management cannot be omitted from the list of disciplines that determine the subject of military sciences. This attitude supports the fact that the term "management" in the modern practice of defence activity in the Republic of Serbia has received a negative status
and is therefore "bypassed" at every opportunity. Which, on the other hand, implies the assumption that the subject of military sciences will be developed and defined in the future without the elaboration of management postulates applicable to military activity.

3. MILITARY ACTIVITY AND SCIENCE

It is impossible to develop, in a systematic way, sustainable military capacities without the existence of systematic military science. The development and use of military capacities in the Republic of Serbia are based on various normative documents. Maybe some authors will consider it unacceptable to base the argument on the observation and basing of the problem of defining the subjects of military sciences from the aspect of normative documents analysis. But wasn't that the case until the moment when "military science" was declared a scientific field, so the development of military capacities was based on normative regulations, without the support of the parent scientific field. In addition, normative documents are executive in nature and without them it is not possible to carry out even the best scientific research, which confirms the assumption that the analysis of the influence of normative documents on the development of "military science" or "military sciences" is of crucial importance for proving the true nature of the phenomena that are researched in the field of military sciences.

In order to elaborate the problem of engagement of military capacities in the Republic of Serbia, three documents were subjected to analysis: the national security strategy, the defence doctrine and the Instruction for operational planning and work of commands in the Serbian Armed Forces. By analyzing these three documents, essential characteristics can be shown, which prove that the spectrum of phenomena and conditions for the engagement of military capacities is based on much broader foundations than phenomena such as "armed struggle".

The National Security Strategy of the Republic of Serbia (Official Gazette No. 94/2019) is the highest strategic document of the state, which determines the strategic framework of its security. Aimed at protecting the national values and interests of the Republic of Serbia from the challenges of risks and security threats in all areas of social life, it represents the broadest basis for identifying, analyzing and responding to various "crises" and sizing the national security system in relation to the environment.

The Defence Strategy of the Republic of Serbia (Official Gazette No. 94/2019) is the highest doctrinal document aimed at realizing the defence interests of the Republic of Serbia. Challenges risks and threats to the defence system of the Republic of Serbia, observed in the broadest form, at the local, regional and global level, where "the complexity and dynamics of international relations, international security integration, the increase in unpredictability and instability in the world" apostrophes as the basic features of the security environment of the Republic of Serbia. It is precisely these characteristics which indicate that these are the characteristics of crises. Defence doctrine divides the defence system into military defence and civil defence in conditions of peace, state of emergency and war in relation to the widest range of challenges, risks and threats. A number of authors will oppose the analysis of doctrinal positions in the function of scientific analysis, but this is precisely the proof that the existing solutions are based on some past research, and the foundations of the development of military sciences are practically based on the solutions of that time. In order to avoid a similar trap in the future, the conclusions from this analysis are very significant.

The Law on the Army (Official Gazette No. 116/07 with amendments) materializes and specifies the engagement of military capacities in various conditions. On the basis of the Law on the Army, "instructions for operational planning and work of commands in the Serbian Army" were prepared as a basic document for planning operations during the preparation and execution of the Army's missions and tasks. This document explicitly links the planning
process to "crises". This fact indicates that armed conflicts as a phenomenon or set of circumstances in a certain environment are not only related to the engagement of military capacities in order to carry out combat operations. The instruction itself envisages planning the engagement of military capacities in various non-combat operations, which represents a specific environment. The conclusion can be drawn from the above that military capacities can be engaged in different situations, which do not have to be characterized as "combat operations" and do not have to include the use of weapons. Perhaps it is not usual, that legal solutions (and all that arise from them) are used as arguments to prove facts, which can have an impact on the subject of science. It is a fact that the system of defence activities of the Republic of Serbia is being developed based on those solutions, which may indicate that it is developing in the right or wrong direction. In the end, if these solutions are the result of scientific research, then it is unequivocally clear that the subject of military science is not determined in a proper way. On the other hand, if they are not, then they should be subjected to scientific criticism and re-examination.

From the presented facts, it can be concluded that military activities are not only activities with armed attributes. Even, bearing in mind the determinations in the analyzed documents, the use of weapons represents the smallest part of the total activities of the defence system. The spectrum of phenomena that must be subjected to scientific research is wider than the use of weapons in armed conflicts. The authenticity of military activity also requires an authentic scientific discipline, which can reliably investigate the phenomena inherent in it within realistic frameworks. It is unequivocal that military science has a developed theory, subject, language and method, as constituents that make it an authentic scientific discipline. Considering that the theory, language and method of military science are sufficiently developed to have a minimum preference for authenticity, the subject of military science is elaborated in the following text. This constituency was singled out, because the previous approaches of the authors who were involved in its elaboration did not realistically cover all areas of engagement of military capacities. In such a way, the subject of military sciences is narrowed, and it seems disproportionate in relation to the reality of phenomena that affect the engagement of military capacities.

4. SUBJECT OF MILITARY SCIENCES

There are different understandings in modern military theory about the quantum of phenomena that are the subject of military science research. The majority of authors support the opinion that the subject is covered by the phrase "armed struggle". The very term "armed" limits the subject of research to situations in which weapons are used in the engagement of military capacities. The specifics of phenomena that characterize the environment in which military capacities are engaged go beyond the framework defined by "armed struggle". The term "struggle" in this case has a key meaning and indicates that the engagement of military capacities is carried out in specific conditions, where in addition to the use of weapons, a number of phenomena occur that have a decisive or secondary impact on the engaged military capacities in a given environment. The use of different weapons certainly has a decisive influence and this is a primary phenomenon in the subject of military sciences. However, secondary phenomena can be: climate changes, migrations, diseases, natural disasters, rebellions, terrorism, etc., viewed from the security aspect, which can significantly affect the engagement of military forces, and thus call into question the realization of the set goals. In addition to the above, military capacities are engaged in special activities related to maintaining peace in the world, i.e. peacekeeping operations. In peacekeeping operations, they are exposed to special challenges: political, economic, ecological, security, religious, etc., which tempts them to make decisions according to the knowledge they have in relation to the situation.
The above argumentation indicates that the subject of military science is not only armed struggle, but also various crises and crisis situations, which have an impact on the engagement of military capacities, that is, on decision-making in order to prevent or respond to crises. In practice, this conclusion is based on the fact that doctoral dissertations and projects implemented in the Ministry of Defence cover phenomena that are much broader than armed struggle. Of course, elaboration can be taken into account, prof. Sakana, that armed struggle includes all phenomena that accompany it, which is not in dispute, but it is obvious that in practice this is not the case. In such a way, space is left for subjectivism and generalism, which leads to the possibility of using "formal power" in order to determine what is, and what is not, a phenomenon covered by the subject of military sciences.

If the reality is accepted that the subject of military science must be defined more broadly than armed struggle, space is opened for the application of a greater number of methods for researching phenomena, that is, a complex of methods that provides more relevant research results. In the light of the above arguments, starting from the generally accepted definition that the subject of science is "the area of social reality to which the statements of a given science refer”, the subject of military sciences should be harmonized with the reality that characterizes the engagement of military capacities. The formulation that would correspond to the reality of military capacities engagement, and determine the subject of military sciences, should include crisis situations that contain armed conflicts and other types of impact on values for the protection of which military capacities are developed and engaged.

The subject of military sciences, defined in this way, gives researchers the breadth of various phenomena that affect the process of military capacities engagement, respecting the causality, complexity and reality of the environment. Therefore, everything that was learned in crises (crisis situations) through the process of thought-cognitive activities of people participating in those processes, and elaborated as knowledge, and serves as a basis for improving the practice of engaging military capacities in different situations, improves and makes the theory of military sciences more realistic. Armed struggle, in this case, remains a part of the subject of military sciences and constitutes a very important part of it, but it also finds its place in the real environment, as part of crises in which military capacities are engaged.

The presented approach to defining the subject of military science can serve as an argument for advocates of war as a subject of military sciences. As the war represents the ultimate outcome of the failed application of all other instruments used to solve "problems" between states, in the form of a multidimensional conflict, it is clear that, nevertheless, it represents a situation that has all the hallmarks of crisis. Of course, the dimensions of the war conflict may coincide with the dimensions of the resulting crisis, but this only indicates that the crisis is of a procedural nature, and that it develops from a "small" event to a situation with catastrophic consequences.

5. CONCLUSION

The importance of military science as an authentic scientific discipline is indisputable in the Republic of Serbia. It is obvious that the definition of the subject of military sciences is yet to be seriously debated. The subject of military sciences is of supreme importance for determination of other constituents of military sciences, i.e. for their development in relation to the existing state of definition. One gets the impression that the existing subject of military sciences, "armed struggle", has introduced researchers in this scientific field into a comfort zone, so their thoughts do not go beyond that limit. However, reality is the best indicator of the need to define the breadth and scope of phenomena that affect the engagement of military capacities in different situations.
The research of phenomena important for military sciences must be differentiated according to certain primary disciplines. In the existing opus, the primary disciplines are: strategy, tactics and operations, and leadership and command. Blagojevic and others propose a somewhat broader list of primary disciplines and add military logistics and the methodology of military sciences, which is methodologically correct. However, recognizing the fact that the subject of military science must be defined more broadly than the existing one focused on "armed struggle" implies the need to review the existing disciplines and add new ones that would include the subject of military science. The argument for this claim is found in the fact that the specificity of military science has its foundations in the activity of the army. That is completely true, but a new question opens up, whether the scope of military science subjects can be included in the proposed primary disciplines, or whether it is necessary to expand the list of disciplines.

Observing military activities in the spectrum of "modern crises" significantly changes the perception of the subject of military sciences. In this way, military sciences create a platform for understanding the realities in which military capacities are deployed. The subject of military sciences, defined on the basis of the concept of "crisis", enables a true confrontation with what the army does in reality. The basic activity in military activity is “making decisions” in conditions of lack of time, incomplete information and pressure, as well as preparation, in the broadest sense, for making decisions. In military practice, this process is known as commanding. Therefore, the purpose of command, inherent in military systems, is the successful resolution of crisis situations.

Elaboration of the problem of military science subjects in the spectrum of contemporary crises opens the issue of additional definition of the military science constituents. It is indisputable that military sciences have an important place in the development of military activity and the activity of society in general. The complexity of military activity raises it to the very top of importance in the system of social activity. Therefore, it is necessary to define the subject of military sciences in this light, so as not to lose the character of complexity, and to maintain specificity in relation to all other sciences.

As a final point from the previous analysis, it can be concluded that military sciences should identify the strategic, operational, tactical, political, economic, psychological, social and technological elements of the operational environment necessary to maintain the relative advantage of military power in order to increase the possibility of realizing the set goals directed towards the development of optimal capabilities in peace (as a preventive option) or victory in war.

REFERENCES


Defence Strategy of the Republic of Serbia, Official Gazette No. 94-2019


Herfried Münkler. (2015) Hybrid Wars: The Dissolution of the Binary Order of War and Peace, and Its Consequences, Ethics and Armed Forces,


Instructions for operational planning and work of commands in the Serbian Armed Forces, General Staff VS, Belgrade, 2017.


Karovic, S., Zupac, G., Ristic, V. (2011) Military management - scientific discipline of management and business sciences or defence science, Vojno delo 63, pp. 251-261, Belgrade

Marcek, J., Kovac, M. (2011), System of defence sciences and their place in the system of sciences in society, Zbornik. Defence Sciences, Military Academy, Belgrade, pp. 21-47

National Security Strategy of the Republic of Serbia, Official Gazette No. 94-2019


THE GLOBAL CHALLENGE OF TERRORISM DURING COVID-19

Srdjan Zgonjanin¹, Hatidza Berisa², Milan Miljkovic³

¹ University of Defence in Belgrade, National Defense School, Veljka Lukica-Kurjaka Street No. 1, Belgrade, Republic of Serbia, strategija@va.mod.gov.rs
² University of Defence in Belgrade, National Defense School, Veljka Lukica-Kurjaka Street No. 1, Belgrade, Republic of Serbia, hatidza.berisa@mod.gov.rs
³ University of Defence in Belgrade, National Defense School, Veljka Lukica-Kurjaka Street No. 1, Belgrade, Republic of Serbia, milanmiljkovic04011@gmail.com

Received: 10th August 2022
Accepted: 28th August 2022

Professional paper

Abstract: The statement that there is no single definition for such a monster, terrorist organization called terrorism sounds not only as a cliché, but also as an alibi for not engaging in certain spheres of exploration and penetration into the essence of this phenomenon. Staying on the surface, do not bother and do not try to delve into the depths of terrorism, means not knowing the complexity of matter, and therefore making the wrong conclusions at the root of a particular phenomenon. That is why the new challenges that appeared, terrorism applies them in its own way, and that is why number of questions are being asked about how terrorist organizations behaved during the time of COVID-19.

COVID-19 virus or biological weapon? Is it terrorist act or selective killer? What is behind this new treat? These and much more questions go through our heads when we hear for this new invisible thing, called SARS-CoV-2 virus and COVID-19 disease. It seems everything vanished when COVID-19 pandemic started this January 2020. Terrorism and other threats just went away. Many people even did not realize that it happened so.

Many governments, governmental and non-governmental organizations fighting global terrorism and at the forefront of all the world’s media houses, have suddenly disappeared from public life.

Key words: terrorism, COVID-19, treat, control

1. INTRODUCTION

Looking back at the acts we should leave to future generations, we simply realize that the progress and development of humanity has had, and has, a high cost. Disrespecting nature and its laws, man endangered his survival on the planet, or more precisely, endangered the planet itself. Sometimes, nature remind us of the power it possesses and strikes hard enough to be able to take on the scale of a catastrophe, but apart from such a force, it is no less important than the artificially evoked one that descends from that same man who seeks more, further,
and who does not look before him and what he treads on. The price for the latter is the suffocation in greed, which puts those same people on the opposite side to be feared.

„The outbreak of the COVID-19 pandemic in February 2020 arguably created the greatest global security challenge since 1945. Faced with this unanticipated threat, scholars and practitioners from the security and counterterrorism fields have struggled to understand and assess the impact of the pandemic on global and domestic terrorism“(https://www.cranfield.ac.uk/press/news-2020).

Namely, without the influence of nature, man has created many conditions for the emergence of artificial, caused disasters, among which is one such as terrorism. The development of technology, which is not always or has not always been so safe and secure, has a continuing negative impact on people, even if the technological processes take place in the intended course. By deliberate human action occurs the event of unexpected or unpredictable consequences in these processes where the end result can be a different one or more human victim. What we are talking about here is the victim of terrorism, caused in a crazy way without any meaning, viewed from a peaceful human side and without any need.

The pandemic has not only exposed social inequities and structural challenges but also provided an avenue for those inequities and challenges to be exploited by terrorists and their affiliates. The report concludes that the counter-terrorism community should seek to address the threats of terrorism and violent extremism in a post-pandemic world based on the principles of cooperation, shared responsibility, and enhanced multilateralism. Existing policies and measures should therefore be adapted in order to ensure an adequate response to evolving challenges (https://undocs.org/S/2020). CTED will continue to assess and analyse the impact of COVID-19 on the evolving terrorist threat, counter-terrorism responses, and other emerging issues and challenges, through engagement and consultations with its partners.

2. CHALLENGES OF THE PANDEMIC TO TERRORIST THREATS

For unusual reasons, the COVID-19 pandemic has been reduced to focus just on intelligence and the fight against terrorist threats, including less prevention of violent extremism and radicalization. In addition, terrorist organizations have not made or have been heard (without statements) since the COVID-19 pandemic started. Does a pandemic potentially change the strategy and mindset of a terrorist organization or terrorist personality?

A new report authored by Pool Re and Cranfield University’s Andrew Silke, Professor of Terrorism, Risk and Resilience, reveals how the COVID-19 pandemic is already having a significant impact on terrorism around the world (https://en.wikipedia.org/wiki/List_of_terrorist_incidents_in_2019).

The report, „COVID-19 and terrorism: assessing the short-and long-term impact” reveals:

- There is a mixed picture on the level of attacks in the short-term – lockdown measures will tend to inhibit attacks but terrorist propaganda calling for attacks (while authorities are distracted, etc.) will incite some incidents.

- Much propaganda – and particularly that connected to far-right extremism – is focusing on conspiracy theories connected to COVID-19 and this has already inspired plots and attacks.

- Islamist extremist propaganda is focusing more on the vulnerability of government opponents distracted by the pandemic and the opportunity this presents for attacks.

- There is a significant current increase in online extremist activity, raising the risk of increasing short-to-medium term radicalization.
- There are strong long-term concerns that states weakened by the serious economic consequences of the pandemic will be more vulnerable to the emergence/resurgence of terrorist groups in many parts of the world.

In COVID’s shadow, global terrorism goes quiet. But we have seen this before, and should be wary. Every news is obsessed with COVID-19 pandemic information. As we have seen no extra news about global security or counter terrorism measurements.

In this pandemic time, we can see good news about terrorism as well. The curve of international terrorist attacks has been flattened. This year, till now, we experienced “just” 26 terrorist attacks all over the World. In comparison with the year 2019, when 73 attacks occurred, it is clearly visible that COVID-19 has great impact to the global terrorism also (https://www.brookings.edu/blog/order-from-chaos/2020).

But we have seen that before. The attacks of 11 September 2001 were followed by a wave of attacks around the World. For example, Bali in October 2002. Casablanca, Istanbul, Jakarta and Riyadh in 2003. Then we saw attack in Madrid in March 2004, followed by Khobar in May and London in July 2005 and Bali in October. At this point I did not mention many other attacks in the Middle East and West Asia.

Since 2005 al-Qaeda has been prevented from carrying out major attacks in western capitals, with the exception of the Charlie Hebdo shooting in Paris in January 2015.

As we can conclude, here terrorist attacks do not stop. Many terrorist groups tried to destroy major capitols, countries, innocent lives and they tried to make great propaganda for them. Do not forget that even Europe has registered 57 very dangerous individuals and 47 groups or entities inside the EU (data from 2019) (https://www.un.org/sc/ctc/wp-content/uploads/2020).

Just for clearer picture, see below (figure 1) all kind of terrorist attacks in comparison of 2017 and 2019:

**Figure 1.** Most active perpetrator groups worldwide in 2019, based on number of attacks

*Source: (www.statista.com)*
If we closely look at one very big terrorist attack, like about the Easter bombings in Sri Lanka last year, it is very obvious that we can fail to identify new threat, because we have focus on the other issue. On Easter Sunday (21 April 2019), suicide bombers killed at least 253 people and injured some 500 at churches and top-end hotels across Sri Lanka. Sri Lankan authorities said they believed a little-known local militant Islamist group known as National Thowheed Jamath (NTJ) was to blame. The government admitted a "major intelligence lapse" after it was revealed that an Indian intelligence warning from the beginning of the month about planned attacks was not properly shared by the authorities. Security services had been monitoring the NTJ (National Thowheeth Jama'ath – National Monotheism Organization), but the prime minister and the cabinet were not warned, ministers said.

Most governments invested huge sums in antiterrorism organizations after 9/11, but as history shows, humans find new way of self-destructing. The entire World has faced a persistent threat from terrorism mostly over the past decade, with recent attacks focusing on busy public spaces.

3. TERRORIST THREATS DURING THE COVID-19 PANDEMIC

The pandemic has allowed terrorist recruiters and extremists to exploit financial, health and personal concerns opportunistically to advance their own movement and ideology all while using propaganda to reinforce power and influence, and fuel division to further a loss of trust in governance and state authority. Violent extremists have continued to utilize low-tech, low-cost tactics such as improvised explosive devices (IEDs), shooting attacks and vehicle ramming that often defy detection and disruption.

Domestic threat is also in the States. The COVID-19 (https://www.controlrisks.com/riskmap) started new tensions. When people must stay at home it seems like very abusive situation. It is the reason why people raised against the government. As a rule, the wrong rhetoric of the local government has very negative consequences. Recall that the U.S. government made fun of people and the virus. But when the matter got worse and people started dying, however, it was a problem as the population resisted by force. People became violent as the measures began to intensify. Any ban leads to rebellion. In the case of the US, however, the problem is much bigger, as there are extremely violent and brutal minority groups that in no way follow the security authorities (Simcox, 2020). These violent groups can be considered terrorist organizations because of the threat they pose to society. These groups are very well organized and are willing to act in accordance with their plan and understanding of it.

The Chicago Police Department said that domestic-violence-related calls increased 12 percent during a period from the start of the year through mid-April, compared with the same time period in 2019. In other cities, including Los Angeles and New York, the police have seen a drop in calls, but the authorities have said they believed that victims were in such close quarters with their abusers that they were unable to call the police which was published in daily newspaper New York Times (Ackerman, Peterson, 2020).

Anyway COVID-19 pandemic had reduced opportunities for terrorism. The lockdown had seen all over the World high streets and public spaces almost deserted, with most non-essential businesses forced to close, lowering the number of potential terrorist targets.

While lockdown is getting relaxed, danger for terrorist attack rises. People come out to public spaces again, which is very interesting for terrorists. They access more victims at the short period of time. Most of countries have recovery strategy, but they forgot on security. Recovery strategies mention redesigning public spaces to make them “secure”, but only focus on the risk of the COVID-19 virus itself. Security also needs to take into consideration the threat posed by terrorism.
Rather than relying on improvised explosive devices or firearms, recent terror attacks have often been “low-tech”, requiring very little planning and featuring weapons that are easily accessible. For example, vehicles were used as weapons by driving them into crowded spaces in attacks in London, Barcelona, Berlin and Nice over the past few years. Media and social networks also negatively affected the spread of the CHOVID pandemic, and terrorist organizations used it to strengthen their ranks and what can be expected of their actions.

The challenges of disrupting terrorist plots involving vehicles are considerable. Vehicles are common, inexpensive to obtain and easy to maneuver towards crowds. This attack method is likely to pose the greatest threat during the COVID-19 recovery.

The COVID-19 pandemic has triggered the deepest global recession in eighty years and the global economy is expected to lose $8.5 trillion in output over the next two years. The economic fallout will be especially devastating to countries in the developing world and those dependent on oil revenue - characteristics of many Western counterterrorism partners in Africa, the Middle East, and South Asia (https://eur-lex.europa.eu/). Developing economies are already saddled with fiscal deficits and high levels of public debt, while oil-producing states have suffered a collapse of oil demand and prices. (Berisa, 2019)

Most developed countries have already severely reduced the budget for counter-terrorism operations and redirected money to tackle the so-called COVID-19 pandemic. In some cases, direct medical costs treating patients infected with COVID-19 virus and preventing disease reached millions of dollars or euros and these numbers are still rising. This means that counter-terrorism budget cannot get enough money and proper military training are already declining. The sum of all these effects will result in a big drop down of counter-terrorism capabilities, which will allow terrorists to spread their influence and cause more actions. The pandemic, however, offers new opportunities for terrorists and poses distinct challenges for the governments that seek to combat them.

While the coronavirus has put the international community in the crosshairs of a crisis like no other since the founding of the United Nations 75 years ago, António Guterres noted that “like the virus, terrorism does not respect national borders” (https://news.un.org/en/story/2020).

Regardless of the borders, terrorism today skillfully adapts to the current conditions, so that it follows trends, and it is precisely the pandemic that uses it to develop its new action strategies. (Berisa, 2019)

4. CONCLUSION

„It affects all nations and can only be defeated collectively”, he said, opening the second annual gathering of UN and international experts known as Counter-Terrorism Week, held virtually this year, with a call to “harness the power of multilateralism to find practical solutions”.

We are just at the beginning of a new era of terrorism. The international public has barely begun to get used to the new situation. Terrorists also need to get used to it. They need to find new ways and means to expand their influence.

All this gives us an advantage over terrorists. We can prepare for the new known circumstances and anticipate new possible views of terrorist organizations as well as individuals.

Closing the borders and control over the movement of people has for the ordinary people of enormous bad things. To prevent terrorism, as well as other illegal operations and actions, the current situation is more favorable, as the movements are easier to spot.

Many terrorist groups and individual extremists reacted with enthusiasm to the pandemic. Salafi-jihadist and far-right extremists, in particular, claimed that the pandemic vindicated
their very different ideological standpoints and called for attacks while affected states were at their most vulnerable. However, outside of areas already impacted by armed conflict like the Sahel, there has not been a rise in terrorist attacks during the pandemic. Terrorists of all kinds have stepped up their propaganda, hoping to influence anxious people largely confined to their homes by lockdowns and compelled to spend more time on the Internet and social media. However, the extent to which terrorists have successfully attracted new converts to their cause or active recruits during the crisis still remains uncertain. The pandemic has also raised the specter of bio-terrorism, as there were fears that terrorists might try to use COVID–19 as a biological weapon. Early in the crisis, some extremists used the internet to encourage infected individuals to spread the virus in public places, but there is little evidence of such activities being carried out. As regards more sophisticated attacks, some terrorist groups in the past have aspired to employ bio-terrorism, but the necessary weapons have always proved too difficult for terrorists to successfully develop or deliver.

In any case, we must not neglect the fact that terrorism is a living organism, like a virus, and is spreading in its own way. Terrorism knows no boundaries or limits. Live on and expand.

REFERENCES


New York Times, August, 7, 2020

Robin Simcox, (2020)., “Terrorism After the Pandemic,” Foreign Policy, August 20


https://undocs.org/S/2020/717


www.statista.com
Abstract: Throughout history, the territory of the Republic of Serbia has been the scene of a large number of different types of armed conflicts. Remnants of wars are manifested by different types of projectiles (mortars, cluster bombs and mines, grenades - artillery or cannon, artillery-rocket missiles, air bombs) and mines (anti-personnel, anti-tank, anti-ship and mines that were used for mining remains of sunken ships). A significant number of the mentioned ordnances were not activated during use, but remained unexploded on the surface or inside the ground. The consequences of the aforementioned explosive remnants of war are shown through various examples (deaths of the population, damaged roads, impossible work due to the destruction of construction or agricultural machinery, disability among residents, fear, etc.). In the light of today’s infrastructure development with the aim of expanding the construction industry, the importance of creating conditions for the safe execution of infrastructure works is growing.

Key words: mine action, infrastructure, explosive remnants of war

1. EXPLOSIVE REMNANTS OF WAR - POSSIBILITIES OF THEIR DETECTION

Over the years behind us, significant progress has been made in removing the explosive remnants of war that are on the surface of the ground. This is evidenced by the successful projects of the Mine Action Centre of the Republic of Serbia.

The issue of explosive remnants of war that are under the surface of the ground requires special attention. Their depth of penetration, under the ground, is conditioned by the type of projectile or bomb, and thus it is conditioned by the configuration of the terrain, the composition of the soil and whether the area has been exposed to flooding, earthquakes and similar circumstances.
The previously mentioned construction works on infrastructure projects are highly dependent on the safety conditions achieved. To this end, extraordinary efforts are being made to create a database with surveys of areas contaminated by explosive remnants of war (ERW). The base was formed on the basis of non-technical survey, which was carried out for many years, and then more precisely defined by certain methods of technical survey.

After detecting a potential danger, the necessary work is started according to the defined Standard Operating Procedure (SOP).

Based on many years of practice, it has been determined that significant successes are achieved by applying magnetic and electromagnetic methods, according to which certain devices function.

Considering the type and scope of work, the procedure for working with ERW suspected to be at depths of up to 4 m will be explained in more detail here. That is why the main goal of this work is to define the principles of functioning of active detection systems in the work with ERW, which is supported by the results of the specific case "Denino brdo".

2. ACTIVE ANOMALY DETECTION SYSTEMS

Magnetic and electromagnetic methods are widely used to investigate anomalies below the ground surface. These can be divided into active and passive methods.

UPEX 740 M belongs to active methods or systems, and is used for the detection or in-depth search of metal objects of large mass and the rapid survey of large areas. Depending on the vegetation, areas of up to 2.5 hectares per day can be surveyed with one device.

UPEX detects ferromagnetic and non-ferromagnetic metals, as well as alloys and is very suitable for locating explosive remnants of war, pipelines, underground landfills, hideouts, shafts and sewers, etc.

The device UPEX 740M works on the principle of the electromagnetic method. It uses an actively generated electromagnetic field to disturb metal objects. These objects then radiate their own detectable electromagnetic field. The width of the track surveyed by the UPEX 740M device is 2m with the possibility of overlapping the readings of each subsequent track. This method of surveying is applied in order not to make mistakes when surveying the terrain and to obtain more accurate surveying and better quality data processing.

![Figure 1. Method of surveying with the UPEX 740m](image)

*Source:* (SOP Millennium Team)
The surveying depth with the UPEX 740m device is a maximum of 4m below the ground surface. It should be taken into account that the recording depth also depends on the size of the requested ERW, while the maximum recording speed is 10 km/h.

The UPEX 740m device is equipped with the most modern GPS positioning system, the accuracy of which is measured up to 1cm depending on the satellite coverage at the location where it is being worked on.

The data is recorded on a PDA device that is connected to the GPS positioning system and the device itself via a cable or via Bluetooth. Data is recorded on a memory card on the PDA device.

![PDA device](image)

**Figure 2. PDA device**  
*Source: (SOP Millennium team)*

When the data is recorded on the memory card of the device, it is transferred to the computer and the data is processed. Processing of recorded data is done using EPAS-GPS software.

**3. METHODS OF MECHANICAL EXCAVATION OF ANOMALIES**

Once a located anomaly is identified as an ERW or an anomaly is suspected to be a potential ERW, excavation of the object is undertaken.

Manual excavation at greater depths requires accurate locating of the target object at the surface level. An assessment of the subject's depth should be made as accurately as possible. Mechanical methods of search and excavation are possible only on a clean and safe surface. Therefore, it must be ensured that the designated area is: declared clean and free from all suspicions and risks of UXO and mines; or that the surface is cleared at least 50 cm below the ground surface before any mechanical activities.

In order to reduce the risk during mechanical excavation, the operator must have special protection when performing the ERW excavation task, that is, armored construction machines must be used. The minimum protective equipment consists of a frontal shrapnel shield covering the lower part of the operator's cabin, including a windshield and additional armor plates covering the lower part of the cabin. The design and level of protection must be in accordance with the standards determined by the competent service.

Standard minimum safety distances of 50m must apply. However, for each object, a damage assessment must be done beforehand using the data obtained from the survey. Based on these assessments, the Project Manager will increase the safe distance and, if necessary, reduce the number of teams working simultaneously.

When excavating certain objects, it is desirable to have a plan of all electrical or other installations that may be located underground on a given project.
Open excavation without supporting structures can only be carried out safely up to a certain maximum depth depending on the characteristics of the soil. Accurate classification of soil types is mandatory before any excavation without support structures. During excavation, the soil should be re-evaluated several times to ensure stability through all phases of excavation.

Trench reinforcement structures used during excavation must meet general safety standards.

When the anomaly is defined as a possible ERW excavation is carried out as follows:

An armored construction machine (excavator) is used to remove soil up to the anomaly. In this case, of course, it is assumed that before this stage, the contractor cleared the land to a depth of 50 cm with metal detectors and removed all anomalies. The removal of soil around the defined anomaly is done layer by layer. Namely, with an armored excavator, the operator removes the first layer of soil and deposits it on a safe, previously inspected surface. In the next step, the deminers, using metal detectors, examine the surface around the previously defined anomaly, and remove smaller signals. Then the armored excavator operator removes a new layer of soil, and so the process is repeated until the anomaly is located. The contractor's task is to define or identify whether an anomaly is a harmless metal object or an explosive remnant of war. If it is an ERW, the contractor is obliged to inform the Mine Action Centre of Republic of Serbia on the same day.

The removal and destruction of UXO is organized and carried out by the Competent Service, i.e. the Department for Emergency Situations, in accordance with Article 73, Paragraph 1, Items 3 and 4 of the Law on Disaster Risk Reduction and Emergency Management ("Official Gazette of the RS", No. 87/2018), and in terms of Article 25, paragraph 1 of the same Law.

The Mine Action Centre of Republic of Serbia, during the introduction of contractor into the Project, performs checks and test all devices and detectors that will be used on that Project.

4. CASE STUDY IN THE „DENINO BRDO“ COMPLEX

At the request of the City Administration for the Development of the City of Kragujevac, the Mine Action Centre of Republic of Serbia, developed the Project for the clearance of the ERW in the "Denino brdo" complex, number 0229/20, the city of Kragujevac in 2020. The area for clearance was located in the territory of the city of Kragujevac. In view of the planned infrastructure works (construction of water and sewage lines and roads), clearance of the area of 17,870m2, in the "Denino brdo" complex, was required. The Project for clearance was on the site for construction of apartments for members of the security forces. The criteria that were applied during the implementation of this Project were divided into phases:

- 1st phase - clearance up to 50 cm;
- 2nd phase - clearance up to 3m;
- 3rd phase - clearance up to 6m.

The task of the contractors in the second phase was to determine the existence of anomalies that indicate the possible presence of ERW up to 3 meters depth by surveying using an active method. Any unexploded ordnance and ammunition regardless of mass, type and caliber was considered a critical error; metal objects weighing 500 grams when phase I of the project was applied, or 50 kilograms when phases II and III of the project were applied.

Quality control was performed on 3% of the cleared area, basically using the same method and type of detector used by the contractor, using the capacities of the Mine Action Centre and the contractor. During quality control, no anomalies defined by the term „critical error“ were found.
The Mine Action Centre carried out the introduction of the contractor, according to phase II of the "Denino brdo" project, on 17.11.2020. During the introduction of operational staff, the equipment used by the contractor in this phase of the Project was inspected and introduced. The contractor used the UPEX 740m device to survey the surface up to a depth of 3m.

**Figure 3.** Anomaly identified through data using EPAS-GPS software  
*Source: (EPAS - GPS software)*

To survey the Project area of 17,870 m², the contractor needed one working day, which is documented by the contractor's daily report of the completed works. After that, the contractor performed the mechanical excavation of the anomalies, with an armored construction machine, while adhering to all safety procedures and distances according to the SOP. The contractor needed 10 working days for the mechanical excavation of the anomalies. During the implementation of the project, the contractor found a total of 11 unexploded ordnances (artillery shells of different calibers). The image below shows the anomaly identified using the UPEX 740m device, which was determined to be an artillery shell after mechanical excavation.

**Figure 4.** Anomaly identified through data using EPAS-GPS software  
*Source: (EPAS - GPS software)*

The final quality control of the Mine Action Centre was carried out on November 30, 2020. Before the start of the quality control, UPEKS 740m device was checked and tested. By checking the samples, it was determined that there are no missed anomalies that indicate a critical error defined by the Project.
The implementation of the Project for clearing the explosive remnants of war in the "Denino brdo" complex, number 0229/20, the city of Kragujevac, i.e. the implementation of all phases of the Project and the removal of found ERW contributed to the removal of the danger posed by explosive remnants of war for the construction of water and sewage lines and roads. The project was viewed as a project of national importance, because its implementation enabled the construction of 216 apartments for members of the security services, out of a total of 972 planned.

5. CONCLUSION

The use of devices for deep detection of explosive remnants of war, in this case active methods - deep detection systems, greatly increases the safety of deminers when performing ERW clearance works, and also contributes to increasing the safety of the local population and creating conditions for safe land use.

Specifically, in the case of the Project for clearing explosive remnants of war in the "Denino brdo" complex, number 0229/20, Kragujevac, the implementation of all phases of the Project contributed to the safe identification and removal of 11 unexploded ordnance. This created the conditions for the continuation of construction works in the "Denino brdo" complex.

Starting from the intensive infrastructural development in the Republic of Serbia, which implies the need for clearing the explosive remnants of war during the construction of roads and factories, then the fact that the Mine Action Centre have in database 150 locations on land that are suspected of being contaminated by unexploded aerial bombs, and about 18,500,000 m² of surface suspected to be contaminated with unexploded ordnance due to the explosion of municipal warehouses at several locations, the significant location, significant activity of the exploitation system and necessary detective activities in the significant activities of explosive systems are highlighted.

All of the above is supported by numerous examples from practice, where the application of active anomaly detection systems, and through the realization of projects of the Mine Action Centre, created conditions for the safe execution of construction works on projects of the greatest national importance, such as the Project for clearing the ERW from area for construction „Fruskogorski koridor“, then the Project for clearing ERW on the Sremska Raca.
- Kuzmin section along the planned route of the Belgrade - Sarajevo highway, the Project for clearing ERW at the factory construction site „Linglong“ - town of Zrenjanin, ect.

However, the consequences of war conflicts and the remaining problems associated with the pollution of explosive remnants of war on the territory of the Republic of Serbia indicate the need and necessity for further improvement of the system for deep detection of ERW. Emphasis is also placed on comprehensive training of operational personnel who use these systems in the field and during data processing. Therefore, the Mine Action Centre of the Republic of Serbia, as an entity that coordinates and controls the work of all participants in ERW clearance projects, takes care of the adequate training of the operational staff.

REFERENCES

Law on Disaster Risk Reduction and Emergency Management. Official Gazette of the RS No. 87/2018

Standard operating procedures of the "Millennium Team" company

https://ebingergroup.de/de/
CIVIL DEFENCE SYSTEM OF THE REPUBLIC OF SERBIA

Milica Mladenovic

1 University of Defence in Belgrade, Military Academy, Veljka Lukica-Kurjaka Street No. 33, Belgrade, Republic of Serbia, mladenovicmilica21@yahoo.com

Received: 15th August 2022
Accepted: 21st September 2022

Abstract: With the outbreak of the conflict in Ukraine, civil defense trainings around the world are on the rise. The phrase civil defense suddenly came to the fore and is the subject of daily reports by various media, geostrategic and security experts. With the emergence of the fear of a new global armed conflict, numerous questions, forgotten in the past 20 years, have been revived: What is civil defense? Who is responsible for it? What are its goals and objectives? What happens to the civilian population and material resources during a state of war or any other crisis? Among them, the most important question arises: Does the Republic of Serbia even have civil defense? The paper presents the current state of the civil defense system of the Republic of Serbia with an emphasis on the problems it faces in its functioning and development, primarily regarding the existence of an adequate organizational structure.

Key words: civil defense, Republic of Serbia

1. INTRODUCTION

The conflict in Ukraine has shown the global community that the speed of changes in the modern world calls into question the possibility of predicting future events and that any country in the world can face an uncertain struggle for its existence at any moment. The safety of people and material resources, as well as overall survival, are currently in the center of attention of the entire international community. In the world of security, the 21st century brought numerous novelties that showed that the mere possession of enormous military power is not enough and does not guarantee security. After the conflict in Nagorno-Karabakh and the global pandemic crisis, the world is currently facing a new/old danger: the outbreak of a new global armed conflict. The conflict in Ukraine has shown all the dangers of regional confrontation and the speed with which it can lead to disruption in the entire world. Although it was claimed years ago that the possibility of a new world war breaking out was minimal, in just a few days the Ukrainian example proved all the inaccuracy of that claim. In just a few days, the regional conflict showed all the problems of the global community and caused an overall economic, energy, emigrant and, it seems, every other crisis.

The biggest problem of any conflict is the defense and protection of the civilian population and material resources. During the military operation in Ukraine, it can be seen that such a conflict requires comprehensive preparations of all the human and material resources of a state.
In such conditions, the role of the civil defense system reaches its full expression, because only that system can enable comprehensive preparedness for defense, implying the direct engagement of the entire society. In light of the ongoing fighting on the ground, security and protection are becoming the concern of every citizen. The growing number of victims and the increasingly serious material destruction on the ground gave civil defense immeasurable importance, because its main activity is the protection, defense and rescue of people and material resources, which triggered an avalanche of trainings and preparations of the civil defense systems all over the world.

All crises that arise at the global, regional and local level also have an impact on the security of the Republic of Serbia. All of them can lead to destructive activities aimed at the civilian population and material resources, so an effective system of their protection - the civil defense system - must be established at the level of the Republic of Serbia. The topic of this paper was created based on research for the preparation of doctoral dissertation and deals with determining the state of the civil defense system of the Republic of Serbia at the highest - state level. Does the Republic of Serbia have a civil defense? Is the population equipped and trained to respond to a new global conflict? Can the civil defense system counter the emerging dangers and mitigate the consequences that may arise from daily dealing with new threats? Answering all these questions provides insight into the current state of the civil defense system of the Republic of Serbia and the need for its improvement.

2. CIVIL DEFENSE AS THE PILLAR OF DEFENCE OF THE REPUBLIC OF SERBIA

Due to the process of globalization and the general global progress of science and technology, the physiognomy of war has been significantly changed, which has led to the emergence of the so-called a hybrid war that includes countless different ways of warfare that create an unstable battlefield, without firm borders. The factors of modern war are designed to permeate civilian life and every pore of society with the aim of achieving complete domination over the enemy and the collapse of all his capacities so that he does not offer successful resistance, while the main targets of the attack are all vital points, not only the defense system, but of the social system as a whole. In accordance with such a way of warfare and the overall characteristics of modern war, the Republic of Serbia must develop a civil defense system that achieves the organizational and functional connection of the total potential of society and their direction in the effective defense of the country. It is necessary to introduce a new principle of transition from rapid response to risk management and prevention, because "the process of globalization contains numerous unknowns that can take on an apocalyptic character." (Stojanovic, 2005)

Although international law prohibits wars and aggression and all actors of the international community unanimously call for peace and peaceful resolution of conflicts in the world, we can see from the example of Ukraine that this has not yet led to the eradication of armed conflicts and that despite numerous prohibitions, armed conflict is still a way resolving disputes and conflicts. A new global conflict would certainly represent a completely new type of conflict characterized by the use of precision-based weapons, the use of chemical and biological weapons, and most certainly nuclear weapons. All this leads to the conclusion that modern means of armed struggle have unlimited range, high precision and enormous destructive power, which represents a great danger for the civilian population and material resources of the Republic of Serbia. We have already experienced all of this on the example of the NATO aggression against the FRY in 1999, when more than 200 cities were bombed, thousands of civilians were killed, 2.5 million people were left without the means to meet their basic needs and material damage of over 100 billion dollars was caused. This indicates that
the danger of the civilian population and the material resources of the Republic of Serbia from
the dangers of war is not impossible, which is another reason for the development of an
efficient civil defense system.

Civil defense is currently the most effective defense concept considering the characteristics of
the modern security environment and the determination of the Republic of Serbia for the
concept of total defense. Civil defense, as part of the national security system and the country's
defense system, should be ready to protect the civilian population and material resources in
peace, war and emergency. In the concept of total defense prescribed in the Defense Strategy
of the Republic of Serbia, civil defense is an indispensable part of the defense and protection
system of the Republic of Serbia, which is primarily aimed at reducing the vulnerability of the
civilian population and material resources. Therefore, the civil defense of the Republic of
Serbia represents one of the pillars of total defense.

In the Defense Strategy of the Republic of Serbia, it is defined that "civil defense is part of the
unified defense system organized at the level of the Republic of Serbia, autonomous provinces
and local self-government units, (Defense Strategy of the RS, 2019), while in the Law on
Defense it is defined as "part of the defense of the Republic of Serbia, which includes a set of
measures and activities aimed at: preparations for the defense of the Republic of Serbia with
non-military means, ensuring the successful functioning of state bodies, bodies of autonomous
provinces and local self-government units, business companies and other legal entities,
protection and rescue and provision of living conditions and the work of citizens and meeting
the needs of the defense forces in a state of emergency and war. (Law on Defense, 2018) Civil
defense is an integral part of the country's defense and protection system, which represents a
form of civil organization of the state and society with the main goal of protecting and
defending the population and material resources. (Jakovljevic, 2006) It is an indispensable part
of the unified defense system of the Republic of Serbia. It is "part of the defense and protection
system of the country, which represents a form of civil organization of the state and society,
which assumes the maximum engagement of all potentials of the civil society sector in order
to protect, defend and save the population, material and cultural assets, the economy,
authorities and the ecosystem from all catastrophic threats in peace and war, and the creation
of the most favorable conditions for protection and defense and for unarmed opposition to an
attacker (aggressor in war)". (Jakovljevic, 2006) On the basis of the above, it can be concluded
that civil defense should represent a set of well-organized and functionally coordinated
elements, whose actions fulfill the prerequisites for successfully overcoming various crisis
situations in peacetime and wartime conditions. (Misovic & Kovac, 2006)

The Strategic Concept of Defense expresses the determination of the Republic of Serbia for
the concept of total defense, which enables a comprehensive response of the defense system
to challenges, risks and security threats significant for the defense of the Republic of Serbia,
relying on its own forces and potentials. Total defense includes military and civil defense, and
is planned, organized and implemented in peace, emergency and war. (Strategy of Defense of
the Republic of Serbia, 2019) Within the defense system of the Republic of Serbia, civil
defense is focused on preparations for the defense and defense of the Republic of Serbia with
non-military means and is implemented in peace, state of emergency and war as "a set of
measures and activities aimed at ensuring the successful functioning of state bodies, bodies of
autonomous provinces and local self-government units, business companies and other legal
entities, creating conditions for the life of citizens, meeting the needs of the defense forces,
planning and implementing citizen training plans for the defense of the country, coordination
of protection and rescue operations, execution of military, labor and material obligations as
well as mobilization." (Strategy of Defense of the RS, 2019) The views expressed in the
Strategic Concept of Defense represent the starting point for the design and development of the civil defense system as one of the pillars of defense of the Republic of Serbia.

3. STRUCTURE OF THE CIVIL DEFENCE SYSTEM OF THE REPUBLIC OF SERBIA

The civil defense of the Republic of Serbia, in addition to the military defense, represents one of the foundations of the defense system and should be the most organized force of society that provides all the necessary assistance to the vulnerable population and preserves material resources. Although in practice that process has not been fully implemented, the civil defense system must be brought to the level where it can effectively fulfill all its missions and tasks and provide the necessary protection. The civil defense system of the Republic of Serbia consists of various elements and subsystems, which enable the achievement of the goals and objectives of the system. However, there is no normative regulation that precisely defines all these elements, and this represents a major problem in creating an efficient system.

The civil defense system of the Republic of Serbia does not currently have its clearly defined structure in any normative-legal act, but it can be derived based on detailed analyzes of various acts by which the state regulates this area, in which it can be determined that the civil defense system is unequivocally part of the national security system and an indispensable part of the defense system of the Republic of Serbia. According to the highest normative acts in this area, the civil defense system of the Republic of Serbia is under the competence of the state and institutions of the Republic of Serbia. Based on this, it can be said that the management part of the defense system is also the management part of the civil defense system. According to the existing strategic and legal provisions, the management of the civil defense system is the responsibility of the management part of the defense system, which is represented by the National Assembly of the Republic of Serbia, the President of the Republic, the Government, the Ministry of Defense, the General Staff of the Serbian Armed Forces and the National Security Council. Civil defense management is also carried out within the framework of state bodies, bodies of autonomous provinces, bodies of local self-government units, companies and other legal entities. (Strategy of Defense of the RS, 2019) Management of the civil defense system is the responsibility of the Government of the Republic of Serbia, i.e. the Ministry of Defense. (Kastratovic, 2015) The National Assembly is in charge of creating adequate normative-legal regulations in the field of civil defense, while the implementation of defense policy and civil defense policy, adoption of by-laws and other general acts is the responsibility of the Government of Serbia. The Ministry of Defense coordinates and implements the established defense policy through the Minister of Defense, the General Staff of the Serbian Armed Forces and the Serbian Armed Forces.

The subjects and forces of the civil defense system of the Republic of Serbia are not precisely defined in any legal document of the Republic of Serbia, but by analyzing the normative acts in the field of civil defense, it can be concluded that they include (Law on Defense, 2019):
- state bodies,
- state administration bodies,
- bodies of autonomous provinces,
- bodies of local self-government units,
- The Army of Serbia,
- companies,
- other legal entities,
- entrepreneurs,
- citizens.
Considering the numerous problems that the civil defense of the Republic of Serbia faces in practice, a comprehensive reorganization of the entire system is needed, primarily by providing precise normative-legal regulations, and then by establishing a system based on new principles, because existing security threats place new demands on the system of civil defense. In this light, and bearing in mind the experiences of different countries, it is evident that the civil defense of the Republic of Serbia must be dimensioned based on the principles of crisis management. (Komazec, 2006) Future research should be focused on finding opportunities to establish a civil defense system capable of preventing crises, confronting them and eliminating their consequences, while the priority should be to reduce the threat to the civilian population and material resources.

The civil defense system is a system that represents a set of elements, where all elements interact with each other and serve a common purpose. Such a system is established in order for society to successfully respond to any type of crisis situation, so its organization based on the principles of crisis management is necessary. The civil defense system of the Republic of Serbia must have a clear organization in view of the state's commitment to civil defense in strategic documents. The Republic of Serbia must develop a civil defense system with a precisely defined organizational structure in order to ensure the unity of the system at all levels of its organization. Currently, civil defense is presented as a term that includes what is outside the military sphere of defense and there is no clear and precise systematic organization of it. In the current state of civil defense, each element functions as a separate unit with certain authorities that coordinate their work, and everything is mainly reduced to civil protection.

The civil defense of the Republic of Serbia must be organized as a system, i.e. a subsystem of the defense system with a unique vertical and horizontal organization, a system of a civil-military character, with mandatory and voluntary participation of citizens in it, all of which is under the jurisdiction of the Ministry of Defense. The organization of the RS civil defense system should follow the territorial structure of the Republic of Serbia, i.e. it should be developed according to the administrative-territorial division of the state and be represented at all levels of the state organization. In order for the civil defense system to develop, it is necessary to have a comprehensive organization that would enable its smooth functioning.
4. CONCLUSION

The civil defense system of the Republic of Serbia represents a strategic component and is intended to protect the civilian population and material resources in peace, war and emergency. In recent years, the need for its comprehensive reform within the unified national security system has been recognized in order to ensure the effective implementation of the function of meeting the needs of the army, state authorities and citizens, and the function of protecting and rescuing the civilian population and material resources. With the growing role and importance of the civil defense system of the Republic of Serbia within the national security system, the need for its faster reform, development and improvement is also growing.

In modern conditions, the civil defense system must be seen as a system within the framework of crisis management, because it is primarily intended for confronting crisis situations, and in order to function successfully in any conditions, it is necessary to manage it as an organizational system through the processes of planning, organizing, coordinating and controlling. The context of civil defense functioning within the defense system of the Republic of Serbia has not yet been fully implemented in practice. In addition to problems in strategic and normative-legal regulation, competences and functioning itself, it is also accompanied by problems of implementation in the defense system, as a process whose methods of establishment are undefined and unclear. There are numerous issues of its implementation that are still unresolved, especially issues of qualified and trained personnel who can successfully manage such a system, and the management of the defense system (civil defense) is an indispensable condition for its efficient and effective functioning.

REFERENCES


Doctrine of command in the Serbian Armed Forces (2016), General Staff of the Serbian Armed Forces, Ministry of Defense of the RS.


OFFENSIVE OPERATION FORCE MODELING – ANALYSIS OF AN EXAMPLE OF BATALLION TACTICAL GROUP OF RUSSIAN FEDERATION IN UKRAINE

Miloje Ilic¹, Misa Zivkovic², Zoran Djuric³

¹University of Defence in Belgrade, National Defense School, Veljka Lukica-Kurjaka Street No. 33, Belgrade, Republic of Serbia, milojeilic@gmail.com
²University of Defence in Belgrade, Military Academy, Veljka Lukica-Kurjaka Street No. 33, Belgrade, Republic of Serbia, zivkovic.misa@yahoo.com
³University of Defence in Belgrade, Military Academy, Veljka Lukica-Kurjaka Street No. 33, Belgrade, Republic of Serbia, z.djuric09@gmail.com

Received: 20th August 2022
Accepted: 1st September 2022

Professional paper

Abstract: Ongoing armed conflict gives insight of classic, line war to the theoreticians. Analysis and predictions prior to conflict did not foresee future war with formed front lines and massive artillery usage. A piece that did not fail modern insights on combat is certainly force modularity. In Ukraine conflict, we are witnesses of wide spectra of variants of force modeling in purpose of task realization. Battalion combat groups, which are the main bearers of combat operations, appear as the most massive phenomenon. Having in mind that one of organization principles of Serbian Army is modularity, the analysis of temporary components engaged in Ukraine’s conflict is useful lection for us.

First part of this paper clarifies term modeling in Serbian Army with accent on offensive operations. Second part is an analysis of Russian federation’s battalion combat group attacking populated area. Its composition as well as the way of realizing the tasks in this operation were reviewed. The first step in that analysis was to determine how to model a battalion combat group, searching principles that determine the most suitable structures and combat organizations of forces. Then the use of the same in the implementation of an attack on a populated area was analyzed.

Key words: force modelling, Russian federation’s battalion combat group, combat in populated area, fight organization, Ukraine conflict

1. INTRODUCTION

By defining Serbian Army’s missions, the tasks that she realizes are carried out. In need of realization of given tasks, the army leadership determines the required level and amount of engaged forces and assets. Process of defining of needing assets for task realization is force modeling.
Army’s organization principles represents adopt positions of its organization and development for conducting given missions and tasks. Those are effectives and efficiency, three-component composition and purpose, interoperability, modularity, elasticity and financial sustainability. SA’s organization, among its own principles, recognizes modularity as one of the key ones. Modularity implies organization, equipping, training and forming components of Land Army in line with needs for conducting specific mission and tasks. Basic modular unit of the Army is battalion – division – squad (Serbian Army’s doctrine, Media center “Odbrana”, 2010).

By force modeling, temporary formations are to be formed and they can be of tactical or operation level. Temporary formations are combat group, tactical group and operation group.

For the full realization of engaging principals of the SA, forces that are planning, preparing and conducting combat operations are organized in command forces, combat forces, battle support forces and security forces. Strength, composition and role of the forces are in line with concrete missions and tasks.

Ongoing conflict in Ukraine, points out that in the center of conducting military operations stands task realization divided on to smaller tasks of tactical level that are assigned to temporary units, battalion combat groups. They are compiled of company-battery size units and they represent main task executors. We conclude that the basic modular unit of the Armed forces of Russian Federation (RF) is company-battery.

This statement opens an analytical space for looking at the basic level of modularity. The subject analysis should look at both models and recommend a better solution that would make the use of the Serbian Army more efficient.

2. FORCE MODELING IN OFFENSIVE OPERATIONS FOR SERBIAN ARMY

Force organization in combat operations as a system, can be defined as a whole compiled of parts, elements and relations between those parts. “A system is a set of elements or objects between which there are established relationships so that they represent a whole. The whole must have a clearly stated purpose of existence.” (Zivkovic, 2012). Following this definition’s logic, through purpose and established relations, it is clear that army forces for conducting operations can be observed as a system, or even more precise as an organization. Process of defining necessary resources for task realization is force modeling. Modeled forces for conducting operations have their consisting elements, clearly determined relations and purpose of existence, i.e. they are modeled with the aim of performing a specific task. Forces in operations have their sub-systems, military units of lower level of which they consist of. Those building elements represent the organizational structure that makes up the formal system for assigning tasks, which also includes the resources for their execution (Ondrej, 2013). In addition, they have arranged relations: vertically - subordinating and hierarchical, and on the horizontal side of collaboration and cooperation. Modeled forces in operation have, ultimately, unique or joint goal – mission.

Forces for conducting missions are consisted of command forces, combat forces, combat support forces and security forces.

**Command forces** plan and guide combat activities and enable continuous command.

The system of leadership and command in an offensive operation includes commands of all levels, connections of commands with other forces, their organizational-formation structure and technical-material means that support leadership and command in the operation. A very important determinant of the command and control system is the command information system, which through the collection, processing, distribution and use of data significantly
contributes to the quality of the system itself. The leadership and command system in an offensive operation, as a priority task, has high-quality preparation of the operation and purposeful use of forces in it.

Offensive operation of the Army is prepared, organized and conducted by operation level command or temporary command, if it is formed. The command that will plan and command the offensive operation, in principle, is formed from the formation commands, that is, from the command of the unit that, through reinforcements, is the bearer of the formation of the temporary composition. In case of a need, this command can engage headquarter specialists from other command of lower and even higher level.

Organizational structure of the command needs to match the level of a unit and assigned task in both quantity and quality. Modeling of forces for telecommunication and IT security, which represent an element of the command post, depends on the command level. They should provide means and systems that will enable a continuous and reliable exchange of information. When dimensioning forces for telecommunication and IT security, special attention should be paid to forces for anti-electronic protection.

Force modeling for the immediate security of the command post directly depends on the organization and numerous size of the command, the position of the command posts in the operational combat layout, the intensity of the threat and the availability of forces. These forces should be designed, if possible, from formational dedicated forces that are trained to perform specific security tasks.

**Combat forces** consist of units of branches whose task is to defeat enemy in direct combat using firepower and maneuver.

“The aim of combat operations in which the forces of the Army are used is the defense of the area in the assigned zone, the liberation of the occupied part of the territory and the control of the territory.” (Land Army’s doctrine, Media center “Odbrana”, Belgrade, 2012). As the offensive operation of the Army is a combat operation, and the Republic of Serbia is committed to conduct a defensive war in accordance with valid strategic and doctrinal documents, the conclusion is that the goal of the offensive operation of the Army is to liberate the occupied territory, control it and create conditions for the normalization of life. The objective of the offensive operation is to isolate, disrupt, harass and destroy the enemy, seize space and key facilities on the ground, seize resources from the enemy and deceive the enemy and create a secure environment. Achieving the goal is achieved through the realization of a series of tasks that should be doctrinally regulated.

Combat forces in operation must be modeled so that their commander can do quality planning and organization of all types of action and counteractions. The modeling of combat forces will be conditioned by the estimated need for their implementation in the operation.

One of the basic criteria that must be followed during force modeling is attack tempo. Combat forces must be with similar maneuver capabilities, for ability of keeping equal tempo of conducting combat activities.

**The combat support forces** consist of units of the SA whose task is to provide fire and operational support to the combat forces.

Fire support creates the conditions for free maneuvering of one’s own forces, prevents the maneuver of the enemy and affects its morale. Fire support results in slowing down, neutralizing, and destroying enemy forces to conduct operations. The bearers of fire support in the operations of the Army are artillery units and artillery-missile units and units of the Air Force and against air defense.
Operational support includes fortification of facilities, areas and routes on land and inland waterways, overcoming artificial and natural obstacles, arranging roads, as well as defensive actions against enemy air and river forces. The bearers of operational support are engineering units, artillery-missile units for anti-aircraft operations (ARJ for PVD) and river units (Land Army’s doctrine, Media center “Odbrana”, Belgrade, 2012).

Combat support forces are intended to support maneuver forces in an operation with their actions and counteractions. They manage their tasks by following actions and counteractions:
- artillery-missile and counter artillery-missile,
- counter aircraft,
- vessel and counter vessel,
- engineer and counter engineer,
- electronic and counter electronic\(^1\).

Through the above actions and counter actions, support forces provide fire and operational support to the Army forces conducting an offensive operation.

In purpose of relieved work of commands and training process it is necessary to define branches tasks by doctrine.

**Security forces** consist of SA units whose task is to create conditions for conducting combat operations and force command.

Security forces\(^2\) are to be modeled during modeling of all other forces. Through the process of modeling the total forces and through the tasks assigned to those forces, the need for security in the operation is considered. By modeling forces, it is usually necessary to design forces for all security contents, and the degree of realization of those contents is directly related to the sustainability of the forces, as a condition for the realization of the mission. An important determinant of the implementation of security in an offensive operation is the coordination of activities and cooperation with the institutions of the state and local self-government in the area of the operation. The unity of activities and efforts with the mentioned structures is of great importance in the influence of the operational environment on the modeling of forces.

When the command looks at all the mentioned influencing factors, it makes a conclusion about the sufficiency of logistics units for the execution of the operation and based on that, it decides whether to request additional forces for logistical support. The specifics of modeling forces for logistical support in an offensive operation derive from the objectives of the operation, and the objectives create tasks that should be implemented by the modeled forces, in order to accomplish the mission.

### 3. BATTALION COMBAT GROUP OF RF – STRUCTURE AND ENGAGEMENT IN OFFENSIVE OPERATION

The armed forces of the Russian Federation, like our army, are organized structurally into types and branches and functionally into units and institutions. Although large army with great

---

\(^1\) Electronic and counter electronic units are not in the Army for the moment and in the future work is needed on their enlargement and decentralization.

\(^2\) Experience in engaging formal JNA in armed conflicts in area of formal Yugoslavia point out a forces security issues. Especially when it comes to security provision of forces in operations. Similar case is with other organized armies in modern conflicts. Failures in the organization and implementation of the content of the security of the forces were paid for with great casualties.
number of units of different composition and usage, Russian army have shown, in Ukraine conflict, that that modularity principle as in the top of the leader.

What is characteristic is that they showed in this conflict that their basic modular unit is the company-battery, and the basic unit, the base, for the formation of a temporary composition is a motorized rifle battalion.

The battalion combat groups structure is identical to ours. It also consists of command forces, combat forces, combat support forces and security forces. The basic organizational and formation structure of the BBG, which is studied in Russian military schools, was used for the analysis (https://www.youtube.com/watch?v=wSDP-CmwcNM&list=PL6Udnt8OH5-tuFBlYitzmYc6mYE6_TiCqV7&index=1).

**Command forces** forms from the command of the parent battalion (motorized rillie or tank, in the given example it is motorized rillie). According to the reinforcements, specialists are gathered to the headquarters who will help the headquarters and the group commander to use the assigned composition and combat capabilities of their assets as efficiently as possible.

For command purposes, a command post, auxiliary command post and false command posts are formed. Commands have command information systems so that they are very mobile during operation and have detailed procedures for moving.

![Organizational structure of BCG AF RF used in Ukraine conflict](source: Out of the schooling material of one of the authors in AGS RF 2019)

**Combat forces** are composed of units of combat branches. In this case, they consist of two motorized rillie companies on BMP-3 vehicles, one tank company on T-72 B3 tanks and one assault company on BTR-12 vehicles attached to the motorized rillie battalion that served as the basis for the modeling. In addition to these companies, the combat forces also include lower independent units of that battalion, namely the grenade launcher platoon, the sniper platoon and the anti-tank platoon.

**The combat support forces** are tasked with providing fire and operational support to the combat forces and are composed of independent units of the battalion: reconnaissance platoon, AAA platoon, mortar platoon, communications platoon and engineering platoon. In addition to them, emphasis was placed on fire support and the following were added to the composition of the BCG: a mortar company, a battery of self-propelled howitzers, a battery of SVLR and a battery for AAA. In addition to these standard reinforcements, which are studied as a school
model, the conflict in Ukraine has brought about the practice of reinforcing the BCG with a TOS-1 "Solnpec" reactive artillery battery and operational support elements up to platoon level with electronic warfare units and remotely piloted aircraft units.

**Security forces** are units whose task is to create conditions for the work of other elements. In the AF RF, it is called the background and it includes the formation units of the motorized rifle battalion: the technical security platoon, which consists of the ammunition supply department, for the supply of exploitation fluids, the quartermaster's platoon and the technical maintenance department, as well as the medical platoon.

The organizational formation structure of the BCG that appears in the combat operations in Ukraine, in relation to the school model, differs in the attached elements of fire and operational support of a higher level. In general, it is most often reinforced in fire support with the TOS-1 battery, and in operational support with a unit equivalent to a platoon for electronic operations and a platoon of remotely piloted aircraft. In addition to the mass use of commercial drones, the “Orlan 10 UAV” is most often part of this platoon.

This kind of organization of the combat group resulted in great firepower and independence of the unit in the direction of attack. In a possible attack operation on a populated area, the commander would send the reconnaissance unit to discover the elements of the enemy's battle arrangement before starting the attack. Intelligence-wise, the battle group exploits a wealth of data from a multi-unit that uses a wide range of intelligence-gathering methods, including satellite surveillance.

The assault begins with classic artillery preparation, which is realized by small-caliber tube and reactive artillery, as well as electronic "covering" of the zone of interest. With the start of the fire preparation, the commander from a distance includes the tank company, which aims to observe the enemy's firing points. Their movement is followed by an AAA unit that closes the sky above the entire combat layout.

When the enemy "opens" the entire fire system, the commander activates the TOS-1 battery, which fires extremely effective missiles from short distances that cause enormous damage to personnel, equipment and infrastructure. Only after that, motorized rifle and landing companies can join the operation and occupy the area. Their movement is accompanied by the massive use of RPAs for reconnaissance during depth combat. Other elements of the combat schedule will also move with their progress.

Having occupied the area, the unit organizes itself to protect it and organizes a normal life in it.

**4. CONCLUSION**

Experiences from modern armed conflicts unequivocally indicate that smaller tactical units of a combined composition, that is, those composed of units of different branches and services, are significantly more effective for the performance of assigned tasks. At the same time, the high degree of dynamism that characterizes modern combat operations, especially offensive ones, emphasizes mobility as one of the important principles of modularity of military units. Accordingly, in the modeling of the temporary composition, it is aimed that all organizational parts - the so-called modules should be highly mobile, i.e. have the ability to quickly move and group in a certain space when necessary, as well as flexibility in terms of reacting to new situations.

We can conclude that from the specific conditions of the combat environment and the specifics of a certain type of combat operation, the entire spectrum of abilities that the modeled temporary composition should possess in order to perform the task as efficiently as possible
emerges. This further influences the choice of level - rank and type of individual units that will be part of the modeled composition, as well as the regulation of their mutual connections. In the analyzed structure of BCG AF RF units of company-battery rank appear as basic modules - elements used in battle group modeling. On the other hand, in domestic doctrinal documents, the battalion is defined as a basic modular unit. However, such a formulation does not support the modeling of smaller temporary formations (combat and tactical groups), nor does it support the provision of different capabilities of one temporary formation, bearing in mind that an adequate ratio of combat forces, combat support forces and security forces can only be achieved with the participation of smaller units as basic modules. Force modeling aims to compensate for the shortcomings of the Army’s formation maneuver units (infantry, mechanized, armored), which is most often achieved by strengthening them with combat support units and units intended for providing combat operations.

In the further reform of the Army, the formation of battalion-level organic units that would have mechanized companies (or infantry companies on armored personnel carriers) and tank companies should definitely be considered. Such organic units would represent the basis for further modeling, by strengthening them with specific "modules", such as units for AAA, units for electronic actions, units that would be equipped with remotely piloted aircraft of various purposes, etc. It is inevitable that the development of technology will have a strong impact on the conduct of armed conflicts in the future, therefore the development and equipping of units for electronic operations, as well as their decentralization in order to create conditions for their use as part of tactical groups in combat operations, should not be neglected.

Furthermore, in the doctrinal documents of the SA, the existing models of fire support should be revised, in terms of regulating the pre-subordination of certain parts of brigade artillery with greater range and greater firepower to tactical groups. Adequate firepower of fire support units is necessary in order to ensure independence in the execution of tasks and greater freedom of action of the commander of such a group within the mission assignment. The ability of temporary structures to act independently is important in the conditions in which they will be used most often, which are populated areas, dominated by a complex system of various infrastructure objects that makes cooperation with neighbors and within the unit significantly complex.

REFERENCES


Kukoleca S., (1986). Organization business lesions, IRO “Rad”, Belgrade,


Operation experience, Book, VAGS, lesion “Basic grouping in army operations” – notes from classes by the author.


Zivkovic, N., 2012. Integrated management systems, FON, Belgrade,

https://www.youtube.com/watch?v=wSDP-CmwcNM&list=PL6Udnt8OH5-tuFBUyigic6mYE6_TfCqV7
THE CAPABILITIES FOR USING A MECHANISED BATTALION IN A BREAKTHROUGH FROM THE ENCIRCLEMENT

Branko Velickovic¹, Ninoslav Djudjic², Predrag Ruzic³

¹ University of Defence in Belgrade, Military Academy, Veljka Lukica-Kurjaka Street No. 33, Belgrade, Republic of Serbia, bra.velickovic@gmail.com
² University of Defence in Belgrade, Military Academy, Veljka Lukica-Kurjaka Street No. 33, Belgrade, Republic of Serbia, ndjudjic@gmail.com
³ The Army of Serbia, Jovana Bojovica bb, Kraljevo, Republic of Serbia, predrag.ruzic81@gmail.com

Received: 31st August 2022
Accepted: 11th September 2022

Professional paper

Abstract: Mechanized battalions are the main maneuver force of the Serbian Armed Forces and the backbone of defense operations, due to their great firepower, human and technical potential, and maneuverability.

Combat actions, despite knowing the principles of how the units operate, are almost always sudden and are most often conducted in a blurry combat situation. A complex operation, such as a defensive one, can lead to an undesired effect, which is that the unit finds itself in the encirclement and is forced to make a break through, in order to complete the task and preserve the lives of its personnel.

Key words: Mechanized units, defense, encirclement, break through

1. INTRODUCTION

The encirclement and breakthrough from the encirclement in its classic manner has not been performed since the World War II in this region. The tactics and principles of the use of units are gradually being adapted to modern conflicts, which are mainly carried out in urban areas.

In the rich history of wars in this region, we have knowledge in the form of records and memoirs of prominent military commanders, mostly of those who fought in People's Liberation War in World War II and wars from 1991-1995. There are examples of this kind of combat activities, where units were encircled, and had to do a breakthrough, with more or less success, or more or less casualties. SO far, these examples form wars in Former Yugoslavia weren’t studied in military schools, through tactics. There is no scientifically verified knowledge about the subject of the research itself.

In modern conflicts, the prerequisites for the execution of actions are: mass of forces, mobility, intensive use of modern technical and technological devices and assets, supremacy in air space, and asymmetry, which puts the defender in the position of having to constantly monitor changes on the battlefield, so as not to get into a situation to be surrounded by enemy. In these
combat conditions, it is necessary to constantly be aware of the situation in the operational encirclement and be ready to make timely decisions.

Encirclement can be viewed as part of a defense operation, as the worst case scenario, when a unit, due to poorly implemented preventive measures to prevent encirclement, comes into a situation of being surrounded, due to an insufficiently well-organized withdrawal. The specificity of the breakthrough from the encirclement of the mechanized battalion lies in the possible speed of the maneuver of armored combat vehicles, the combination of firepower and speed, with the skillful use of which we create an advantage over the enemy. Successfully making a breakthrough in a carefully selected sector, and according to the decision made by the battalion commander with a quick and high-quality assessment of the situation and quick decision-making, flawless organization of cooperation and organization of forces for combat is necessary.

2. CONDITIONS IN WHICH ENCIRCLEMENT HAPPENS AND ITS PREVENTION

Mechanized units have the potential to effectively prevent the encirclement, by the enemy forces exerting the encirclement. Primarily, they engage from the reserve and carry out a counterattack in cooperation with the reserve, and are irreplaceable in closing the gaps; they are efficient in accepting the forces that have withdrawn from the battle, and they can very successfully, in cooperation with other friendly forces, but not on their own, lead the fight against airborne and paratroopers.

The unit or its parts may get encircled during combat activities in a defensive operation (counterattack, raid, etc.), or after getting wedged into the enemy's forces, if care is not taken to expose its own flanks. It is possible to get into encirclement even after withdrawal from the battle, during the retreat and the enemy's efforts to reach our forces during the pursuit/chase, they cut off the path of retreat, very often in combination with air landings.

The encirclement is, most often, a consequence of the unfavorable development of the battle situation on flanks and the rapid breakout of the enemy's armored units on the flanks and in the depth of own troops, in combination with air landings and nuclear strikes (Land army brigade Field manual, 2013).

The most common conditions in which the encirclement can occur are:
- breach of defense, fast and deep penetration of armored or mechanized units into the depth of enemy’s defense with the use of airborne troops (frontal breakthrough with superior forces),
- when the defense is organized without direct support of neighbors, usually when the units organize the defense along the lines and with larger interspaces (especially if the tasks of securing the flanks and interspaces are not clearly defined, if the flanks are not fortified or covered with the fire-support system of the superior ),
- due to the unfavorable outcome of the battle of neighboring units or on the flanks, without organized cooperation and constant monitoring of the situation on the battlefield,
- when wedged into the enemy's battle formation by conducting out a counterattack, where despite success, there may also be a deliberate misleading up of enemy forces in order to act in the flanks or bring them into the encirclement,
- when the defense is organized hastily, without sufficient data on the layout, strength, intentions of the enemy, execution of obstacles, security of flanks and a quality of a fire system,
- by organizing defense in environment that does not allow full mobility of forces and maneuver in all directions (existence of partitions/obstacles or other similar objects in the operation zone).
As the encirclement does not occur suddenly, it allows the HQ and units to plan and organize certain procedures and measures in order to prevent it. In these cases, together with quality and skillful assessment of necessary preventive combat measures, the time for organizing those actions is a decisive factor, considering the speed of conducting modern operations, and the use of modern technology.

It is necessary to organize a part of the measures that are carried out during the conduct of the defense operation, for the purpose of prevention and reducing the consequences of the enemy's actions:

- intervention in the case of an unfavorable development of the situation in a certain direction, first with the assets of fire support, for anti-armor combat, and, if necessary, with stronger forces,
- performing active actions on sensitive elements of the combat deployment with the aim of disrupting the attack, inflicting losses and limiting maneuvers,
- monitoring and constant assessment of the enemy's actions for the purpose of possible deception and other actions,
- maintaining contact and monitoring the situation through the organization of cooperation with neighboring units in order to exchange intelligence data,
- timely and organized withdrawal, unless otherwise defined by the task.

If, despite the actions taken, it is impossible to avoid the encirclement, it is necessary to ensure that the unit threatened by the encirclement accepts the imposed situation as organized as possible or at least under the most favorable conditions.

3. ORGANIZING COMBAT FORCES FOR THE FIGHT IN ENCIRCLEMENT AREA

Primarily, if unit is encircled, it should always accept combat and try to make a breakthrough. Further decision how a unit will make a breakthrough from the encirclement depends on several reasons, primarily on the task and goal set for unit. The assumption that the unit will be surrounded cannot be the only reason for leaving the area and position, as well as for not completing the assigned task. The basic thing that it undertakes after the encirclement is the order to switch to circular defense, that is, the defense of the outer part of the battlespace area where the unit is surrounded.

Initial success in combat in the encirclement is achieved by forming an appropriate combat deployment. It stems from previous actions, mainly defense, but it is specific in co-relation to the combat deployment in other actions, especially in the way forces and assets are engaged. The combat arrangement of the unit in the encirclement can have the same elements as in the defense organized in direct contact with the enemy. Most often it will be an deploying in one line with a reserve in the back.
When grouping and preparing forces for the battle in encirclement, the commander also prepares the forces for the breakthrough, because regrouping during the battle is extremely difficult and demanding. All activities are directed with the aim of protecting own forces, assets and finding a suitable route and time to execute a breakthrough and merge with its own forces.

The elements of the combat deployment of the mechanized battalion are, in general (see picture 1):

**The companies of the first line** will be distributed along the edges of the encircled area unevenly and with a smaller depth, except on the routes where a stronger effect and manpower of the enemy is expected. Each company does its own obstacles in front of the first line end and in the intermediate spaces. According to the decision of the battalion commander, a part of the forces for anti-armor combat can be attached to the companies on more vulnerable routes.

**The reserve** will be of the strength of a reinforced platoon, formed from a company that was at the main effort in previous operations, and the task of the reserve is to close critical routes.

**The battalion fire support team** is deployed closer to the middle of the encircled area with the task of effectively supporting the action of the first line companies in all directions.

**The battalion anti-tank group** should be deployed the area closer to the most threatened routes, to defend possible advance of the enemy's armored forces.

**The command post** is generally placed in the middle of the encircled area or in a place from where it can successfully run the battle. The battalion commander with part of the HQ will be on the most threatened part of the battlespace.

**The logistics unit** forms stations and places them in a scattered manner in the middle of the encircled area.
The choice of the method of deployment of units within the mechanized battalion is up to the commander, his experience, knowledge and skill, and the most important factor is the development of the combat situation, the area of the operation, the possibility of cooperation with neighbors, etc.

4. MECHANIZED BATTALION IN BREAKOUT FROM ENCIRCLEMENT

The breakthrough should be executed before the enemy manages to form a full circle/ring around the battalion and strive to always be in the direction of location of our forces, in order to link with them.

The breakthrough from the encirclement can be done in one or more directions, with the aim of getting the unit out as soon as possible and with as few losses as possible.

1) Breakthrough in one direction is most often used because it allows a greater concentration of forces and impact of the breakthrough in the selected direction, optimal use of support forces and command during operation. Usually is done in combination with fake actions in the other direction in order to deceive about the actual direction of the breakthrough. Although by grouping the forces in one direction, the unit is exposed to greater danger from artillery and air attack from the enemy, this method is more effective. By implementing fake actions, it is possible to achieve surprise in the breakthrough section by quick regrouping of forces and choosing the section that the enemy least expects.

2) A breakthrough in multiple directions is used when the unit's freedom of movement is limited and there are no conditions for regrouping forces and breakthrough in one direction, or the pressure of the enemy is such that it is impossible to stay in the surrounded area. It is conducted out by subordinate units from their positions without regrouping and they have given tasks about the actions after the breakthrough, the time and place of gathering. In this way, it is likely to merge with its own units in smaller parts. The good features of this kind of the breakthrough are the scattered deployment and the distracted effect of the enemy simultaneously in all directions. The disadvantage of this way of breakthrough is that commanding the unit is more difficult than usual and the probability of success is low. Battalion commander will resort to a multiple directions breakthrough when there is no other way and is usually a last resort measure to prevent the destruction of own forces. Regardless of the chosen method, each requires proper preparation and organization in order to overcome all aggravating circumstances.

The choice of the method of the breakthrough will depend on the specific situation, the capabilities of surrounded unit, the available assets, and also on the position and the possibility of engaging friendly forces outside the surrounded area.

The preparation of a breakthrough is a very complex process, which requires great effort from both the battalion commander and the HQ to solve one of the most demanding situations for the battalion, in this regard, one should always strive to make the preparations in a timely manner and in the utmost secrecy, and the breakthrough from the encirclement is carried out in shortest possible time.

The preparations for the breakthrough include:
- selection of a direction and section of the breakthrough (one or more),
- selection of a direction (one or more) for a fake attack due the surprise,
- determination of the time for the beginning of the breakthrough-fake attack,
- the time and method of regrouping and formation of a combat deployment for a breakthrough,
- replenishment of units with ammunition, fuel and other supplies,
The timing of the start of the breakthrough and demonstration combat activities is extremely important for the success of the breakthrough. The best time for a unit to start breakthrough from the encirclement is at the very beginning. If the enemy is given more time, the conditions for a breakthrough will be increasingly lower, and the breakthrough success will mostly depend on the enemy's activity.

The breakthrough from the encirclement must be done regardless of the ratio of own and enemy forces. The strength of the breakout force will depend on how many forces are surrounded. In terms of choosing the time and place of the breakthrough, the battalion commander will have less opportunity to choose the most favorable one, but the concrete situation will decide that crucial role.

The breakthrough begins according as battalion commander ordered. By that time, troops have regrouped and a combat deployment was formed, and the units were issued precise and concrete tasks in accordance with the battalion commander's decision.

The breakthrough is preceded by fire support units towards the enemy in the direction of demonstration action. With fire support, demonstrative actions by certain forces begin with the aim of deceiving the enemy and diverting attention from the actual section of the breakthrough. By quick and sudden action with the support of other forces in the area (if any), the enemy is forced to concentrate forces in that direction and maintain combat contact.

After the enemy has reacted and tried to repel the attack, the fire support group transfers fire and tries to make as strong effect as possible on the borders of a encircled area, in the direction of the actual breakthrough section. With the fire support of the forces for the breakthrough, they hold up the assault position making short movements, and then make the final breakthrough. The fire support group protects the flanks with barrage fire and prevents enemy intervention. Other forces (HQ, logistics…) move after the breakthrough forces make final action.

**Figure 2. Basic combat arrangement of a mechanized battalion for a breakthrough from the encirclement**

*Source: (The picture is the author's work)*

The breakthrough begins according as battalion commander ordered. By that time, troops have regrouped and a combat deployment was formed, and the units were issued precise and concrete tasks in accordance with the battalion commander's decision.

The breakthrough is preceded by fire support units towards the enemy in the direction of demonstration action. With fire support, demonstrative actions by certain forces begin with the aim of deceiving the enemy and diverting attention from the actual section of the breakthrough. By quick and sudden action with the support of other forces in the area (if any), the enemy is forced to concentrate forces in that direction and maintain combat contact.

After the enemy has reacted and tried to repel the attack, the fire support group transfers fire and tries to make as strong effect as possible on the borders of a encircled area, in the direction of the actual breakthrough section. With the fire support of the forces for the breakthrough, they hold up the assault position making short movements, and then make the final breakthrough. The fire support group protects the flanks with barrage fire and prevents enemy intervention. Other forces (HQ, logistics…) move after the breakthrough forces make final action.
After breaching the perimeter, the breaching forces widen the gap to the flanks and quickly withdraw. The reserve carries out security of the flanks, to ensure the passage achieved by the breakthrough. Demonstration forces disengage and move after breakout forces. Protection forces (which, with their own protection, are withdrawn to suitable positions and prevent the attacker from wedged into the surrounded area and disrupt the normal course of the breakthrough) protect the withdrawal of forces from the encirclement by preventing them from being cut off from the breakthrough forces and provide them from the rear.

After the withdrawal of all the forces from the encirclement, the protective forces are disengaged, making a backward maneuver, they gather on the move and continue moving after the breakthrough forces. The reserve still protects the flanks of the forces for the breakthrough, the passage and prevents the intervention and action of the enemy by the forces in the withdrawal.

After the protective forces have withdrawn from the encirclement, the reserve performs a realignment on the move and withdrawing its own forces. At the same time, they provide rear security of the movement of the battalion. The distance between the elements of the combat parts is reduced in order to separate from the enemy as quickly as possible.

After the breakthrough, the main part of the battalion moves, generally in marching order or battle order (with appropriate security) until it gets out of direct combat contact with the enemy, and then acts according to given task and specific situation.

In the event that the breakthrough is made towards one's own forces, the units towards which the battalion is moving and in whose direction it is making the breakthrough bind the enemy's forces by undertaking active actions that begin with the start of the breakthrough. If the units from the front and from the encirclement areas come into contact with fire, the merger is successfully carried out and the breakthrough is completed after the acceptance of all subordinate units of the battalion.

In order to merge with one's own forces, there must necessarily be a system of mutual recognition that must be planned to prevent the effect of one on the other, that is, to implement force protection measures through identification on the battlefield. May include visual signals such as marked vehicles, armbands, use of lights, weapon or hand signals.

If there is no merging with its own forces, the battalion is deployed in a certain area, establishes contact with the superior command, organizes and prepares for the next task in accordance with the superior's order.

5. CONCLUSION

From all of the above, it can be concluded that breaking out of the encirclement is a complex operation that requires an extraordinary effort of all forces and constant coordination of their activities. In armed conflicts, it is necessary to constantly monitor the situation, so that there are no unwanted consequences, that is, an enemy movement that will put its forces in a more favorable position compared to ours.

Defensive operations require predicting the encirclement, beside main objective in operation, which is to prevent the enemy from occupying the territory, constant consideration and assessment of risk factors that may lead to the unit's encirclement.

The possibilities of a mechanized battalion in the modern way of warfare, which has changed in the last 30 years, are great, but modernizing the assets must keep up with time and technological development. The forces formed by the battalion must be equipped with more modern assets, for example wheeled vehicles, in addition to tracked ones, better and more
modern weapons and better individual equipment for a soldier on the ground. The composition of the battalion should also include modern surveillance means that can collect data at greater distances, and this means primarily drones.

Another important group of assets is the acquisition or modernization of fire support assets, which, in addition to the fire support of units, will have the ability to provide more effective support during a breakthrough from the environment.

Consideration of this type of combat activities is necessary at higher levels, where the use of helicopter and aviation units is also necessary.

The specificity of breakthroughs from the encirclement carried out by mechanized units is the speed of breakthrough, which definitely sets them apart from other maneuver units. Mechanized units in this occasion show their firepower and maneuverability in full glory, which makes them the basic maneuverability of the Ground Army and the Serbian Army as well.

REFERENCES

Land army brigade Field manual (2013). (Only in Serbian: Правило бригада КоB), MOD, GS SA, Land forces HQ, Nis.
THE CONCEPT OF MODERN ARTILLERY RECONNAISSANCE IN FOREIGN ARMED FORCES AND ITS IMPLEMENTATION IN THE SERBIAN ARMED FORCES IN THE FUNCTION OF OWN UNITS SAFETY

Zoran Djuric¹, Marko Markovic², Branislav Bojanic³, Vuk Novakovic⁴

¹ University of Defence in Belgrade, Military Academy, Veljka Lukica-Kurjaka Street No. 33, Belgrade, Republic of Serbia, z.djuric09@gmail.com
² Combined artillery brigade, Camurlijski put bb, Nis, Republic of Serbia, marko.markovic.81@live.com
³ University of Defence in Belgrade, Military Academy, Veljka Lukica-Kurjaka Street No. 33, Belgrade, Republic of Serbia, branislavbojanic80@gmail.com
⁴ University of Defence in Belgrade, Military Academy, Veljka Lukica-Kurjaka Street No. 33, Belgrade, Republic of Serbia, qrjak984@gmail.com

Received: 1st September 2022
Accepted: 11th September 2022

Professional paper

Abstract: Serbian Army’s modernization process thru the introduction of new digitalized and modernized weapons and equipment requires discovering the most optimal methods for handling and using it considering all key characteristics of modern armed conflict. During practical use of this weapons and equipment, in participating in field exercises and combined arms live fire exercises (CALFEX) we could see the dynamics of operations in modern warfare requires more mobility, better target acquisition in whole area of operation, faster flow of information and data processing, as well as speed of reaction toward better artillery fire effects and decreasing risks for own forces. Thru analysis of realized exercises where participated artillery units equiped with modern reconnaissance equipment we empirical concluded there exist strong need for arrangement and change of organizational framework of artillery units. Considering that actual formations are dimensioned according with requirments of equipment wich is more or less exceed we identified need for adaptation to modern equipment requirements in terms of optimization human resources potentials both in quantitative and in qualitative sense. Thru this work we offer some models of doctrinal arrangement and change of organizational framework structure.

Key words: Artillery reconnaissance, modern equipment, doctrinal arrangement, formation.

1. INTRODUCTION

During running operations in modern warfare, accurate and precise artillery fire support is recognized as very remarkable, so artillery reconnaissance, as part of it have great contribution in the operation’s goal reaching. By following the development of techniques and methods of
units usage in modern wars, as answer to possible threats, the need arises for modernization of all combat systems in Serbian Armed Forces. Focus in modernization process is given to increasing fire power, range, speed of reaction and mobility of artillery units in zone of operation. In modern equipment and high mobility enemy’s units usage environment combined with camouflage, it is very difficult to detect enemy’s key elements which implicate strong need for modernization of artillery reconnaissance equipment and improvement of whole artillery reconnaissance system.

Actual regulations and field manuals defines that handling and control of artillery fire doing exclusively the artillery branche members, otherwise, practical usage of artillery units shows that current organization of artillery reconnaissance don’t afford completely and comprehensively observing, target acquisition and handling and control of artillery fire in whole area of operation.

From forces protection aspect, usage of modern artillery reconnaissance equipment significantly decreasing risks of own loses, but that requires doctrinal arrangement changes and improvement of organizational framework structure artillery recon units.

In the light of previous, this work will consider changes of system and organization of artillery reconnaissance by comparation with artillery reconnaissance organization in United States Army (US Army) and The Armed Forces of the Russian Federation (AFRF).

Accordingly, work’s goal is to inspect how changes of doctrinal arrangement and organizational-framework changes affect to increasing level of own units safety.

2. THE ORGANIZATION OF ARTILLERY RECONNAISSANCE AND EQUIPMENT USED BY UNITED STATES ARMY AND THE ARMED FORCES OF THE RUSSIAN FEDERATION

In order to reach the most acceptable solution for changing of doctrinal arrangement and suit of organizational-formation structure to usage of modern equipment for reconnaissance it is necessary to analize organization of artillery reconnaissance in world’s leading countries armed forces in production and usage of modern weapons and equipment. The United States Army and The Armed Forces of the Russian Federation are surely one of the leading forces in production and use of modern weapons and equipment, while the analysis can led to the conclusion that the organization and principles of the of units differ in many ways. The characteristic of artillery reconnaissance in artillery units of the US Army is certainly that artillery target’s data is collected by all participants of the operation and all possible sources in the area of operation. According to current US Army regulations, target acquisition can be obtained in several ways (Army techniques publication, 2015):

- Direct observation by special operations forces, scouts and forward observers,
- Electronic intelligence sources such as radio frequency intercept systems,
- Human intelligence sources (HUMINT),
- Weapons locating radars,
- Unmanned aircraft systems,
- Higher headquarters and joint sources,
- Maneuver formations down through the squad level.

By analysis of the aforementioned methods of data collection led to the conclusion that the diversity and level of sophistication of reconnaissance devices directly affects the level of own units safety.
Looking at organizational framework structure of the artillery units of the US Army, we can see that the command-reconnaissance part is completely excluded from the organization of the artillery battery, and that the artillery reconnaissance system is established by the formation of several support teams and forward observers. Support teams and observers are in the ground order of battle of maneuver units, and as they are composed of artillery commissioned officers, non commissioned officers and soldiers, conditions are created for faster reaction and more precise handling of artillery fire. By increasing the speed of reaction, accuracy and precision of handling artillery fire, greater effects of neutralizing the enemy are achieved, which in turn leads to reduction of own units losses.

Battalion and brigade level units have a platoon or battery for target acquisition. The basic component of these reconnaissance units are radars designed to detect the fire positions of enemy fire support and provide data that enables counter batting. The characteristics of individual radars are shown in table 1.

Table 1: Tactical and technical data of the radar in use in the US Armed Forces (Fire Support for the Brigade Combat Team, 2016)

<table>
<thead>
<tr>
<th>Radar</th>
<th>Observation sector</th>
<th>Observation distance</th>
<th>Target detection</th>
</tr>
</thead>
<tbody>
<tr>
<td>AN/TPQ–36</td>
<td>16–00</td>
<td>0.75–24km</td>
<td>Shorter range, higher group of angles, lower projectile velocity. Weapons such as mortars and short-range artillery pieces.</td>
</tr>
<tr>
<td>AN/TPQ–37</td>
<td>16–00</td>
<td>3–50 km</td>
<td>Longer range, lower group of angles, higher initial projectile speed. Long-range artillery and missile systems.</td>
</tr>
<tr>
<td>AN/TPQ–50</td>
<td>64–00</td>
<td>0.5–10 km</td>
<td>Shorter range, higher group of angles, lower projectile velocity. Weapons such as mortars.</td>
</tr>
</tbody>
</table>

Each artillery battalion has these radars, which, in addition to the stated purpose, can also correct the fire of its own artillery, providing data on the place of fall of the projectile so that the technical fire direction sections can calculate corrections. All radars used in the area of operation thus enter into a single system of reconnaissance and target acquisition.

In the organizational framework structure of artillery units of the US Army, there are no embedded units equipped with unmanned aerial vehicles, but in order to protect their own forces, when engaging in joint operations, other units that have unmanned aerial vehicles in their composition collect information on artillery targets.

In relation to US Army, the organization of artillery reconnaissance in AFRF is an integral part of the execution of artillery combat operations. In the AFRF artillery reconnaissance is organized at all levels, from artillery batteries corps and groups of armies.

Reconnaissance of the enemy on the field itself is organized by the commander of the artillery unit in accordance with the order of the superior headquarter. The organization of artillery reconnaissance is itself is based on the possession of observation posts by reconnaissance units using specialized vehicles equipped with devices for detection of targets and target acquisition.

For the purposes of target acquisition the AFRF use advanced reconnaissance devices and systems both from the ground and from the air.

In addition to the basic optoelectronic devices in the artillery units of the AFRF, reconnaissance radars are also used to detect targets in the enemy’s ground order of battle, the appearance and characteristics of which are shown in Table 2. From the aspect of forces protection, AFRF use lightly armored vehicles equipped with modern reconnaissance devices,
which largely provides protection for personnel during the march and occupation of observation posts, but also makes them easier to see compared to smaller reconnaissance teams equipped with portable devices.

**Table 2. Radars in AFRF equipment (Source: www.topwar.ru for Kredo-M1 and www.roe.ru for Aistenok)**

<table>
<thead>
<tr>
<th>Radar</th>
<th>Purpose</th>
<th>Features</th>
</tr>
</thead>
</table>
| PSNR–8 Kredo–M1 | Detection of moving targets on land or water, artillery fire support at any time of the day, regardless of the season, and also in low visibility conditions. | • Target detection distance:  
  - Manpower: 15km  
  - Non-combat m/v: 32 km  
  - Combat m/v: 30 km  
  - Explosive projectile 155 mm: 10 km  
Data accuracy: 20 m per distance and 0-05 per direction. Weight of the set: 51 kg  
Manufacturer: Rosoboronexport, Russia |
| Aistenok | The Aistenok radar is intended for detecting the position of mortars 80-120 mm, detecting moving targets (combat vehicles) and for correcting own artillery fire 122-152 mm. | • Mortars: 5 km  
  • Moving targets: 20 km  
  • Correction: 10 km  
  • Operating range: J-band  
Data accuracy: 30–40 m  
Manufacturer: Алмаз–Антей, Russia |

3. **MODEL OF ORGANIZATION OF ARTILLERY RECONNAISSANCE IN MODERN COMBAT OPERATIONS**

Modern combat operations have as their primary goal the avoidance of conventional warfare, and the application of quick and short actions using precise and deadly weapons in order to impose their own will on the opposing side as soon as possible. In order to achieve these goals, the tendencies of the development of the armed forces in the world go in the direction of increasing mobility, the possibility of accurate and precise detection of targets in the entire area of operation, rapid transmission and processing of information, as well as increasing the speed of response in order to achieve the greatest possible effect of artillery fire and reducing the risk of losses of own forces.

Comparing the methods of conducting artillery reconnaissance in the Serbian Armed Forces (SAF), the US Army and Armed Forces of the Russian Federation, it can be concluded that the artillery reconnaissance in the SAF and AFRF is almost identical. In the AFRF, reconnaissance personnel rely more on the use of command-reconnaissance vehicles as primary artillery observation posts, which allows them to leave their positions more quickly and have more consecutive follow-up observation posts. With the introduction of the BOV KIV armored
vehicle in the SAF artillery units, the conditions are created for our artillery reconnaissance units to be engaged in a similar or the same way.

On the other hand, the artillery reconnaissance units in the US Army are smaller, mobile, trained for independent work, which allows them to carry out their assigned tasks with significantly smaller numbers. Also, their presence at the front end of their own forces allows them to have a better overview of the situation on the battlefield, timely sighting of targets and handling fire of them.

Following the trends in the development in the world, the SAF began the process of improvement and modernization by introducing digitalized weapons and modern equipment into operational use. Namely, self-propelled howitzers 155mm NORA B52 M15, modernized self-propelled howitzers 122mm 2S1 GVOZDIK and self-propelled multiple launching rocket system digitalized 128mm M17 OGANJ and modern devices for observation, handling and fire control were put into operational use in the units of the SAF. The mentioned process made it possible to shoot at longer distances, and by automating the observation system and calculating the elements for shooting, the time for the preparation and fire delivery was shortened.

The use of artillery reconnaissance units, dimensioned according to the previous rules and instructions, in such conditions makes those units visible, vulnerable and sluggish with reduced possibilities of monitoring the activities and maneuvers of the enemy in the entire area of operation, and therefore to an increase in the risk of own losses. The need for a greater level of protection of our own forces and personnel as one of the most important elements of combat actions led us to think about changing the organizational frame structure and the way artillery-reconnaissance units are used. Through the practical use of the mentioned devices and equipment, and the analysis of the organization of artillery reconnaissance of foreign armed forces, we arrive at possible models of the organization of artillery reconnaissance in the units of the Serbian Armed Forces.

Starting from the lowest level of organization, the reconnaissance section, it was concluded that the organizational frame structure of the section should ensure the formation of 2-3 reconnaissance teams at the battery level, which would be equipped with modern portable devices and devices installed on appropriate vehicles and would be able for independently fire handling, which means that the section should have several teams of the following:

- 1st reconnaissance team
  non-commissioned officer-scout, team commander
  soldier-radio operator
  driver.

- 2nd reconnaissance team
  non-commissioned officer-scout, team commander
  soldier-radio operator
  driver.

- Observation team
  non-commissioned officer-forward observer, team commander
  soldier-radio operator
  driver.

This organization would enable the formation of two artillery observation posts and one reconnaissance team at the battery level, which would increase the possibilities of observing a larger area in the area of operation, increase mobility, and given that the reconnaissance team
would be assigned to the composition of the maneuver unit, on the main direction of attack or the center of gravity of the defense, the same would provide a higher speed of reaction, faster and more accurate fire on enemy units in direct combat contact. All the mentioned changes would affect the increase in the degree of protection of own forces.

The next level of organization would be the command-reconnaissance platoon of the command-reconnaissance battery, whose composition should provide 3-4 battalion-level reconnaissance teams, trained, equipped and capable of independent management and handling of artillery fire. The composition of the command-reconnaissance platoon would be as follows:

- 1st section of the composition of 2 reconnaissance teams, which are of the same composition and purpose as the reconnaissance sections in fire batteries,

- 2nd section consists of 2 teams
  non-commissioned officer-scout, team commander,
  scout non-commissioned officer, sniper,
  soldier-scout,
  soldier-radio operator,
  driver

- 3rd section of unmanned aerial vehicles
  non-commissioned officer, department commander,
  non-commissioned officer-operator,
  soldier,
  driver

The first section would carry out the same and similar tasks as the reconnaissance section in the batteries, with the fact that they would also have the obligation to organize reconnaissance from the observation posts of the battalion commanders and commanders of the command-reconnaissance battery.

The task of the 2nd section would be to scout targets in the depth of the enemy's deployment, and they would be sent to the enemy's territory as part of the reconnaissance elements of the supported unit or independently.

The third section, with the use of remotely controlled aerial platforms, would have the task of reconnaissance of the area of operation in the zone of the maximum range of the weapon.

Units dimensioned in this way with the specified methods of use would to a certain extent respond to the modern conditions of conducting combat operations.

4. CONCLUSION

Following the development of artillery-missile systems and associated accessories and instruments in the modern age and their importance, which is reflected in the creation of conditions for the achievement of operational tasks with the least possible losses of its own forces, the Serbian Armed Forces realized the necessity for a doctrinal regulation of the use of artillery units. Thus, in 2012, the procedure for the development of new rules and instructions was initiated, which resulted in the drafting of the Artillery Rules of Battle, the Artillery Brigade Rules, the Artillery Division Rules and the Artillery Battery Rules. However, the method of conducting artillery reconnaissance in the aforementioned rules has not been changed in relation to the rules issued in the eighties of the last century, although the dynamics of conducting modern combat operations and equipping units with reconnaissance devices of a newer generation also required it.
Comparing the way artillery reconnaissance is organized and carried out in the Serbian Army with the way it is done by the armed forces of the USA and the Russian Federation, it was concluded that artillery reconnaissance in the Armed Forces and the Armed Forces of the Russian Federation is carried out in an identical manner, while artillery reconnaissance is organized, prepared and carried out in the US Armed Forces. Smaller units that are more mobile, more independent and more present in the front end of their own forces, which allows them to detect as many targets as possible with significantly smaller formations and successfully handle artillery fire.

With the introduction into operational use of modern artillery devices and the modernization of existing systems, the artillery units of the Serbian Armed Forces have gained the ability to deliver artillery fire at distances greater than 50 km, and the need to improve the artillery reconnaissance system has been imposed in order to ensure the effect of artillery in all weather and spatial conditions while reducing risks to the safety of one's own forces.

This work offers a model for the formation of multiple artillery reconnaissance elements that are smaller, mobile, highly trained and equipped and capable of detecting targets and handling artillery fire, which would enable better knowledge of the situation in the area of operation, detection of well-masked and established targets and acting on them and significantly increased the security of its own forces.

By organizing several consecutive artillery reconnaissance stations (observation posts), with a smaller number of people and at a shorter distance, better knowledge of the situation in the operation zone would be achieved, lucrative targets for artillery action would be more successfully discovered, which would significantly reduce the risk of own losses, which would have a multiple impact to achieve the goals of their own operation.

REFERENCES


Credo–M1 official brochure, (2020), Rosoboron Export, Moscow,

Headquarters, Department of The Army, (2015), Army techniques publication 3-09.23, Chapter IV, Department of The Army, Washington DC.

Headquarters, Department of The Army, (2016), Army techniques publication 3–09.42 , Fire Support for the Brigade Combat Team, Department of the Army, Washington, DC.
THE INTERDISCIPLINARY NATURE OF CRISIS MANAGEMENT

Viacheslav Chebotarov¹, Beata Glinkowska-Krauze², Iegor Chebotarov³, Tetiana Bukoros⁴

¹ Luhansk Taras Shevchenko National University, 36000, Kovalja str., 3, Poltava, Ukraine, vena.lnu@gmail.com
² Faculty of Management, University of Lodz, Matejki str., 22/26, Łódź, Poland, beata.glinkowska@uni.lodz.pl
³ Faculty of Management, University of Lodz, Matejki str., 22/26, Łódź, Poland, iegor.chebotarov@wz.uni.lodz.pl
⁴ National University of Technology and Design, 01011, Nemyrovycha-Danchenka str., 2, Kyiv, Ukraine, bukoros.t@knutd.edu.ua

Received: 3rd September 2022
Accepted: 14th September 2022

Abstract: The cyclic constantly reproducible nature of socio-economic crises, the increase in modern conditions of general uncertainty and instability, as well as the aggravation of the technogenic and environmental situation, together actualize the problem of crisis management in its qualitatively new - complex systemic content. To solve it, it is necessary to form a comprehension of the interdisciplinary nature of crisis management. Based on the generalization of theoretical and methodological studies, the phases of the crisis are singled out in the article, and its difference from the crisis situation is shown. An analysis is given of the regulatory support of crisis management in Poland and an example of the empirical practice of regulating relevant aspects at the local level is given. On this ground, an attempt was made to identify and rank the blocks of sciences, to identify the components of the branches of knowledge within each of these blocks (with a schematic illustration of the developed model), which is aimed at substantiating an interdisciplinary understanding of the nature and functional purpose of crisis management.

Key words: crisis management, interdisciplinary approach, block of economic sciences, institutional sciences

1. INTRODUCTION

The issue of forming the need for interdisciplinary in crisis management has been actively discussed in recent years. The sphere of crisis management concerns every aspect of society's functioning. Public awareness of the issues addressed in the study is also of great importance in terms of each country's citizens' safety. Threats that have arisen in recent years have a negative impact on people, the environment, infrastructure, and the state as a whole. Prevention, proper and quick response, as well as effective elimination of threats, are the most important goals of the state and public institutions. Therefore, it is necessary to constantly...
improve the system of crisis management, which poses a complicated and complex problem of determining its interdisciplinary content.

The purpose of the research is to show and reveal the interdisciplinary nature of crisis management. To achieve the goal, a systematic theoretical analysis was conducted, which is based on extensive empirical studies.

2. RESEARCH METHODOLOGY AND PROBLEMATICs

To study processes and interrelations in the social circumstances and natural environment, it is necessary to use qualitative methods of cognition. For this reason, the case study method was used to comprehend the interdisciplinary nature of crisis management. Several problematic questions were formulated, the most important of which are: which subjects participate in the so-called "security network"? What are the tasks of these organizations?

What fields and disciplines of knowledge are required for crisis management? To understand the interdisciplinary nature of crisis management, it is necessary to know the definition and essence of this concept, as well as to identify its interdisciplinary content. This is the subject of a complex scientific and practical analysis since an effective response to the crisis requires coordinated actions of specialists from a wide range of industries and spheres. Accordingly, it is necessary to employ methods of knowledge of various sciences.

3. CRISIS AND CRISIS SITUATION - THEORETICAL ANALYSIS

The etymology of the term "crisis" is of Greek origin (from the Greek "krisis"), and in general, it can be defined as a struggle, choice, or functioning under the pressure of time (Dworecki, 2012, p. 30). The essence of a crisis is a turning point and a change in the functioning of a specific subject (and/or object), that is, a moment when the functioning of a specific subject (and/or object) improves or worsens.

The cause of the crisis can be a large-scale social emergency that causes negative consequences for society and the economy of the country/countries (for example, an epidemic, war, climate disaster, etc.). The crisis may be related to the difficulties of a specific entity of economic (social) activity, or – its responsible executives. That is, the causes of the crisis can be both external (foreign) and internal (domestic). Accordingly, there are external and internal theories of crisis in science.

Crisis and crisis situation can be defined in different ways. It usually depends on the field and discipline of science, the nature, and the purpose of the subject. Sometimes these two terms are used synonymously, despite their diversity. A crisis is an element of a crisis situation, but not every crisis situation has to be a crisis (Wojciechowska-Filipek, S., Mazurek-Kucharska, B. 2014, p. 15-16). A crisis is a breaking point in a crisis situation when control over the crisis situation is lost (Zieliński, 2017, p. 49). This turning point can help control the threat or deepen and develop it.

The topicality of researching the problems of crisis and crisis management is, in many ways, determined by the cyclical, i.e., reproducing nature of the crisis. This important methodological provision was put forward for the first time in the history of science at the end of the 19th century by the famous Ukrainian scientist M. I. Tugan-Baranovsky (1894). Then this concept was developed by his disciple and follower N. Kondratieff (1984).

The characteristics of a crisis are the loss of control over the situation, suddenness and unexpectedness, negative character, and the resulting pressure of certain circumstances and lack of sufficient and/or accessible resources.
The following approach dominates in modern science. During a crisis situation, its four phases are distinguished (Fig. 1). In the first phase (peace). The main goal of crisis management at this stage is information gathering and constant monitoring of the situation. The purpose of the second stage is the preparation and planning of the appropriate response. In the de-escalation phase, control over the crisis situation is gradually taken and an attempt to stabilize it is made. The last phase, called the new stabilization, is not equivalent to the restoration of the pre-crisis situation (initial state), but it restores social peace.

Figure 1. Crisis situation — phases
*Source: (Grocki, 2012.)*

In summary, a crisis situation begins with the first visible symptoms, and a crisis is the culmination of a crisis situation deepening. To "relate" crisis management to the field of science, it is necessary to compare some aspects from the point of view of security sciences and management sciences. Table 1 shows a comparison of the concept of crisis in two aspects - in the context of security sciences and the context of management sciences.

Table 1 shows the fundamental difference in defining the concept of crisis, depending on the field of science. The term "crisis" is often associated with risk. It appeared in the context of crisis management at the turn of the 1940s and 1950s. At first, it only covered insurance and financial risks. The risk now affects all aspects of society, organizations, and countries. This also became the reason for the need to create an interdisciplinary approach to the crisis management process.

Table 1. Definitions of the crisis (*Source: Skomra, 2018*)

<table>
<thead>
<tr>
<th></th>
<th>Duration</th>
<th>Manageability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Security Sciences</td>
<td>A breakthrough, a turning point, a moment</td>
<td>Loss of capability to manage the situation</td>
</tr>
<tr>
<td>Management Sciences</td>
<td>State, phase, period, situation</td>
<td>Requires management under time pressure</td>
</tr>
</tbody>
</table>
Nevertheless, for this, it is necessary to synthesize the approaches of security sciences and management sciences of social direction.

4. CRISIS MANAGEMENT AS A SYSTEM - CONCEPT, AND ESSENCE

The essence of crisis management is to respond appropriately and prepare actions (planning, coordination, support, organization, control) to prevent or mitigate the consequences of threats. For crisis management to be effective, it is necessary to use human resources, legal acts, technologies, and information sources the right way. This means that it is necessary to possess knowledge in various fields (management, law, IT, security, psychology, sociology).

The crisis management system should become part of the actively developing security sphere, subject to changes and improvements at every stage of its functioning. This is a certain organizational structure (model), which should consist of several levels and encompass the resources of the country and society. Under the legislation of the Republic of Poland, such a structure is presented in Table 2.

Table 2. The structure of the crisis management (Source: National Security System)

<table>
<thead>
<tr>
<th>Administrative level</th>
<th>Crisis Management Authority</th>
<th>Opinion-making and advisory body</th>
<th>Crisis Management Center</th>
</tr>
</thead>
<tbody>
<tr>
<td>National</td>
<td>The Council of Ministers, the Prime Minister</td>
<td>Government crisis management team</td>
<td>Government Security Center</td>
</tr>
<tr>
<td>Departmental</td>
<td>Minister managing a department of government administration, Head of the central authority</td>
<td>Crisis Management Team (ministry, central office)</td>
<td>Crisis Management Center (ministries, central office)</td>
</tr>
<tr>
<td>Provincial</td>
<td>Provincial governor</td>
<td>Provincial crisis management team</td>
<td>Provincial Crisis Management Center</td>
</tr>
<tr>
<td>County</td>
<td>County Executive</td>
<td>County Crisis Management Team</td>
<td>County Crisis Management Center</td>
</tr>
<tr>
<td>Commune</td>
<td>Head of the commune, Mayor, President of the city</td>
<td>Communal Crisis Management Team</td>
<td>Communal Crisis Management Centers may be set up</td>
</tr>
</tbody>
</table>

The crisis authority carries out support and coordination activities, as well as monitoring of rescue operations throughout the country. The governing body is the Council of Ministers which deals with crisis situations in the territory of the Republic of Poland. The Government Security Center is a body subordinate to the Council of Ministers.

The provincial level (accountable to the Council of Ministers) supports rescue operations. Activities on the territory of the county are performed at the respective level.

Summing up, the essence of the crisis management system is related to the cooperation of many subjects and institutions aimed at maintaining public safety and responding appropriately to threats. The issue of crisis management is a broad and new direction of research, which is of interest to many scientific disciplines.

One of the tools that empirically demonstrates the interdisciplinary nature of crisis management is the security network. This concept (according to the Law of Poland "On Crisis Management") means a list of potential threats with an indication of the leading entity for their elimination and cooperating entities.
To confirm the proposed thesis Table 3 shows an example of the security network of one of the municipalities in the Świętokrzyskie Province (Voivodeship).

**Table 3.** Security network of the Samborzec commune (Source: Crisis response plan of the Samborzec commune)

<table>
<thead>
<tr>
<th>Incident</th>
<th>System Entities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flooding</td>
<td>Head of commune</td>
</tr>
<tr>
<td>Hurricane</td>
<td>OSP/PSP</td>
</tr>
<tr>
<td>Fire</td>
<td>Police</td>
</tr>
<tr>
<td>Drought</td>
<td>PPIS</td>
</tr>
<tr>
<td>Snowstorm/blizzard</td>
<td>PLW</td>
</tr>
<tr>
<td>Heavy raining</td>
<td>WIOS</td>
</tr>
<tr>
<td>High air temperatures</td>
<td>PINB</td>
</tr>
<tr>
<td>Low air temperatures</td>
<td>SZMiUW</td>
</tr>
<tr>
<td>Construction catastrophes</td>
<td>ARMIR</td>
</tr>
<tr>
<td>Epidemics</td>
<td>IMGW</td>
</tr>
<tr>
<td>Epidemic</td>
<td>RZGW</td>
</tr>
<tr>
<td>Highway catastrophes</td>
<td>Road administrator</td>
</tr>
<tr>
<td>Water supply disruptions</td>
<td>RZE</td>
</tr>
<tr>
<td>Terrorist attacks</td>
<td>ABW</td>
</tr>
<tr>
<td></td>
<td>ZGK</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>System Entities</th>
<th>Incident</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head of commune</td>
<td></td>
</tr>
<tr>
<td>OSP/PSP</td>
<td></td>
</tr>
<tr>
<td>Police</td>
<td></td>
</tr>
<tr>
<td>PPIS</td>
<td></td>
</tr>
<tr>
<td>PLW</td>
<td></td>
</tr>
<tr>
<td>WIOS</td>
<td></td>
</tr>
<tr>
<td>PINB</td>
<td></td>
</tr>
<tr>
<td>SZMiUW</td>
<td></td>
</tr>
<tr>
<td>ARMIR</td>
<td></td>
</tr>
<tr>
<td>IMGW</td>
<td></td>
</tr>
<tr>
<td>RZGW</td>
<td></td>
</tr>
<tr>
<td>Road administrator</td>
<td></td>
</tr>
<tr>
<td>RZE</td>
<td></td>
</tr>
<tr>
<td>ABW</td>
<td></td>
</tr>
<tr>
<td>ZGK</td>
<td></td>
</tr>
</tbody>
</table>

Legend:
- OSP – Commune Volunteer Fire Department / State Firefighting Service
- PPIS – County State Sanitary Inspector
- PLW – County Veterinary Doctor
- WIOS – Provincial Inspector for Environmental Protection
- PINB – County Building Supervision Inspector
- SZMiUW – Świętokrzyski Board of Melioration and Water Facilities
- ARMIR – Agency for Restructuring and Modernization of Agriculture
- IMGW – Institute of Meteorology and Water Management
- RZGW – Regional Water Management Board
- RZE – County Power Company
- ABW – Internal Security Agency
- ZGK – Department of Communal Management
The leading subject of crisis management, in this case, is the Head of Samborzhets commune, while the supporting/auxiliary subjects differ depending on the nature of the threat. Auxiliary organizations, in particular, include voluntary fire brigade and state firefighting service, police, state district sanitary inspector, etc.

5. FORMATION OF SYSTEMIC COMPREHENSION OF THE INTERDISCIPLINARY NATURE OF CRISIS MANAGEMENT

The implementation of the method of cognition "from the abstract to the concrete" in the context of the objectives of the presented study allows for making some generalizations.

Crisis management as a complex interdisciplinary phenomenon is objectively formed under the influence of several blocks of sciences. Respectively, - its systemic content should include aspects of several sciences (Fig.2).

![Figure 2. The interdisciplinary nature of crisis management.](image)

Source: (own author’s elaboration)

The basis of crisis management is, as shown in Fig. 2, the block of fundamental economic sciences - management itself, economics, finance, and marketing. Moreover, in this case, crisis management should synthesize these fundamental economic sciences and, in a new qualitative pattern, should be embodied in the management profile (Glinkowska and Chebotar, 2019).

In this understanding, crisis management in its functional mission is the basis of a block of sciences, which also includes life safety, political science, sociology, psychology, medicine, engineering (a set of technical and technological aspects of the crisis of a particular subject or object), qualimetry and PR (public relations).

Insufficient attention to these aspects, and their ignorance, affected the justification and implementation of measures to counter the COVID-2019 pandemic (Kolosov et al., 2022).

This block, in its turn, was made up of a broader block of sciences, including both institutional sciences and natural sciences: international economics, environmental protection, cultural studies, and religious studies. In this context, a particularly important role in crisis monitoring and substantiating the system of measures to overcome its consequences is played by taking into account the varying degree of response of managers in certain countries to uncertainty and
instability. In economic comparative studies, this is defined by such a dimension (parameter) of national business cultures as "uncertainty avoidance" (Glinkowska-Krauze et al., 2022).

Subjects (and/or objects) of different complexity levels that have found themselves in a crisis (or crisis situation), to overcome it - to enter the phase of "new stabilization", respectively, "require" the use of crisis management of different complexity levels. Thus, for small and medium-sized businesses, it may be sufficient to use crisis management using only the tools of the fundamental economic sciences block. For big business subjects and regional level social systems, it requires (along with the first block) also the block of sciences such as life safety, political science, sociology, psychology, medicine, engineering, quality control, and PR. Overcoming the crisis by subjects (and/or objects) of the national level necessitates the use of approaches and tools of the sciences like international economics, environmental protection, cultural studies, and religious studies as additional components.

5. CONCLUSIONS

Cyclical - reproducible nature of socio-economic crises, as well as increased instability of the modern economy and aggravation of the technogenic situation, significantly update the problems of crisis management. The multifaceted nature of contemporary crises objectively necessitates the use of a systematic approach to their foresight, monitoring, management, and overcoming the consequences (loss minimization). As a consequence, there is a need to use the conceptual approaches and practices of the system of modern sciences and branches of knowledge. Underestimating, and even ignoring the interdisciplinary nature of crisis management, is not only scientifically invalid. This results in human, financial, and material losses.

REFERENCES


M. I. Tugan-Baranovsky (1894). Industrial Crises in Contemporary England: Their Causes and Influences on the Life of the People


COUNTERMOBILITY IN POPULATED AREA’S DEFENCE

Srdjan Kostic¹, Miroslav Jovanovic², Zoran Sebez³

¹ University of Defence in Belgrade, Military Academy, Veljka Lukica-Kurjaka Street No. 33, Belgrade, Republic of Serbia, srdjankostic36@gmail.com
² University of Defence in Belgrade, Military Academy, Veljka Lukica-Kurjaka Street No. 33, Belgrade, Republic of Serbia, mjovanovic36@yahoo.com
³ 2. River Squad, Usce nn, Belgrade, Republic of Serbia, zokisebez341@gmail.com

Received: 3rd September 2022
Accepted: 8th September 2022

Professional paper

Abstract: For many years, little by little, the importance of a properly organized defense of a populated area in defensive operations was neglected. Large-scale military conflicts disappeared in the decades after World War II and gave way to localized conflicts of a small number of individuals, where the priority was given to technology and air superiority. In such an environment, the opinion was reached that, if defended, the populated areas would be bypassed and blocked, and the attack would continue. However, the events from the beginning of 2022 in Ukraine bring us back to reality, in which it is necessary to reconsider the ways and possibilities of defending populated areas, to recall the experiences from previous wars, but also to analyze them through the prism of the use of modern military equipment. In such conditions, prevention also has a significant impact.

Key words: countermobility, defence, populated area

1. INTRODUCTION

Modern combat operations have a number of specificities that set them apart and by which they differ from combat operations that were conducted until the end of the 20th century. The specifics developed as a result of changes in the doctrines of the world’s largest powers and affected the dynamics and manner of conducting combat operations, where often, when analyzing the operations, it is not possible to accurately determine the beginning of the operations, fire preparation, performance, combat in depth, or even major events, such as offense and defense. While an attack is being carried out on one part of the area, fire preparation is being carried out on another, and there is complete silence and preparation for actions on a third. Such dynamics of actions, with the use of modern means for reconnaissance and action from the air, called into question the possibility and need for the traditional organization of defense. Due to the exceptional capabilities for aerial reconnaissance, the question arises as to how to hide larger works that are required during countermobility, so it is also considered whether the traditional method of countermobility is an unmasking sign and an easily visible target for highly precise tools.
Due to the doctrinal requirements to maintain the pace of the attack, not to let the enemy out of touch and constant pressure, there were entrenched views that populated areas, which are in the direction of the attack, should be bypassed, and the enemy's forces should be kept in the vicinity until surrender or the arrival of larger forces for destruction. However, the events from the beginning of 2022 in Ukraine bring us back to reality, in which it is necessary to reconsider the ways and possibilities of defending populated areas, to recall the experiences from previous wars, but also to analyze them through the prism of the use of modern military equipment. In such conditions, prevention also has a significant impact.

In any army, countermobility is primarily handled by engineering units. Proper engagement of engineering units in all types of combat operations is an important prerequisite for achieving and ensuring success in operations. The use of engineering units especially comes to the fore in situations where, in addition to movement and fire, the emphasis is on the protection of people, techniques, and the engineering arrangement of areas and directions and on overcoming obstacles in order to accomplish some tasks. This tasks description is best reflected in the operational support of the defense operation.

2. DEFENCE

A defensive operation is a type of combat operation that is carried out in order to crush the offensive power of the enemy and create preconditions for the transition of one's own forces to attack (Serbian army's operations doctrine, 2012). The main goal of the defensive operation is to oppose the will and intentions of the enemy and to neutralize the forces on which his offensive power is based (Serbian army's operations doctrine, 2012). Like all operations, it is organized and carried out through a preparation phase, an execution phase and a stabilization and disengagement phase. In the defense operations of the Army, success is based on the organized deployment of units, the successful organization of fire and interdiction systems, the application of appropriate degrees of countermobility and the successful maneuvering of units (Land Army brigade handbook, 2014).

Countermobility has a significant impact on the movement and behavior of units, both your own and enemy units. Countermobility is the content of engineering actions that inflict losses on the enemy and prevent, slow down and channel his movement and maneuver forces (Land Army doctrine, 2012). A fact that is often forgotten is that countermobility also affects our own forces and, if not properly coordinated between units, can represent a complicating factor in the execution of operations.

Maneuver character, high intensity and dynamics of modern combat actions are more and more prominent in the foreground, as the necessity of carrying out tasks from the content of countermobility. In the absence of modern systems for remote (and fast) countermobility, it must be planned and organized in a timely manner, and professionally and timely implemented in order to achieve the right, required and expected effect.

According to the way of execution and use of space, the defense can be decisive and restraining (Land Army brigade handbook, 2014). It can be prepared in conditions when the basic forces are intended to perform the operation out of contact or in direct contact with the enemy, in conditions of timely preparations, or during the performance of other operations. The degree of tenacity in defense can be different - from elastic holding in depth to decisive holding of important positions, objects and areas. It is achieved by coordinated distribution of forces along the front and in depth: proper use of land and its engineering arrangements; countermobility and matching fire with obstacles; by quickly establishing a disrupted system of fire; dispersive and covert arrangement of forces for protection from nuclear weapons and aviation and others (Land Army brigade handbook, 2014).
Restraining defense is realized on consecutive zones, areas, positions and facilities by zone depth and active actions in the depth of the enemy's deployment and in one's own rear (Land Army brigade handbook, 2014). It is achieved by elastic resistance on successive belts, regions, positions and objects in the depth of the operation zone and active actions on all elements of the enemy's combat arrangement in his and his own rear. Decisive defense of individual directions, areas and facilities is achieved by firmly holding facilities in the operation zone with limited maneuvering of part of the forces in the depth of the zone and various intensive active actions of the forces on the front (in contact), in the enemy's rear and in their own rear.

In conditions where there is enough time and information about the enemy to prepare and organize a defense operation, when the units are more manned and rested, the planned grouping of forces, the organization of collaboration and cooperation, determination and prevention are approached. Depending on the characteristics of the terrain, the defensive operation can be prepared and carried out in different conditions, which affects the structure of the defensive operation zone, the grouping of forces and the overall content of combat operations.

The preparation of a defense operation is the same as in other operations, and the scope of certain activities, the method of their implementation and the method of engagement of forces is coordinated with the specific conditions in which the preparations are made. The preparation of the defense operation consists of the work of the command and the work of the units, and it depends on the conditions in which the operation is being carried out.

Organization of forces includes the assessment of the forces required for the operation and the establishment of the organization according to the plan of operation. The assessment of required forces is performed in the operational planning process and is based on mission and task analysis, enemy or non-military threat character, force availability and force operational capability. The establishment of the organization of forces is based on the commander's conceptual idea, unified command, centralized planning and direction, and decentralized execution. In most cases, the forces for the execution of operations are consisted of different units. For the needs of the operation, in addition to formations, dedicated and joint dedicated forces can be formed.

The main goal of the defensive operation is to inflict the greatest possible losses on the enemy, prevent them from occupying areas, break the offensive power and stop their attack, while protecting our own forces and assets from greater losses, taking the initiative and creating conditions for moving into offensive operations. The goal of the defense operation is determined on the basis of the received task, ideas for carrying out actions, strength, composition and methods of action of the enemy's and own forces, conditions in which actions are prepared and carried out.

3. COUNTERMOBILITY

When we talk about countermobility, the first thing that comes to mind is mines and explosive devices. However, countermobility is much more extensive and includes the creation of various fortification obstacles that slow down or stop movement, as well as the arrangement of space for these purposes.

Countermobility, as an activity, belongs to engineering actions, which inflict losses on the enemy and prevent, slow down and channel his movement and maneuver of forces. They are carried out by arranging objects, areas and directions. The bearer of engineering actions are engineering units, and they are also carried out by all other units of the Army at their positions, in areas and zones of combat operations. For tasks for which units of other branches are not
trained and equipped, engineering units are used, at the center of action, with the support and cooperation of the main bearers of operations - infantry and artillery units. The main objects of engineering operations are traffic roads and facilities on them, airborne facilities and tank-passable routes (Land Army doctrine, 2012).

In defensive operations, countermobility is undertaken in order to protect units in positions and increase the effectiveness of the forces' fire in defense, slow down the pace of attacks and channel the enemy's forces, create conditions for the successful operation of one's own units, hinder the use of landings, hinder movement, supply and evacuation and cause immediate losses to enemy forces by the effect of mine, explosive and flammable obstacles.

The organization and method of conducting countermobility in the defense depends on the conditions in which the defense is prepared, the objective of the defense, the planned maneuver, the characteristics of the ground, the amount, type and condition of natural and previously created artificial obstacles, the enemy's mode of action and his possibilities for overcoming obstacles, means and time for countermobility. Based on the assessment of these elements, the center of gravity of the obstacles, the type and amount of obstacles in certain directions and positions is determined.

Countermobility in the defense of a populated area can be organized as part of the external defense position, on the approaches to the populated area and inside the populated area, which depends on the size and role of the populated area in the defense system. Blocking performed in an outside defensive position is no different from countermobility performed in defense. On the approaches to a populated area, the largest volume of obstruction should be carried out in front of the front end of the defense, especially on the direct approaches to a populated area. The extent and method of countermobility within the settlement depends on its size and the way of defense organization. Obstacles are placed on streets, intersections, passages between buildings, in squares and within resistant nodes of unit defenses (Countermobility and overcoming obstacles, handbook, 1989).

For countermobility in large populated areas during the conduct of the defense, additional blocking groups can be formed (ABG) (Land Army brigade handbook, 2014), although according to the description of the tasks performed by those groups, they would be closer to the countermobility groups (CG). They, in addition to creating obstacles, can be tasked with demolishing buildings and other objects, and accordingly equip themselves with the necessary means of work.

Countermobility is conducted on the approaches and in the interior of the settlement. On approaches, the following obstacles are used: ravines, steep slopes, fences and rows of trees, reinforced with wire and mine obstacles. Streets, squares and intermediate spaces between units in the interior of the settlement are obstructed by the installation of wire barriers, minefields and demolition. In the obstacles of the ruins, loopholes, platforms for tools and passages for own units and means of transport are made. Passages in obstacles are secured against collapse, protected by heavy fire and arranged for quick closing. Demolition is carried out so that the enemy from the neighboring streets cannot go around the ruins. Surprise mines are widely used (Land Army brigade handbook, 2014).

4. COUNTERMOBILITY OF A POPULATED AREA

There is no handbook that defines how to properly block a populated area. Each settlement is separate, with its own specifics (although there are types of settlement), and each situation is different from another. Successful countermobility depends on the ideas of the commander, availability of manpower and material, time, situation...
Countermobility is of great importance in the defense of a populated area. When it is carried out as part of the external defense of a populated area, it does not differ from countermobility that is normally implemented in defense. The prevention that is carried out inside the populated area has its specificities, which are determined by the characteristics of the area itself. Passability within the settlement is limited to existing streets, passages and parks, so countermobility is carried out as part of resistant points and nodes of defense at intersections, passages between buildings, on squares, boulevards and in parks (Garasanin, 1979). As larger minefields cannot be used, groups of mines can be used to mine streets, passages, parks, ruins and congested streets, to strengthen anti-tank trenches, barricades... Mines are placed on a concrete (hard) surface and masked with various materials that has fallen from damaged or destroyed buildings in the vicinity. Fortification barriers on streets, intersections, parks and squares are very effective. The great possibility and choice of using a variety of hand-held materials enables the creation of various types of fortification obstacles such as barricades, concrete blocks, tetrahedrons, hedgehogs, pillars, dams, wire obstacles, etc (Garasanin, 1979).

In order to have some idea of what can be built and in what time, for the sake of timely planning of countermobility as part of the defense, it is necessary to have some framework norms for the construction of fortification and mine-explosive obstacles.

For most anti-tank mines the norm for placement and masking is 12-15 minutes, while for anti-personnel mines the norm is 5-15 minutes depending on the type of mine. In order to calculate the required time, it is necessary to multiply the norm by the planned number of mines and divide by the planned number of engaged personnel. To create a complete anti-tank minefield, which would be created in front of a populated area, a platoon (30 soldiers) needs to work for 10 hours for 1 km of minefield.

Making fortification obstacles generally does not take too much time, and the benefits are more than obvious. It takes 2 people and 30 minutes of work to make one hedgehog. It takes 2 people and 1 hour of work to make a double hedgehog. It takes 18 people and 4 hours of work to make a 100m-long reinforced wire fence, while a platoon makes 1 km in 20 hours of work. It takes 10 hours of work and 10 people to make a low wire net 100 meters long, while a line makes 300m in 10 hours of work. For more difficult and complex obstacles, it is necessary to hire engineering machines and their construction depends on the resources available (Engineering handbook, 1965).

5. CONCLUSION

By countermobility of a populated area in the zone of the defensive operation, favorable conditions are created to stop, with smaller forces, a numerically significantly superior enemy and thereby gain time to establish a battle order or bring in fresh forces from the depths. This kind of countermobility has its special significance in situations where the inhabited area cannot be passed due to the canalized area and traffic corridors that lead to the settlement and do not allow passing.

Considering the characteristics of modern warfare, which implies the massive use of aviation, remote-piloted aircraft and actions from a distance, it is extremely important to block in front of and in the populated area itself, so as to reduce the expected effects of the actions of these means, and at the same time to channel the movement of enemy assets in the directions leading to the zones of action of our own forces. For that, it is necessary to work out a detailed plan for countermobility in the settlement, which is different for each settlement and there is no universal solution.

One of the major limitations for countermobilizing a populated area in defense is finding and preparing enough construction material, especially timber, for the construction of planned...
fortification obstacles, because these are not standard material and technical means that exist in units (unlike mine-explosive assets). The required quantities depend on the extent of obstruction and the size of the settlement itself. On the other hand, the characteristic of engineering units is improvisation, so fortification obstacles can always be adapted to the available material, so they can be made even from waste material.

REFERENCES

Countermobility and overcoming obstacles, handbook, 1989, SSNO, Belgrade.


Garasanin, Radovan. 1979, Engineering tactics, SSNO, GS YPA, VIZ, Belgrade.


Serbian army's operations doctrine, 2012, Media center „Odbrana”, Belgrade.
THE CONTRIBUTION OF UAVs IN IMPROVING THE LANDMINE FIELD DETECTION PROCEDURE

Dejan Blagojevic¹, Bojan Glamolić², Srdjan Jovkovic³, Milan Protic⁴
¹ Academy of Applied Technical and Preschool Teacher Studies Nis, Aleksandra Medvedeva 20, Nis, Republic of Serbia, info@akademijanis.edu.rs
² Academy of Applied Technical and Preschool Teacher Studies Nis, Aleksandra Medvedeva 20, Nis, Republic of Serbia, info@akademijanis.edu.rs
³ Academy of Applied Technical and Preschool Teacher Studies Nis, Aleksandra Medvedeva 20, Nis, Republic of Serbia, info@akademijanis.edu.rs.com
⁴ Mine Action Center of Republic Serbia, 31, Vojvode Toze St., Belgrade, Republic of Serbia, czrs@czrs.gov.rs

Received: 3rd September 2022
Accepted: 11th September 2022

Abstract: The use of unmanned aerial vehicles is gaining more and more importance day by day and its applications are expanding. Monitoring, inspection, live stream and delivery are just some of the areas where UAVs play a dominant role. In recent decades, intensive attempts have been made to apply UAVs in coastal minefield inspections with the aim of improving the inspection process, increasing the efficiency of preparatory actions, the safety of teams in the field, and reducing the costs and time of operations. In this paper, experimental results will be presented that indicate the advantages of using unmanned aerial vehicles, as well as the possibilities of their future application, all with the aim of improving this area.

Key words: unmanned aerial vehicles, landmine, inspection, mapping

1. INTRODUCTION

Unmanned Aerial Vehicles (“UAVs” – drones) – enable a very wide range of new services and applications such as aerial surveillance, environmental sensing infrastructure monitoring, live broadcast etc. Employing drones for such variety spectrums of applications can improve safety aspects for human operators’ injuries and reduce the overall operational cost. The UAVs is equipped with an on-board device to control a motion beyond visual line of sight - LOS. Thanks to developed cellular network coverage and broadband data rate support, the UAV does not require a nearby flight operator, but is controlled remotely over the internet at unprecedented distances. We can say that today, we live in UAVs era.

Landmines are acute problem of presents dangerous and costly obstacle in area where it has been scattered. Landmine has a serous effect on people and surrounding. It can not only injure or kill a person, but it can also block access area with the delivery of food and medical supplies etc (Ember, Kovács, 2020). Landmines are debris of war activities, and it can be found everywhere, fields, roads, farmers’ fields, bushes, forests, deserts, along borders, in and
surrounding houses and schools, and in other places (Kovács, 2008). Landmines fields block access to food, water, and other everyday needs and inhibit freedom of movement. In situation when land cannot be cultivated, when medical systems cannot access to all who needs a help, it is clear that we need a general activism (Krause, 2018). In situation when countries must spend money for clearing mines instead to spend money for education, health care, new energy sources, it is obvious that landmines not only cause appalling human suffering (Lukács, 2006).

According to data from the Geneva International Center for Humanitarian Demining, as of January 2021, 55 countries in five different parts of the world are facing the problem of the presence of minefields. This is a serious and complex problem, the solution of which requires a comprehensive multidisciplinary approach and solution (Landmine Monitor report, 2021). The combination of modern technologies with field experience as well as a proactive approach can represent one of the potential WIN-WIN-WIN solutions.

Unmanned aerial vehicles are becoming day by day more and more important tools in the improvement of processes and activities in the field of humane demining. Terrain mapping processes, using different technologies, thermal, hyperspectral, LIDAR (light detection and ranging), GPR (ground penetrating radar) in combination with UAVs, are the future in the daily struggle with the consequences of human disasters such as landmines (Robledo, 2004). At the basis of numerous research is the examination of the efficiency of various sensor systems in different technologies in the application of minefield inspections (Ahmed, 2014). Such systems have shown certain degrees of efficiency in examining the presence of unexploded ordnance - UXO on large, contaminated area (Gooneratne, 2004).

2. UAV TECHNOLOGY, DIGITAL MAPING OF LANDMINE TERRAIN

With RGB cameras on UAVs, a much higher level of detail is achieved, with significantly less time spent, and optimal accuracy. The main advantage of mapping using unmanned aerial vehicles is reflected in the fact that certain work can be carried out with a much higher level of detail, with significantly less time spent for data collection in the field compared to the application of conventional surveying methods, with the achievement of optimal accuracy that must be met. The drone mapping process can be divided into three basic phases: Mission Planning, Data Collection and Data Processing. The data processing procedure can be done in a short time, i.e., in less than one hour, if a small number of photos were collected during mapping, while for projects with a large number of collected photos, significantly more time is needed for data processing (Kurmi, 2019).

A realistic digital 3D model of an object can be obtained with a drone, if there are no physical obstacles between the object being mapped and the camera used for recording.

The quality and accuracy of the footage is affected by the characteristics of the camera mounted on the drone and the details of the flight plan - flight height, camera angle, values of the longitudinal and transverse overlap between the photos, the accuracy and mutual geometry of the set control points on the object that is the subject of the recording etc.

Based on the information obtained by processing Digital Terrain Model (DTM), adequate management of spatial resources, in this case forest vegetation in the area of cities or outside them, is enabled. UAVs produce high-resolution images and information that provide operational value in a wide variety of different applications while surveying terrain of interest. With the help of obtained photos and various techniques of their processing, the conditions are created for the creation of up-to-date cartographic images and the creation of terrain maps on which appropriate operations are performed in different Google Maps, ArcGis, GIS environments. On the basis of this, the geolocation of suspicious parts of the terrain can be carried out, which will greatly improve the process of operational planning, inspection and
cleaning of the terrain. Namely, the data collected and processed by UAVs together with current and newly created maps for the removal of minefields can potentially predict the location of contamination, define accessible approaches, detect locations in some cases and georeference them (Borisov, 2015).

3. MATERIALS AND METHODS

In first steps of our experiment, we performed field validation and data collection. Field validation regarding the viability of airborne involved remotely collecting in-situ landmine data via drone over legacy minefields during the two days: March 31st and April 8th 2022 in object of Mine action center of Republic Serbia. High temporal and spatial resolution data was captured at a controlled field test site using production landmines – models, landmines free from explosives. These models were scattered inside the perimeter of actual landmines (100m²). The several main landmine types have been presented at this location. The placement of the mine model was done by an employee of the Demining Center according to the random distribution model. The other members of the team that performed the experiment were far enough away, so that they were not physically able to see the locations where the mines were placed. Landmines were partially or completely masked. All this was done in order to simulate the most realistic conditions on the field.

Recording was done using the MATRICE 300 RTK drone and the ZENMUSE H20T dual camera (fig 1). The Matrice 300 RTK is the latest DJI platform for professional solutions with a wide range of applications, 55 minutes flight technology, sacra direction and avoidance and reliability without transport. The following features of DJI, such as portable and fast to set, high efficiency reflectors, speakers, headlights and RTK accessories are available, maximum range of 15 km (FCC) • 1/2.3” CMOS (12 MP) RGB sensor • 640K512P thermal Sensor • 1/1.7” CMOS (20 MP) RGB sensor • laser remote detection system enables high efficiency process of collecting high resolution date.

Figure 1. DJI Matrice 300 RTK with H20T and L1 system

The recording was made by H20T camera from a height of 10 m to 60 m, (IR and RGB mode) where the relative humidity of the air was 60%, the reflection temperature was 25°C and the emissivity of the surface was 0.90. These last two parameters are important for thermal analysis. Recording was conducted in accordance with legal provisions and security conditions. After that, ordinary orthophoto mosaic, thermal orthophoto mosaic were obtained by processing the images on weekdays and recorded on weekends in RGB and thermal image. The mapping process was carried out using a standard procedure through three basic phases - mission planning, data collection and processing. The H20T camera, with its technical characteristics, fully met the requirements of experiment (fig 2).

To realize aerial photography, a flight plan was drawn up. The elements of the flight plan were determined in accordance with the project task, in accordance with the regulations governing the area of photogrammetric surveying. Given that the project task did not define the values of the maximum radial displacement of the image of the object, the values of the longitudinal and transverse overlap of the images and the corresponding constants of the cameras, they
were set to fulfill the given requirement of this report, which is the precise detection of active loggers in relation to the direction and time of flight to be acceptable in terms of avoiding excessive reflections, i.e., shadows, and to provide optimal contrast on the elements of interest in the images. The flyovers were made in the north-south direction to avoid potentially large differences in brightness between adjacent sets of images. For the creation of orthophotos, it was necessary to ensure a higher degree of overlap of the recordings than the standard one and the corresponding camera constants, which were determined in accordance with the project task.

In parallel with the recording of the field, we realized a live broadcast of the camera recordings via live streaming and a simulated small command center for remote supervision of the inspection process from the command room. The goal of this activity was to create conditions for more effective monitoring and the possibility for more people to have access to the results in real time (fig 3).

![Figure 2. DJI Matrice 300 RTK in operation flight](image)

**Figure 2.** DJI Matrice 300 RTK in operation flight

**4. RESULTS AND DISCUSSION**

After mapping in the field, the photos are imported into the Pix4D Mapper program for further processing. In this application, the coordinate system is selected, the accuracy is checked and the connection with the control points is carried out as necessary. In the next step, options for creating 3D models, orthophoto maps and radiometric maps are determined. Each of these options can be turned on or off individually and are independent of each other. In this step, we
can also choose the option to create a “.kml” file that contains maps compatible with Google Earth application, QGIS application and other similar applications (fig 4).

![Google Earth map position of simulated landmine location with stickers on mine location](image1.png)

**Figure 4.** Google Earth map position of simulated landmine location with stickers on mine location

Photo processing and creation of all selected models and files is done automatically, so that the program first finds the common points on the photos, then performs an overlay and finally creates the desired files. After each completed step a report is generated that can be viewed in real time, immediately after creation. The processing time depends on the number of selected options, the type of files and their complexity. For the purposes of the experiment, we chose to present the results in the Google Earth open-source platform due to its interactivity and availability.

![Inserted picture of landmine on location](image2.png)

**Figure 5.** Inserted picture of landmine on location

All nine landmines were detected within four hours at the mentioned location, by comparing the footage in real time in the simulated command room. The potential problem appeared in areas of denser vegetation, because that area was flown over more times than the area we used to simulate rocky terrain (fig 5). The applied methodology proved to be successful not only when detecting mines on the ground and in the surface layers of the earth, but also in cases where the mines were placed at a certain height above the ground (fig 6). In the latter case, the approach was performed from different angles on several occasions, which required much more attention, more experience and concentration from both the operator on the UAV and the observers in the “control room” (fig 7).
Communication between observes in control room with operator has been communication between the control room and the operator is also an important segment and can be maintained in several ways, with a radio station, mobile devices, enabling access of persons from the control room to the UAV console, etc.

In the final phase of the experiment, the images were compared with the situation on the ground, with mapped views. It should be noted here that in parallel with the RGB recording, thermal imaging and thermal mapping of the terrain were also performed. The introduction of thermal analysis significantly advanced and enriched the amount of information we collected about each location, its condition in terms of physical elements as well as thermal elements. All this allowed us a deeper and more detailed insight into the state of the environment around the mines, based on which more accurate decisions can be made.

However, it is very important to emphasize that precise thermal imaging requires appropriate specific conditions that were not met during the implementation of this experiment, so that a more detailed thermal analysis was not carried out, and the co-melting is the future of our work. However, in addition to that, the thermal images and pictures showed us certain terrain anomalies in terms of reflection, which was a good reason to pay extra attention to those locations, i.e., to fly over that location several times from different angles and from a lower height (10 m) (fig 8).
5. CONCLUSION

The use of drones is gaining importance every day. The increased availability of commercial solutions facilitates our research and increases the reliability of the results. Experimental results obtained during the recording of the location of interest encourage us and provide a good basis for further research. The goal of the experiment, which was related to establishing the correlation between the appropriate parameters of the flight technique, flight conditions, resolutions and available tools for photo processing, was fully achieved. The obtained results point to the need for further research and development in this area with the application of all available technologies (LIDAR, thermal hyperspectral GPR, etc.) To conclude, using UAVs in this area improves operational efficiencies safety and time cost. Effective and successful application of UAVs need precisely defined project an assessment of available capacities. In further special attention will be paid to raising the precision of the shots and the accuracy of the prepared orthophoto mosaic weapons in the various GIS environment. As the ultimate goal of this experiment, the pre-cheap georeferencing of locations of interest should be obtained. In addition, a further direction of development of new methodology will go in the direction of the optimal model of planning and performing activity demining.


THE INTERNATIONAL INNOVATION PROJECTS FOR IMPLEMENTATION OF THE CONCEPT OF ECOLOGICAL AND ECONOMIC SECURITY OF AGRICULTURAL NATURAL MANAGEMENT IN UKRAINE

Petro Skrypchuk¹, Viktor Rybak², Sergiy Skrypnyk³

¹ National University of water and environmental engineering, Rivne, Soborna Street, 11, Ukraine, petroskrypchuk@gmail.com
² Khmelnytskyi National University, Khmelnytskyi, вул. Instytutska Street, 11, Ukraine, ribakvv@ukr.net
³ Khmelnytskyi National University, Khmelnytskyi, вул. Instytutska Street, 11, Ukraine, skrypnyks2@gmail.com

Received: 7th September 2022
Accepted: 13th September 2022

Abstract: The principles and projects regarding the implementation of the Concept of ecological and economic security of agrarian nature management in Ukraine have been developed. The relevance of the concept lies in: the implementation of the European integration vector of Ukraine's economy, the implementation of state policies aimed at the green economy, the creation of a favorable business climate, the need for investments, and the implementation of social security projects. Ensuring the implementation of international and national projects for economic growth will contribute to the development of the state’s economy through the appropriate quality of education, science, medicine, culture and preservation of the natural environment in the context of a green economy. Scientific and methodological support of the concept includes: documents of Ukraine, EU, COT, ISO; environmental safety methodology; the concept of Total Quality Management; certification schemes; strategies and concepts for digitization and greening of the economy; scientific and methodological developments of the UN, FAO. The implementation of the concept results in food security through the implementation of FAO’s provisions on the four dimensions of food security (availability, accessibility, utilization and stability) and the three main factors of security (access to food, care and nutrition, health and sanitation) which are now universally recognized in the world.

Key words: safety, projects, concept, agrarian management

1. INTRODUCTION

Over the past 50 years, global food production has increased by approximately 300% thanks to humanity’s incredible capacity for innovation. In addition, the world community continues
to lose more than a third of all produced food, and each year such losses exceed 900 billion dollars. The global market for smart agriculture was valued at USD 15.3 billion in 2020 and is expected to reach USD 22.5 billion by 2026. According to recent estimates, global food demand will increase by 70% by 2050, requiring about $80 billion in agricultural investment to feed the projected nine billion people (EOS Crop Monitoring 2022, Green Finance and Developing Countries 2016, Skrypchuk P and Suduk O. 2020).

The significant demand for agricultural products, caused by population growth, leads to an increase in the cost of fertilizers, pesticides, herbicides and other agricultural resources. In addition, global warming provokes severe droughts and soil degradation. All this makes agriculture critically important for the sustainable development of mankind. In a broad sense, agricultural technologies are designed to increase the productivity and profitability of farms by reducing costs or crop losses. In many countries of the world, national policies regarding agricultural production do not single out as separate priorities the use of land resources and water in the context of food security. The problem lies in the urgency of implementing the ecological and economic provisions of rational nature management in practice. Such problems are superimposed on the issue of safe supply of drinking water and sanitation.

Therefore, the world increasingly recognizes that complex, multifaceted issues, which include, in particular, food security and nutrition, require holistic interdisciplinary approaches, pooling of resources from different countries, and the implementation of innovative projects around the world. The documents have been developed and FAO by 2030 proposes: strengthening of global partnership; stimulation of innovations; implementation of international projects; state programs; development of civil society in the aspect of rational nature management (The Green Growth Action Alliance 2013, The Global Green Finance Index 2019, The High Level Panel of Experts 2021).

2. PURPOSE

Development of provisions for international cooperation (projects) regarding the implementation of the Concept of ecological and economic security of agrarian nature use as a tool for the security of the life of society (then the concept) in Ukraine.

3. MAIN PART

For Ukraine, the urgent tasks in the agrarian sector of the state's economy are: conducting a consistent state policy aimed at the European course; creation of a favorable business climate; export of finished products; investment attraction; development of capital markets; implementation of national and international economic development projects. Ensuring the implementation of international and national projects for economic growth will contribute to the development of the state's economy through the appropriate quality of education, science, medicine, culture and preservation of the natural environment (NE) in the context of a green economy. Transformed and innovative agrarian business projects and an ecologically and economically justified system of nature management will be able to effectively provide competitive advantages for Ukraine on the international market of goods and services. Therefore, we propose the Concept of ecological and economic security of agricultural nature use in Ukraine. The concept reveals the provisions of ecological and economic safety of agrarian nature use: reforming the economy of Ukraine into a socially responsible, ecologically safe, economically expedient one; introduction of greening, digitalization, socialization and economic justification of projects and programs; implementation of project management provisions from the global level to the level of a small farmer (a person as a nature user, as a resident of a community delineated by a certain territory); introduction of mechanisms of intellectualization of the sphere of nature use and implementation of a project approach in the
activities of each community; the safety of the vitality of society and, therefore, the natural capital of the country (Fig. 1).

The concept of ecological safety of agricultural nature use is based on the idea of prevention and compensation of damage caused by NE, health and property of citizens through pollution, damage, irrational use of natural resources, destruction of natural ecological systems and other offenses, concept of ecological certification of territories, etc. The concept takes into account the national program of adaptation of the legislation of Ukraine to the legislation of the European Union and acceptance of Ukraine as a candidate for the EU. Such decisions are taken into account in practical proposals and in the development of new normative legal acts of Ukraine taking into account EU legislation. In particular, the concept of "natural capital", "green" economy, environmental audit and management, safety and economics of agrarian nature use as economic categories that are taken into account in the economies of developed countries.

**Figure 1.** The place of the concept of ecological and economic security of agrarian nature management in the vital activities of the state

*Source: (developed by the authors)*

The concept should be considered as: a mechanism for guaranteeing the environmental safety of the sphere as a whole of all types of nature management, including agricultural for the general public of NE users; a practical toolkit for regulating ecological and economic relations at both the macro and micro levels; a system of criteria for macroeconomic evaluation of natural resources (from the state to the community level). The implementation of the concept of security of agricultural nature management must be carried out at the global, regional, local and point levels. It is necessary to take into account various indicators (sanitary and
toxicological, ecological, sociological, demographic, medical, etc.) in order to quantitatively measure the safety of agrarian nature use of the territory (community).

The concept envisages the economic development of territorial communities in the direction of increasing their food security, providing the population with food products, raw materials for industry, a quality environment for the population to live in, natural resources of appropriate quality and quantity, and preservation of natural capital. Therefore, taking into account such environmental functions will contribute to the filling of the local budget, including through the development of sustainable green tourism, the formation of a positive image and the promotion of the brand of certain territories. From this, a comprehensive ecological assessment of the safety of agricultural nature management of the territory of communities and regions includes:

- systematic assessment of the complex of factors of the NE and the social sphere;
- definition of anthropogenic load;
- zoning of the territory in terms of tasks and relevant indicators (thanks to the environmental audit procedure and the received information);
- determination of factors, resources, sequence of works for economic activity according to the principles of “green” economy;
- constant monitoring (GIS, etc.), for example: normalization of impacts on NE; control of sources of influence on NE; quality control of NE components;
- making management decisions: formation of socio-ecological and economic decisions; prevention of manifestation of anthropogenic factors in NE; minimization of the consequences of the manifestation of natural factors of ecological danger; development and improvement of environmental protection legislation and methods of forming an ecological outlook.

The strategy and means of implementation consist in creating appropriate conditions for the development of the economy in accordance with the requirements: European integration, greening, taking into account innovation and investment opportunities of Ukraine on the way to overcome the crisis in the economy, conducting a unified policy in the field of metrological support, standardization, certification and accreditation.

The state strategy for the introduction of the concept should be a systematic document that provides for the systematic reproduction of the main components of greening, such as: the development of laws and their adaptation to EU directives; economic stimulation of innovations; reproduction of demand for ecological goods and services; reproduction of an ecologically oriented production base; reproduction of greening motifs, etc. Under these conditions, implementation of system innovation processes of environmentalization of socio-economic development is possible only in the event that the state authorities will be able to form reproductive mechanisms for the preservation of natural capital.

To implement the concept, it is necessary to introduce innovations in the areas of: safety of nature management, audit, insurance, licensing, information economy, metrology, standardization, certification, project management, etc. In particular, it is necessary to organize: the development of a regulatory and legal nature in accordance with the process of adaptation of EU directives, the submission of grant applications, the development of joint international projects, the exchange of experience and the provision of a laboratory base for measuring the quality of NE.

The mechanism for ensuring environmental security of the territory (community) is ordered sequence of stages of scientific and practical research aimed at determining reliable and justified criteria and identifying effective measures to improve the environmental condition of
the NE. The first block consists of the determination of quantitative indicators and criteria of environmental safety, assessment of adverse events, determination of the structure, system, and quantitative assessment of territory safety. The second unit is designed to evaluate the methods and mechanisms for ensuring the security of territories, the implementation of this system in the practice of managing the socio-ecological and economic circumstances of the given area, and monitoring the results of the implementation of the entire system.

The mechanism of implementation of the concept includes the stages and sequence of the implementation of the concept in Ukraine, which will depend on: the development and terms of approval of the concept, the correction of legislative and regulatory documents, their compliance by all levels and authorities and business, the accession of Ukraine to the EU, as well as the formation of an environmental and political worldview all sectors of the population and business.

The concept will be implemented in the following ways: the provisions of the concept must be taken as a basis during preparation projects of program and strategic documents, law’s projects and other legislative acts, projects plans of measures in the socio-ecological and economic sphere; measures to implement ways to achieve strategic goals and relevant tasks of the state economic policy must be included in the activity plans of the Cabinet of Ministers of Ukraine and relevant plans of ministries (Approve the Methodology 2022, Berawi M, Suwartha N and others 2019, Gorova A, Skvortsova T and Lisitskaya S 2017, Ostapchuk T, Orlova and others 2021).

The main goal of such formation of safe nature management should be the creation of a decentralized model of management of natural resources, capable of effectively influencing the processes of socio-economic development of territories in the conditions of a market economy.

- creation of institutional infrastructure (a central certification body within the structure of the Ministry of Natural Resources of Ukraine and independent environmental auditors who have undergone training and have the appropriate license, or a certified commercial structure);
- harmonization and adaptation of world and EU directives in Ukraine;
- expansion of financial and economic capabilities of territorial communities;
- instruments of public-private partnership, methodical approaches to the valuation of NE (natural capital) objects of Ukraine, in particular:
  a) Administrative and legal instruments, namely: legislative and regulatory framework (laws and resolutions of the Cabinet of Ministers of Ukraine, directives and regulations of international organizations) and standards (standards of various types, industries and countries, limits, quotas, etc.);
  b) Economic instruments: subsidies, grants, loans, leasing, insurance, payments for nature management, price instruments, preferential taxation, etc.;
  c) Communications and information provision, education, public participation, international monitoring of the sphere of nature management, environmental engineering, consulting.

Appropriate financing from the State Budget of Ukraine should be provided for the introduction of the concept as a document of national importance. In addition, European and international aid funds may be used for such purposes. In order to reduce the time and costs for finalizing and introducing the concept and its regulatory support, it is necessary to use the cooperation mechanism of various ministries and departments.
Legislative and regulatory support consists of:


3) Developers of legislative and regulatory documents that will include a complex of legal provisions regarding the certification of the field of nature management: development of technical regulations; preservation of the share of mandatory certification of products and services; introduction of voluntary certification in the field of nature management (including agricultural); continued harmonization of legislative and regulatory documents of Ukraine with international ones, etc.

Scientific and methodological support includes:

- legislative and regulatory documents of the Ministry of Natural Resources, the Ministry of Economy of Ukraine, the EU, COT, ISO; NE quality methodology; the concept of Total Quality Management and the model of the European Foundation for Quality Management (EFQM); certification schemes; strategies and concepts for digitization and greening of the economy; scientific and methodological developments of the UN, FAO and specialists; concepts in the field of agribusiness and environmental economics:
  - inclusion of the issue of development of agrarian clusters in the general concept of creating clusters in Ukraine;
  - creation of a system for monitoring land relations, deregulation of the field of land management, digitization of permit procedures and administrative services in the field of land relations;
  - ensuring the development of the national infrastructure of geospatial data, transfer of powers of state bodies in the field of regulation of land relations to local governments;
  - creation of legal, tax and financial credit conditions for the active development of agricultural cooperation and other forms of associations of small producers;
  - simplification of the procedure for carrying out economic activities for economic entities producing craft food products for their sale on local agricultural markets;
  - implementation of programs to support producers of organic products;
  - implementation of measures aimed at increasing the level of education of producers regarding the advantages of conducting organic production;
  - ensuring the full functioning of the State Agrarian Register as a system of accounting and monitoring of all agricultural enterprises, including simplifying their access to state support programs;
  - introduction of a traceability system in supply chains of resources for the production and sale of agricultural products;
- introduction of equalization of the tax burden for farms operating in the legal field;
- approbation of European practice in the field of administration of entities producing agricultural products and in the field of effective electronic monitoring;
- popularization of the concept "Industry 4.0" and its individual elements as a mandatory factor for increasing the competitiveness of industrial enterprises on international markets;
- provision of conditions for the creation and development of industrial parks as investment sites with existing engineering and transport infrastructure;
- creating and ensuring the functioning of the geoinformation system for monitoring the development of regions and territorial communities;
- ensuring effective dialogue between the central bodies of executive power and local self-government bodies, as well as local government, the public and business;
- implementation of projects and programs of support and development of certain types of territories;
- ensuring the use and implementation of the smart specialization approach of each region in accordance with the EU methodology;
- joining Ukraine to the European Smart Specialization Platform (S3 Platform).

Implementation of the concept also requires the use of digital technologies. Digital technologies contribute to balanced agricultural management of nature and, in particular, to the formation of sustainable food and agricultural systems.

4. CONCLUSION

The expected result of the implementation of the concept is the definition and public support of the state's strategic course in the socio-ecological and economic sphere, the consistent implementation of which will make it possible to: shape the potential for agribusiness and invest in the quality (adequate) state of the NE; GDP growth per capita; growth of labor productivity; growth of export volumes; maintaining the quality of the NE.

The implementation of the concept results in food security through the implementation of FAO's provisions on the four dimensions of food security (availability, accessibility, utilization and stability) and the three main factors of security (access to food, care and nutrition, health and sanitation) which are currently universally recognized by FAO (The High Level Panel of Experts 2021).

The positive results of the implementation of the concept are formulated as follows:
1. Availability of a sufficient amount of food of appropriate quality, which is supplied at the expense of domestic production.
2. Obtaining quality food, clean water, sanitation measures to achieve a state of nutritional well-being, when all physiological needs are satisfied.
3. Stability - to ensure the socio-ecological and economic development of the state.
4. Society has access to high-quality NE and uses it for innovative environmental projects.
5. Harmonization of EU directives, FAO methods for rational management of nature for: production, infrastructure, food consumption, all types of business, protection of natural resources, etc.

Predictive developments in the field of agrarian nature management require the implementation of the provisions of the European integration of Ukraine, environmental management, audit and, in the future, environmental certification in the field of nature management. Certification in this case is: the final stage of confirmation of compliance after

The concept implements provisions of multilateral partnership mechanisms for financing and strengthening food security and improving nutrition within the framework of the implementation of the Agenda for the period until 2030, the Association Agreement of Ukraine and the EU, for example [EOS Crop Monitoring 2022, The Green Growth Action 2013, The High Level Panel 2021]. At the same time, the industrial model of agricultural improvement implies the use of intensive farming systems, in which large specialized farms occupy a prominent place, which in certain conditions work on the basis of massive volumes of fossil fuels and non-renewable and synthetic production resources.

REFERENCES

Approve the Methodology of normative monetary valuation of land plots, which is attached. Electronic resource. Available at https://zakon.rada.gov.ua › 11.


EOS Crop Monitoring, Electronic resource. Available at https://eos.com › products › crop-monitoring accessed on 15.08.2022


STRATEGIC MANAGEMENT IN MODERN ORGANIZATIONAL SYSTEMS

Slavisa Arsic¹, Mitar Kovac², Vladimir Katancevic³

¹ University of Defence in Belgrade, Military Academy, Veljka Lukica-Kurjaka Street
No. 33, Belgrade, Republic of Serbia, arsic.slavisa@gmail.com
² Faculty of Project and Innovation Management, Boze Jankovica 14, Belgrade, Republic of Serbia, mitar.kovac21@gmail.com
³ Directorate for Public Relations, Ministry of Defense, Bircaninova 5, Belgrade, Republic of Serbia, kalidosfallen@yahoo.com

Received: 12th September 2022
Accepted: 13th September 2022

Abstract: Strategic management as a way to solve future situations and challenges enables modern organizations to anticipate future conditions, adapt to changes in a timely manner and create advantages in relation to other environmental actors that will enable more certain survival and development in the planned direction.

Key words: Strategic management, modern organizations, strategic analysis

1. INTRODUCTION

Strategic management represents a way to solve future situations and challenges and involves defining the goals that the organization wants to achieve and strategies (directions and ways) to achieve those goals. As a scientific discipline and a practical tool, it experienced a special expansion in the 20th century, due to the turbulent environment of global changes and the restriction of the flow of people, goods and information.

2. CONCEPT OF STRATEGIC MANAGEMENT

The word management in our language was adopted from the Anglo-Saxon speaking area and literature. The term itself comes from the English word manage, which means to manage, handle, manage, and was created in the 15th and 16th centuries under the influence of the French word "mesnagement" (Serb. management). At the root of the French term there is a compound consisting of two Latin words - manus (hand) and agere (to act), and it was used to denote actions in dressage and work with horses.

In the context of "business management", the term was first used in 1650, and for "managed economy" in 1933. In our country, the word management came into use in the 90s to denote the management process (which includes planning, organizing, leading and controlling) and the people, management teams, who lead that process.

From a theoretical and practical point of view, management has a threefold function:

- First, management is viewed and defined as the process of managing certain jobs,
undertakings or systems in order to achieve common goals more efficiently;

- Second, management can be seen as a special group of people whose job it is to manage the execution of jobs and tasks;

- Third, management is a special scientific discipline, of a multidisciplinary character, which deals with the research of management problems of certain businesses, undertakings and social systems.

Management in the broadest sense should be seen as a special scientific discipline dedicated to researching management problems in various social and business systems.

The word strategy is of military origin, and in theory one can find several meanings - "the science of leading an army", "the art of warfare", "the art of leading a struggle in society, politics". The root of the word strategy is found in the Greek word "strategos" (prefix "stratos" - army, suffix "ago" - to lead), which meant a military leader, but also a high official with civil and military competences. From the initial meaning of leading the army, over time it spread to other spheres of social life within which certain steps in leading and managing processes and organizations had to be devised.

Henry Minzberg (1988) examined the strategic process and concluded that it is much more fluid and unpredictable than previously thought. Mintzberg concludes that there are five types of strategies:

1. Strategy as a plan - a directed course of action to achieve the intended set of goals; similar to the concept of strategic planning;

2. Strategy as a pattern - a consistent pattern of past behavior, with a strategy that is realized over time, not planned or intended. Where the realized pattern differed from the intention, he called the strategy emergent;

3. Strategy as a position - locating brands, products or companies on the market, based on the conceptual framework of consumers or other interested parties; strategy determined primarily by factors outside the organization;

4. Strategy as a trick - a specific maneuver whose goal is to outwit the competitor; and

5. Strategy as a perspective - executing a strategy based on a "theory of business" or a natural extension of the way of thinking or an ideological perspective of the organization.

The meaning of the word strategy in the context of the phrase strategic management indicates the skill applied by top managers, leaders and can most adequately be interpreted as "a set of rules, principles and laws, which are used in making long-term management actions in the function of the system to which it refers" (Куколеча, 1986).

Professor Petar Jovanovic, the term strategic management implies a specialized discipline of management, a continuous process of adapting a company to a changing environment, in which the environment exerts a permanent influence on the company, and the company itself also exerts a certain influence on the environment in which it exists and to which it adapts (Jovanovic, 2007). Stephen Robbins and Mary Coulter believe that strategic management is what managers do to develop organizational strategy. Organizational strategy means decisions and actions that determine the long-term performance of the organization (Jovanovic, 2007). Fred David defines strategic management as the art and science of formulating, implementing and evaluating cross-functional decisions that enable the organization to achieve its goals (David, 2007). Strategic management is often defined as a process related to: (1) renewing the organizational structure and creating the conditions for development and (2) creating management that will ensure the definition of the strategy and the conditions for its implementation (Forca, 2011).
There are numerous definitions of strategic management, different due to the specificity of the area of human activity and the time dimension in which they were formed, but with the same essence that can be comprehensively expressed by the conclusion that strategic management represents a modern approach to managing organizations, and in principle includes the process of determining goals (in accordance with the mission, vision and trends of the environment), determination of the strategy, implementation of the strategy and control of the implementation and obtained results, at the highest management level of the organization, i.e. strategic management is a process related to organizational strategy, as a way to achieve long-term goals and organizational performance.

3. DEVELOPMENT OF STRATEGIC MANAGEMENT IN THEORY AND PRACTICE

Management has existed since there was a human community and the need to undertake an undertaking and achieve a goal that enables its survival and development. In the beginning, these were the activities of gathering food, hunting, protection from attackers, and later with the development of society, more complex agricultural, construction projects and conducting military campaigns, until today, where it is present in all fields of human activity.

The development of management is connected with solving organizational problems that accompanied the development of human civilization and is limited by the era of social and economic circumstances in which a specific community existed (Egypt, China, Greece, Rome, etc.).

The beginning of modern management is related to the period of industrialization and the appearance of machines that completely or partially replaced the role of nature, people and animals in the process of production, transformation and distribution of goods. The advent of the printing press and the steam engine made possible the rapid spread of information, the rise of innovation, the increase in production volume, and the expansion of markets. The flow of people, goods and information has grown out of proportion to the ability to manage it effectively. Organizational problems that accompanied industrialization generated a need for specialized tools and techniques, knowledge and people who could solve them. Organizational management has become an expert profession and a scientific field that is developing at an accelerated pace to the present day. Scientific and technological development and the era of digitization create the need for new management knowledge, techniques, tools and managers as deficient professions in all segments of society.

The emergence of strategic management as a fundamental research field of research dates back to the early 1960s, when the classic works of Chandler were published (1962), Ansoff (1965), Andrews (1971). From the very beginning, strategic management has been recognized as an interdisciplinary field of research, and strategy researchers have verified and encouraged a multidisciplinary intellectual heritage (Jemison, 1981b; Porter, 1981). Three key events contributed to the further development of the scientific field: publication Schendel (1979), the book "Competitive strategy" (Porter, 1980) and starting a magazine „The Strategic Management Journal” (1980). Schendel Hofer (1979) analyzed current achievements with leading scientists and developed a research program for the next two decades. Porter's book "Competitive Strategy" became the basis for much of the strategic curriculum and marked the transition from reliance on toolkits developed by consulting firms ("BCG matrix") to a systematic, theoretical analysis of strategy at the organizational (enterprise) level. There are numerous authors who recognized the importance of this topic and influenced the formation of the modern concept of strategic management with their research, Figure 1.
The progress of strategic management as a discipline follows several factors.

First, in the literature there is a noticeable increase in the spectrum of covered topics (Hoskisson et al., 1999). The study of "best practices" in the 1960s gave way to the analysis of various topics such as internationalization, cooperation between firms, strategy and competition in product markets, strategic leadership, and the relationship between an organization's strategy and its social responsibility.

Second, there has been a significant growth in the range of research methods used, which have become increasingly sophisticated (Hoskisson et al., 1999; Ketchen et al., 2008). Case studies have largely been replaced by the use of quantitative tools based on complex econometric techniques, multilevel analysis and, more recently, hybrid methodologies, in which a single study combines quantitative and qualitative techniques, each tailored to the nature of the problem to be analyzed (Molina-Azorín, 2012).

Third, a further indicator of the growing maturity of the discipline is the growing consensus regarding certain core concepts, such as the definition or concept of strategy or strategic management. Ronda-Pupo и Guerras-Martin (2012) reveal how consensus around the concept of strategy builds and expands over time slowly but steadily. Although the diversity of definitions continues to be a common feature of the discipline, multiple aspects of the concept over time have formed a single core definition. For the record, two studies conducted in different contexts and with different methodologies found that the main aspects of the concepts of strategy and strategic management are very similar. Using the implicit and explicit definitions of a set of scholars, R. Nag identifies seven key components of the concept of strategic management: performance, enterprises, strategic initiatives, environment, internal organization, managers/owners, and resources. Although a different approach based on content analysis was used, the relevant items on which the concept of strategy is based are the same in the research conducted by Ronda-Pupo and Guerras-Martin.

Fourth, and finally, the academic community interested in strategy research is constantly growing, not only in terms of the number of scholars dedicated to the field, but also in their
international nature, as well as the connections between them. In the publication "Journal of strategic management", one can see an increase in cooperation between scientists from both an inter-institutional and an international perspective (Ronda-Pupo, Guerras-Martí, 2010).

The study of strategic management in our country began later than in developed countries due to the social and economic environment that began to change in the nineties of the last century. Then the systematic study of strategic management began (the first textbooks are published, scientific meetings are organized, it becomes a compulsory subject studied at faculties). During its development, strategic management has accumulated a rather large body of knowledge, both theoretical and empirical and methodological in nature. Today, strategic management is affirmed as a scientific and teaching discipline that is engaged in by a large number of scientific workers.

4. STRATEGIC MANAGEMENT PROCESS

In 1916, Henri Fayol gave the first division of management, which has remained in a modified form until today. According to Fayol, management consists of the following functions: 1. prediction, 2. organization, 3. command, 4. coordination or coordination and 5. control. A more detailed division was presented by J. L. Masi, 1987, according to which the functions of management are: 1. decision-making, 2. organizing, 3. staffing, 4. planning, 5. controlling, 6. communicating and 7. leading (directing). The division of J. A. Cole in 1994 represents management through four sub-processes: 1. planning, 2. organizing, 3. motivating and 4. controlling. Although the process of defining the functions of management was long, there is no consensus among the authors today on the issue of definition, although the differences have become minor over time.

Strategic management is a process in which, after analyzing the environment, appropriate strategies are formulated, which are then implemented, evaluated and modified depending on the degree of achieved effects. The process of strategic management, depending on the level of classification of the activities it includes, can be presented in the following stages: 1. Analysis of the environment, 2. Defining the vision, mission and goals, 3. Formulating the strategy, 4. Implementation of the strategy and 5. Strategic control.

By strategic analysis of the environment, the organization anticipates the state, trends and influence of internal and external factors on its functioning. The internal environment consists of the organization's ability to direct, absorb or protect itself from external influences. The external environment is a multidimensional environment in which the organization performs its function, and the subject of analysis is the complex impact of the environment on the organization. In the strategic analysis phase, by applying various techniques and tools (SWOT, SPESTLE, stakeholder analysis, etc.), relevant indicators are obtained that represent the basis for the following phases.

In the phase of defining the vision, mission and goals, answers to the key questions are obtained: what the organization wants to achieve in the future (vision), why the organization exists (mission), and what are the values that the organization wants to achieve (goals).

Strategy formulation is the phase in which a programmatic viewpoint is formed for the future use of the available resources and capabilities of the organization and the achievement of strategic goals. The formulation of a strategy results from a strategic analysis (recognized opportunities and dangers) and is a mental expression of measures, procedures and activities that should be implemented in order to take advantage of those opportunities and avoid dangers. The strategy limits and directs all future efforts of the organization towards the achievement of the set goals.
The phase of application or implementation of the strategy requires great effort and consistent implementation at all organizational levels in order to fully implement the planned activities.

In the evaluation phase of the implementation of the strategy, the achieved and planned results are compared and the necessary corrections are proposed in order to fulfill the plans.

Strategic control provides feedback for the improvement of all phases of the strategic management process.

Each of the mentioned phases is implemented in the established sequence of steps - sub-processes.

The challenges of modern development, work, activities and activities are becoming more complex, more specialized, and business more complex. More extensive and longer preparation is needed for complex activities and more precise synchronization for functioning in an increasingly uncertain environment. Strategic management is becoming increasingly important as a special management discipline directed towards the future of the organization.

5. CONCLUSION

Strategic management is a relatively young discipline that has steadily matured over the past fifty years. The field of the discipline was consolidating during this period, while at the same time expanding the spectrum of analyzed topics and used research methodologies.

Strategic management as a way to solve future situations and challenges enables modern organizations to anticipate future conditions, adapt to changes in a timely manner and create advantages in relation to other environmental actors that will enable more certain survival and development in the planned direction.

REFERENCES


SAFETY DURING REMOVAL OF EXPLOSIVE REMNANTS OF WAR

Aleksandar Milic¹, Srdjan Kostic², Bojan Sljukic³, Stefan Pusulic⁴

¹ University of Defence in Belgrade, Military Academy, Veljka Lukica-Kurjaka Street No. 33, Belgrade, Republic of Serbia, aleksandar.milic@va.mod.gov.rs
² University of Defence in Belgrade, Military Academy, Veljka Lukica-Kurjaka Street No. 33, Belgrade, Republic of Serbia, srdjankostic36@gmail.com
³ University of Defence in Belgrade, Military Academy, Veljka Lukica-Kurjaka Street No. 33, Belgrade, Republic of Serbia, sljuka75@gmail.com
⁴ Training Command, General Staff of the Serbian Armed Forces, Belgrade, Republic of Serbia, pusulicstefan@yahoo.com

Received: 12th September 2022
Accepted: 14th September 2022

Abstract: A significant increase in investments within the society is accompanied by an increase in construction works and the construction of capital infrastructure facilities. The fact that the territory of the Republic of Serbia was the scene of various war conflicts results in a large number of different examples of explosive remnants of war within the ground. These explosive remnants appear during execution of infrastructure works inside the ground at certain depths. The discovery of the aforementioned explosive remnants of war disables safe work and makes the completion of the planned works impossible. Organizing work on the discovery, excavation, removal and destruction of explosive remnants of war is a procedure that requires compliance with high levels of safety during work. The international standards defined by the United Nations enable the establishment of the necessary legal regulations for the organization of safe work on the removal of explosive remnants of war.

Key words: explosive remnants of war, removal

1. INTRODUCTION

In recent decades, the Republic of Serbia has been characterized by a significant increase in investments. The creation of opportunities for such a degree of investment is accompanied by extensive requirements in significant infrastructure works, construction of industrial facilities, gas pipelines, as well as rehabilitation of important economic facilities. Planning and organization of the aforementioned works, regardless of desires and possibilities, is usually slowed down by requirements for safe working conditions. The set demands come from the fact that during the last 80 years, the territory of the Republic of Serbia has been the site of armed conflicts. Regardless of the reasons for the armed conflicts, the Republic of Serbia was exposed to various consequences. The consequences are most often expressed in human
casualties and damage (expressed in money) caused by the destruction. However, the fact that the area exposed to armed conflicts is marked as an unsafe place for life and therefore for the return of the population (who moved out of the area due to armed conflicts) long after the end of the conflict deserves attention. The stated fact is expressed through the painful truth that the space is contaminated by the use of various explosive and lethal means. (IMAS, 2022)

Within the last few decades, the term in use for space that was affected by armed conflicts - combat operations, is space contaminated by "explosive remnants of war" (hereinafter ERW) (IMAS 2022). The highlighted problem is not typical only for the Republic of Serbia. A large number of countries are facing these problems. (Hall S., 2021, Klever J. Ph., 2022) As a result, the assistance of individual countries in the humanitarian demining of areas contaminated by ERWs was expressed.

In literature, the necessity of humanitarian demining is constantly emphasized, which aims to remove ERW that are on the surface of the ground. "Minefields" made of anti-personnel and anti-tank mines, as well as improvised mines, are included in such communication constructions. The mentioned explosive remnants of war are found on the surface of the ground or up to 10 cm deep in the soil. One of the approaches that can significantly facilitate the process of humanitarian demining is the creation of a unified survey of areas contaminated by explosive remnants of war, which relies on the capabilities of the Geographical Information System. (Schmitz, P., at. al., 2019) This kind of presentation of all areas that were affected by combat operations creates the possibility of easier monitoring of the level of cleaning and planning of funds to create conditions for a carefree life of local communities. However, the problem that has not been given enough attention and about which there is not enough data is expressed in the question "what about the explosive remnants of war that penetrated deep into the ground and remained inside the soil?".

2. PROBLEM DESCRIPTION

The main characteristic of armed conflicts - combat operations is expressed in the fact that they are accompanied by the use of different weapons and combat systems that use different missiles and bombs (mortar, artillery, cannon, artillery-rocket missiles or aerial bombs). The application of the mentioned resources creates an area contaminated with explosive remnants of war (ERW - UXO and AXO (unexploded ordnance and explosive ordnance that has not been used during an armed conflict, that has been left behind or dumped by a party to an armed conflict, and which is no longer under control of the party that left it behind or dumped it. Abandoned explosive ordnance may or may not have been primed, fused, armed or otherwise prepared for use) https://www.mineactionstandards.org/en/standards/)

Humanitarian demining is the physical removal or deactivation of abandoned mines, explosive remnants of war (ERW) and improvised explosive devices (IEDs) to protect civilians from their indiscriminate effects, facilitate a return to normal civilian life and, where applicable, ensure the delivery of humanitarian aid. Humanitarian demining differs from military demining because: (a) it aims to completely remove mines to make the area safe for civilians; (b) does not accept demining casualties as an operational reality and must therefore adhere to strict security standards at all times; and (c) must have a distinctly humanitarian, non-military purpose (Humanitarian demining as a form of humanitarian assistance under international humanitarian law, Diakonia International Humanitarian Law Centre).

Type of mine-explosive obstacle made of mines. It can be on land and in water. On land (and on the coastal edge up to a depth of 0.5 m of water depth) it is a land surface of a certain size, on which mines are placed according to a preselected schedule, intended to limit and prevent the movement, maneuver, action and landing of enemy forces, and for causing losses to his manpower and technical means. (Military Lexicon, 1982).
of war. However, no one questions what happened to the mentioned missiles and bombs that did not activate when they hit the ground, but continued their movement and remained in the depth of the ground.

Such problems have not received sufficient attention from various international humanitarian organizations, which would allocate significant funds in the form of aid to solve them. The mentioned problems are left to the jurisdiction of the countries, which they must solve independently. The issue of missiles and bombs that penetrated deep into the ground is not raised until the moment they affect normal life and work of the population or when it is necessary, to arrange or develop the area through the construction or renovation of various construction facilities or the implementation of capital infrastructure projects. Previous practice has shown that the largest number of explosive remnants of war are found at depths of up to 50 cm. It is mostly ammunition of smaller calibers and therefore larger quantities. However, there is not a small number of explosive remnants of war with large amounts of explosives inside at greater depths (up to several tens of meters). Based on certain data available to the Mine Action Centre of the Republic of Serbia, it is assumed that since the bombing in 1999, various unexploded aerial bombs or rockets are located on the territory of the Republic of Serbia at around 150 locations in the country at a depth of up to 20 meters. (Report on the mine situation from August 2022 in the Republic of Serbia) On the territory of the Republic of Serbia, throughout the practice of the last 20 years or so, we have witnessed the existence of: bombs (of various types and weights), missiles, mines, ammunition (of various calibers), sunken ships that were mined with improvised explosive devices, etc. The mentioned ERW date from the First and Second World Wars, the conflict in the immediate vicinity of the border of the Republic of Serbia (1991-1995), the NATO aggression in 1999, as well as the arbitrary involvement of Siptar terrorist groups during 1999-2003. Considering the extremely long period of time (from installation to the present day), a large part of space has changed its appearance. A significant part of the surface is overgrown with different vegetation, and part of the ground is used as arable land.

3. SAFETY REQUIREMENTS WHEN WORKING ON REMOVAL OF EXPLOSIVE REMNANTS OF WAR

The initial guidelines for work on humanitarian demining tasks are based on defined legal regulations. Initial guidelines in this area have been established by various international standards and norms. A large number of conflicts around the globe have caused a significant number of countries to face ERW problems. In the desire to remove ERW and create safe working conditions, various positive and negative experiences have been gained. In order to harmonize certain norms, the United Nations standards for the removal of unexploded ordnance (IMAS - International Mine Action Standards) were created. (IMAS, 2022) It is important to point out the fact that the stated standards are supplemented every year by positive practice that has been confirmed in humanitarian demining tasks in different countries around the world. For the purposes of the work, we will mention certain standards (which are important for the topic of this paper):

- IMAS 07.40 Monitoring of demining organizations.
- IMAS 08.22 Technical survey.
- IMAS 08.30 Post-clearance documentation.
- IMAS 08.40 Marking mine and UXO hazards.
- IMAS 09.10 Clearance requirements.
- IMAS 09.11 Battle Area Clearance.
The previously mentioned standards are the guidelines that each of the signatory states applies during the drafting of its legislation in this area and prescribes the standards. Based on that, the following are defined:


- Regulation on protection against unexploded ordnance ("Sluzbeni glasnik RS" No. 7/2013).


Rulebook on personal protective equipment ("Sluzbeni glasnik RS" No. 23/2020).


- STANDARD ISO 14001:2004 - Environmental protection management system.

- STANDARD OHSAS 18001:2007 - Occupational health and safety management system.

- STANDARD ISO 45001 - Occupational health and safety management system.

The previously presented documents have an obligation for legal entities, which deal with humanitarian demining, and have received authorization from the Ministry of Internal Affairs of the Republic of Serbia to carry out protection against unexploded ordnance on the territory of the Republic of Serbia, to carry out the development of Standard Operating Procedures (hereinafter SOP) through which the regulations are implemented. The prepared SOP is subject to verification and approval by the Mine Action Centre of the Republic of Serbia.

The standard operating procedure, in addition to general guidelines and work procedures, should also define:

- Standard Operating Procedure - SOP for finding unexploded ordnance in water areas.

- Standard Operating Procedure - SOP for marking suspicious and contaminated surfaces - Emergency marking, permanent marking, semi-permanent marking.

- Standard Operating Procedure - SOP for tasks marking suspicious and contaminated surfaces - demining tasks, clearing battlefields, removing large-mass projectiles at greater depths.

- Standard Operating Procedure - SOP for Technical Reconnaissance, Pyrotechnic Surveillance and Inspection of Surfaces Suspected to be Contaminated by Unexploded Ordnance, Anti-Personnel and Anti-Tank Mines.

Approved documentation enables a legal entity to be approved for humanitarian demining tasks. After obtaining approval for the execution of work at a certain location, the obligation of the Mine Action Centre of the Republic of Serbia is to introduce the legal entity to work and check the technical means that will be used. Work on the removal of ERW is based on non-technical and technical reconnaissance, then on the removal of explosive remnants of war.
Non-technical reconnaissance activities will not be considered in this paper. Technical reconnaissance requires the establishment of a certain system, i.e. standard operating procedures during reconnaissance work and establishment of facts important for further work. In practice, they call it the definition of certain phases of work execution. The defined phases of the work performance require a sequence due to the influence of the ground on the performance of the work. Technical reconnaissance is not always possible to fully realize with one means or in one way. The aforementioned characteristics of the ground require a certain sequence. The gradualness is reflected in the application of appropriate mechanization depending on the characteristics of the ground itself. Reduction of time and efficiency in work can be significantly improved by the application of mechanization. As an example, the requirements for the removal of tall vegetation can be cited. High vegetation, due to a long period of non-exploitation of the ground can be a significant obstacle because a tree with a diameter of 10 to 40 cm makes safe work impossible. This alone makes the execution of works complicated. Special attention should be paid to the fact that these surface works must be approached with a simultaneous check of the surface of the ground and the immediate depth of the ground of 10 cm. Successfully performed surface works to remove vegetation enable a safe in-depth search of the ground up to a depth of 50 cm. Discovery, excavation and removal (destruction on the spot or transport to the place of destruction) create opportunities to move to the next phase of humanitarian demining.

It is possible to inspect the ground up to a depth of 3.0 m. For the needs of such inspections, it is most expedient to use the means of technical reconnaissance, which enable the inspection of the ground and providing the location of the object using GPS coordinates. With this approach, the process of mapping objects is significantly shortened, the safety of the work of the personnel is increased, and at the same time, a precise database is formed for later analysis.

Mineralized soil is a problem that arises during work at these and greater depths. The composition of the soil can significantly affect the creation of errors in data reading. In order to avoid such problems, constant conditioning and training of the personnel (operators) working on these devices is very important.

In order to carry out the work faster and safely, it is advisable to hire machinery intended for the execution of work in the ground or stone (different excavators or diggers, with different working tools). Regardless of the increase in the speed of work, the issue of safety during work must never be overlooked. In this sense, it is an obligation to constantly check the pace of work (safety first, and performance second. Do not change the sequence in any way) as well as check with technical devices whether new discoveries have been made (within the field) regarding ERW. This procedure is necessary due to the experience gained during the ERW removal tasks (a certain reinforced concrete slab at a depth of 2.4 meters made a "mask" that concealed the aerial bomb. Previously performed checks indicated the existence of metal even after the removal of the reinforced concrete slab it was thought to be a false alarm. The amount of armature in the plate was sufficient to make it impossible for the device to detect an aerial bomb.

4. CONCLUSION

Insisting on the issue of removing the ERW is not just an expressed desire to solve the current problem. It is a request that must be approached with a lot of seriousness and anticipation of further steps in the work. A large number of situations should be foreseen and, accordingly, a standard operating procedure for dealing with such situations should be prepared. However, regardless of the desire to pretend, it is necessary to first define the legal frameworks that enable action and provide support when working on the tasks of removing explosive remnants of war.
The starting step towards solving the mentioned problem is a realistic assessment of the mentioned problem. As a reminder, the Regulation on protection against unexploded ordnance (“Sluzbeni glasnik RS” No. 7/2013) is in force. Regardless of its modernity, at the time of its adoption, for many years it influenced that this issue must be approached in accordance with positive examples based on practice from around the world. In particular, it is necessary to implement positive examples that have been verified by practice.

REFERENCES


Jan Philip Klever, 2022, Early effects assessment: Humanicemos reintegration project 2020-2021, UNMAS Colombia, https://www.unmas.org/sites/default/files/assessment_humanicemos_project_english.pdf,

Pravilnik o licnoj zastitnoj opremi („Sluzbeni glasnik RS“ br. 23/2020).


Uredba o zasti od neeksploziranih ubojnih sredstava („Sluzbeni glasnik RS“ br. 7/2013),

Vojni leksikon, 1982, Vojnoizdavacki zavod, Beograd,

Zakon o bezbednosti i zdravlju na radu („Sluzbeni glasnik RS“, br. 101/2005, 91/2015 i 113/2017),


Zakon o smanjenju rizika od katastrofa i upravljanju vanrednim situacijama („Sluzbeni glasnik RS“ br.87/2018),


ALTERNATIVES TO PRISON SENTENCES

Emil Turkovic¹, Slavica Dinic²

¹ Educons University, Faculty of Security Studies, Vojvode Putnika 87, Sremska Kamenica, Republic of Serbia, emilturkovic101@gmail.com
² Educons University, Faculty of Security Studies, Vojvode Putnika 87, Sremska Kamenica, Republic of Serbia, slavicadinic@yahoo.com

Received: 25th September 2022
Accepted: 14th September 2022

Abstract: The increase in criminal activities in society inevitably leads to an increase in the number of convicted persons, and thus to an increase in the prison population, and prison sentences, as the only criminal sanction that has withstood the test of time, the condemnation of history, all changes and criticism. The retributive character of imprisonment is unquestionable. However, looking at the statistical segment of convictions under criminal sanctions in Serbia in the last two decades, we see that the prison sentence was used too much for crimes of a lighter type, or those minor ones, i.e. trivial criminality, essentially for acts of little importance. What we want to investigate in this paper is a penological approach to reducing the prison population rate, through the application of the principle of opportunity and the imposition of alternative measures, primarily for crimes of minor importance, because the imposition of short-term prison sentences for minor crimes, which was the case in our country until recently, first of all, it harms the perpetrator of the criminal act, then it "costs" the state coffers, and the application of treatment to the convicted person in a short period of time is almost impossible.

Key words: offense of minor significance, prison sentence, alternative measures

1. INTRODUCTION

Alternative sanctions can take various forms. They can be applied in pre-trial proceedings, in the trial and sentencing phases, or after sentencing. Alternative sanctions include public interest sentences, which hold offenders accountable for their actions, and may include fines, probation, and a wide range of pre-trial, pre-appeal and post-appeal alternatives to incarceration. Currently, in Serbia, emphasis is placed on the introduction of new types of alternative sanctions - unpaid work in the public interest and probationary period - and on mediation, reconciliation and settlement with the injured party, and on parole.

The absence of a clearly focused implementation plan can to some extent be related to the Law on the Execution of Criminal Sanctions, which does not regulate in detail the processes involved in the implementation of alternative sanctions or prescribe specific measures aimed at reducing the prison population (for example, early release from prison supported by electronic surveillance and home curfew). However, if the goals of the introduction of
alternative sanctions are to be achieved, it is necessary that they be clearly defined and understandable to all involved in their implementation.

Where prison sentences are imposed for minor offenses and trivial crimes and where the number of prisoners is growing, the prison authorities are unable to provide additional resources - neither material nor human - necessary to successfully fight the increase in the number of prisoners, which results in prison overcrowding. In this case, states realize that they are unable to fulfill their duty to care for those they incarcerate, and the ability of prison authorities to guarantee basic human rights to prisoners, to work to rehabilitate prisoners by preparing them for reintegration into society, is impaired. Where the perpetrators of less serious crimes (insignificant or so-called petty crime) are given alternative sanctions, the resources of prison authorities can be freed up and they can work more effectively with those for whom prison is the only option. This is in line with the Council of Europe Recommendation on Prison Overcrowding and Prison Population Growth Rec (1999), which recommends that deprivation of liberty should be seen as a sanction to be resorted to only as a last resort, when the seriousness of the offense would justify any other sanction or made the measure inadequate.

Certain Serbian legal and sub-legal texts, above all the Strategy for the Reform of the Criminal System of Serbia, the Code of Criminal Procedure, represent the context within the standards of the Council of Europe, especially the revised European Prison Rules: Recommendation Rec (2006), (hereinafter referred to as "EPR"), Recommendation Rec (1992) on sanctions and measures related to the public interest (hereinafter R (1992), Recommendation Rec (1997) on personnel responsible for the implementation of sanctions and measures (hereinafter R (1997) and Recommendation Rec (2000) on improving enforcement European rules on sanctions and measures related to the public interest (hereinafter R (2000)). In addition, the implementation and improvement of the system for the execution of criminal sanctions, and the application of alternative measures and criminal sanctions to alternative prison sentences are based on the principles set forth in international instruments (to the European Convention on Human Rights, Council of Europe Recommendation Rec (1999) on prison overcrowding and prison population growth (hereinafter R (1999)) , the United Nations Standard Minimum Rules on Non-custodial Measures (Tokyo Rules) and practices in other European countries. Overall, in Serbia and its system of execution of criminal sanctions, there is an understanding of what is needed to develop an effective system of execution of criminal sanctions and therefore to apply a system of alternative sanctions for criminal acts of petty crime, where the application of a prison sentence would not be expedient and adequate to the committed criminal act. Also, there is good cooperation between the ministries of Serbia and some of the key agencies that will be involved in the processes of application and implementation of changes in the system of execution of criminal sanctions and the implementation of the system of alternative sanctions, primarily the Administration for the Execution of Institutional Sanctions of the Ministry of Justice, the Office of the State Prosecutor, the Ministry of Labor, employment and social policy, Judicial Training Center, Open Society Fund and UNICEF.

Between two conflicting options - imprisonment and probation - today there is a whole range of sanctions and measures that can be maximally adapted to each individual. These measures are united under the name of alternative sanctions and represent the concept of sanctions and measures under the auspices of the social community, based on the assumption that the goals of punishment can be largely achieved in conditions that are less restrictive than imprisonment. The reasons for striving for a preventive rather than a retributive component of punishment lie, among other things, in the negative effects of prison sentences on the convict, his family and the social community. The negative effects of a prison sentence on a convicted person are, first of all: permanent marking as a criminal; separation from family; interruption of education,
loss of job, as well as difficulty in finding a new job; within the penitentiary institutions comes under the very bad influence of problematic inmates. All of the above increases the chances that the convicted person will commit a criminal offense again - recidivism.

The introduction of alternative sanctions in our criminal system is therefore fully in line with modern European trends in the field of penal policy and the need to establish common principles on penal policy among member states of the Council of Europe. A prerequisite for the practical application of alternative sanctions was the adoption of adequate legal regulations, which was done in Serbia in 2006 with the adoption of the Criminal Code and the Law on the Execution of Criminal Sanctions. In order for alternative sanctions to be adequately applied in court practice, appropriate organizational prerequisites are necessary. That is why the Ministry of Justice, in cooperation with the OSCE Mission in Serbia and the Office of the Council of Europe in Belgrade, first worked on the development, and now on the implementation of the Strategy for the reform of the system of execution of institutional sanctions and the implementation of alternative sanctions, the main points of which are: the establishment of the Trustee Service, training of trustees and creation of conditions for their work, professional training of judges and prosecutors, formation of a coordination body and creation of material conditions for full implementation of alternative sanctions and sensitization of public opinion.

As positive effects of effective implementation of alternative sanctions, the following can be counted: negative effects of imprisonment are avoided (separation from family, interruption of education, loss of job, negative influence of other prisoners); the social community is given a more active role in the criminal justice system; the social community receives an immediate benefit in the form of free labor of convicted persons; the reintegration of convicted persons into free society is carried out efficiently and publicly; conditions are created for removing or mitigating the damage caused to the victim of a criminal offense or for her reconciliation with the convict; the social stigmatization of convicts decreases; the prison population decreases, which results in lower costs and allocations from the community.

After the amendment of the Law on the Execution of Criminal Sanctions, key acts were adopted that more closely define the implementation of alternative sanctions: the Rulebook on the Execution of a Conditional Sentence with Protective Supervision and the Rulebook on the Execution of a Sentence of Community Service. In addition, the principles defined by the Rules of work in the public interest and conditional sentences with protective supervision are also very important, namely:

- guaranteeing respect for human dignity, rights, freedoms and privacy of the convicted person and his family and
- prohibition of discrimination due to race, skin color, gender, language, religion, political or other belief, national and social origin, property status, birth, education, social position or other personal characteristic.

2. WORK IN THE PUBLIC INTEREST

The sentence of work in the public interest implies free socially useful work, which does not serve to gain profit, with the aim of the convict developing a more responsible attitude towards society and the consequences of his actions. Work in the public interest was included in our Criminal Code due to numerous positive experiences of other countries, as well as due to the position of our theory that it is justified to introduce this sanction in our legislation. Work in the public interest in Serbia can only be imposed as the main punishment, but this does not change its basic meaning - to be an alternative to imprisonment. The court can impose a sentence of public interest work when it is a criminal offense for which a prison term of up to
3 years or a fine is prescribed, which in our criminal legislation essentially represents lighter crimes, although in our Criminal Code there is no division into lighter and heavier criminal acts, but it is determined that more serious criminal acts are those illegal acts for which a prison sentence of five years or longer is prescribed. Reciprocally, they would come to the conclusion that all crimes for which a shorter prison sentence of 5 years or some lighter criminal sanction, such as a fine, community service or revocation of a driver's license, are prescribed, are lesser crimes. It is also necessary for the perpetrator to accept this sanction, because according to the relevant international acts, forced labor is prohibited as a criminal sanction.

Work in the public interest must meet 3 conditions:
- that it is useful for society,
- that it does not offend human dignity and
- that it is not done with the aim of gaining profit.

The type and duration of work in the public interest is determined by the court, and the specific type of work and the way it is performed is determined by the commissioner, taking into account the abilities, professional knowledge and health of the convicted person. The minimum sentence of public interest work is 60 hours, and the maximum is 360, and the time to complete the determined number of hours is from one to six months, with a maximum of 60 hours in one month. The punishment of work in the public interest can be applied to both employed and unemployed persons. The employed work during their free time, and the unemployed work at any time.

3. CONDITIONAL SENTENCE WITH PROTECTIVE SUPERVISION

Conditional sentences with protective supervision means monitoring the behavior of the convicted person at liberty during the period of probation (probation) with the provision of the necessary assistance and protection in order to achieve the purpose of this sanction. Probation with protective supervision is a combination of continental and Anglo-Saxon elements of probation. In the basic form of conditional sentence, the relationship towards the convicted is passive and static. Through protective supervision, active actions are undertaken, which provide assistance and protection to the convicted, and at the same time, supervision is carried out over him with the aim of not committing a new crime. A suspended sentence with protective supervision is imposed in cases where there is a certain doubt about the perpetrator and his ability to refrain from committing criminal acts, if he were to be left to his own devices as in the case of an ordinary suspended sentence. Therefore, in the implementation of protective supervision, the active action of the commissioner is also necessary.

The Criminal Code provides for a diverse register of obligations, and that is why protective supervision is a measure that simultaneously includes the protection of the convicted and supervision over him. The employer has the right, in accordance with general regulations, to obtain compensation for damages caused by the work of the convicted person. If the convicted person does not fulfill work obligations or grossly neglects them (late to work, leaves work, is absent without justification, intentionally puts himself in a state of reduced work ability, intentionally damages work equipment, does not respect the organization and way of working, other employees and users of work), the employer's representative must inform the commissioner about it.

Protective supervision is defined in the following 10 points:
- Reporting to the authority responsible for the execution of supervision within the deadlines determined by that authority;
- Training of the offender for a certain profession;
- Acceptance of employment that corresponds to the capabilities of the perpetrator;
- Fulfilling the obligations of supporting the family, keeping and raising children and other family obligations;
- Abstaining from visiting certain places, bars or events, if this can be an opportunity or incentive for committing criminal acts again;
- Timely notification of change of place of residence, address or workplace;
- Abstaining from the use of drugs or alcoholic beverages;
- Treatment in an appropriate health facility;
- Visiting certain professional and other counseling centers or institutions and acting according to their instructions;
- Eliminating or mitigating the damage caused by a criminal act, especially reconciliation with the victim of the committed criminal act.

When choosing the obligations that the convicted person should fulfill within the framework of protective supervision and determining their duration, the court will especially take into account the circumstances related to the perpetrator's personality (his age, state of health, inclinations, habits, motives from which he committed the crime, demeanor after the committed criminal act, previous life, personal and family circumstances, conditions for fulfilling the mandated obligations, etc.). In addition to the length of the protective supervision, the court also determines the time of checking (probation) of the convicted person, or the time of probation. Depending on the court's decision, these two decisions may have the same duration, and it is possible that the supervision lasts less than the inspection. The court can shorten or terminate the protective supervision if it determines that its purpose has been fulfilled, regardless of the fact that the inspection period is still ongoing. Also, the court can cancel certain obligations of the convicted person and can replace certain obligations with others. In the event that the person sentenced to probation does not fulfill the ordered obligations, the court can warn him, replace the ordered obligation with another, extend the duration of the obligation or revoke the conditional sentence.

4. TRUSTEE SERVICE

Sanctions imposed as an alternative to prison sentences are enforced in Serbia by the Trustee Service. It operates within the Department for Treatment and Alternative Sanctions at the Directorate for the Execution of Institutional Sanctions of the Ministry of Justice. The regulations on protective supervision and work in the public interest regulate in detail the actions of trustees in monitoring the execution of the obligations of the convicted. The trustee service will become an independent service within the Ministry of Justice with stable confidence of the judicial authorities in its work, it will be able to increase the safety of the social community and the degree of successful reintegration of the convicted.

The commissioner is appointed by the director of the Administration for the Execution of Institutional Sanctions on the proposal of the head of the Department for Treatment and Alternative Sanctions, who takes into account the personal characteristics and needs of the convicted person when proposing. The commissioner's powers provide for the establishment and maintenance of contact with the convicted, while respecting the principle whose essence is to limit the rights of the convicted only to the extent necessary to achieve the purpose of the imposed sentence. He cooperates with the competent court, the internal affairs body, the employer and other institutions, organizations and associations, he has the right to request data and inspect official records and other documents of importance for the execution of a conditional sentence with protective supervision, i.e. for the execution of work in the public interest. After the execution of the sentence, the Commissioner is obliged to submit the file of
the execution of the sentence to the Department for Treatment and Alternative Sanctions, and then the Department for Treatment and Alternative Sanctions submits the notification about the execution of the sentence to the court. Records are maintained and kept in the Department of Treatment and Alternative Sanctions, and consist of:

- Registry book (contains basic formal data on the verdict, conviction and sentence itself);
- file that is kept individually for each convicted person (in addition to formal data, it also contains the program of protective supervision/work, the commissioner's report, the monitoring list of the execution of the sentence and prescribed reports).

Supervision over the execution of alternative sanctions and the work of the Trustee Service is performed by the Department of Supervision under the Directorate for the Execution of Institutional Sanctions of the Ministry of Justice. Control over the execution of alternative sanctions is performed by the Commission formed by the Committee for Justice and Administration of the Parliament of Serbia and the Protector of Citizens.

The fiduciary service should be developed through:
1. Improvement of personnel, organizational and program foundations;
2. New normative framework, namely:
   - amendments to the Code of Criminal Procedure, the Criminal Code and the Law on the Execution of Criminal Sanctions;
   - enactment of a special law on the competences and work of the Trustee Service with accompanying by-laws, which was done in 2014 with the enactment of the Law on the Execution of Extra-institutional Sanctions and Measures.

The aforementioned changes will enable the Trustee Service to provide professional assistance to competent state bodies, such as:

- in the pre-investigation procedure - at the request of the prosecutor's office or the court in the procedure of supervision and reporting on the execution of measures or obligations ordered by the prosecutor to the suspect as a condition on the fulfillment of which the suspension of the criminal procedure depends;
- in criminal proceedings - at the request of the court, prepares the so-called a report before imposing a sanction, which should help the court determine an adequate criminal sanction for the defendant. The report contains data on the defendant's family, health, educational, work and property status, as well as the so-called risk assessment of the defendant, that is, assessment of the degree of danger that the defendant represents for the social community and assessment of the degree of danger that the defendant will repeat/continue committing criminal acts;
- in abbreviated proceedings and proceedings for the imposition of criminal sanctions without a main trial - by drawing up a report before the imposition of a sanction in proceedings conducted for minor criminal offenses and for which the imposition of alternative sanctions is possible;
- in the procedure of execution of existing sanctions - cooperation with treatment services in institutions for the execution of prison sanctions in the application of parole, preparation of the convicted for release from punishment and in the post-penal reception of the convicted;
- in the procedure of execution of new alternative sanctions and measures - supervision over the fulfillment of obligations from the court decision ordering the defendant/convict to house arrest, stay in a "halfway house", electronic monitoring.
5. CONCLUSION

In some justice systems, the application and enforcement of alternative sanctions is the responsibility of a separate probation service. In other systems, as was the case in Serbia until 2014 (although the long-term aim was to establish a separate independent service), the prison authorities were responsible for both the prison and the application of alternative sanctions. However, with the adoption of the Law on the Execution of Off-site Sanctions and Measures, the issue of the execution of alternative measures and off-site sanctions was resolved in a good way, and the above-mentioned service, the so-called Trustee Service, for the implementation of the aforementioned law, and the implementation and execution of alternative prison measures in the best possible way. First of all, it is a good way to eliminate the inequities that existed, where we had that in such circumstances, where senior prison officers are tasked with applying prison and alternative sanctions, they can use their knowledge of prison conditions and design the work and development of non-prison sector. Senior officers have a particular role to play in ensuring that the prison is never overused. For example, they can draw public and parliamentary attention to the consequences of prison overcrowding and the lack of resources to care for large numbers of prisoners. It is therefore a key responsibility of prison authorities to make it known to legislators, the judiciary and the public that prison is a place to be used only as a last resort, in cases where no other reasonable solution exists. In all other cases, it should be possible to apply alternatives to prison sentences, above all when it comes to crimes that are classified as minor crimes in the Criminal Code, for crimes caused by negligence, primary perpetrators of crimes, situational perpetrators of illegal crimes, and perpetrators of petty crimes.

In the last few years, approximately 49,000 prison sentences have been handed down in the Republic of Serbia, of which 65.3% are for one year. Bearing in mind how many prison sentences were imposed in the range of 1-3 years, it can be assumed that over 70% of prison sentences could have been replaced by one of the alternative sanctions. This, unfortunately, has apparently not been done. In the end, we hope that this work will, in fact, influence the consideration of such a penal policy, especially for petty crimes, and promote new research and new types of alternative sanctions and measures, as well as perfect the ways and methods of applying them, and improve implementation in our new penal policy.

REFERENCES


INTEGRATED CONTROL SYSTEMS ON THE SHIP'S BRIDGE

Svetislav Soskić¹, Milan Kresojević²

¹ University of Defence in Belgrade, Military Academy, Veljka Lukica-Kurjaka Street No. 33, Belgrade, Republic of Serbia, cacaksole@yahoo.com
² University of Defence in Belgrade, Military Academy, Veljka Lukica-Kurjaka Street No. 33, Belgrade, Republic of Serbia, milan.kresojevic@va.mod.gov.rs

Received: 9th September 2022
Accepted: 14th September 2022

Abstract: The increasing challenge of managing the complex systems located on the command bridge of the ship, together with the realization of the human potential of seafarers, represents a complex task for all ship traffic participants. The risks of inadequate management of ship systems and crew members can cause major accidents both for the lives of seafarers and the ship as a whole, as well as for the environment, i.e. the water area in which the ship performs its activities. Starting from the assumption that it is human to make mistakes, it is necessary to organize and establish a management system that would react adequately and be able to recognize mistakes in time. Recognizing the error in time and reacting in a timely manner would minimize possible consequences. Also, every mistake or lesson learned contributes to increasing the efficiency of such a system. Such a single and integrated management system on the bridge represents the ability to apply leadership skills, crew management, and teamwork improvement on board, as well as the ability to manage human resources on the bridge. The result of the integrated management system is reflected in the behavior of crew members during emergency situations on board. Also, the system is checked through training crew members in handling complex ship systems primarily at the management level, i.e. on the command bridge of the ship. In the maritime industry in the early 1990s, the term 'Bridge Resource Management', or more commonly used the acronym 'BRM' was adopted as a safety and error management tool that has now become an integral part of ship crew training.

Key words: Bridge Resource Management, Ship Systems, Bridge Team Management

1. INTRODUCTION

The ship has a very complicated structure and organization, from time to time it happens that poor organization of teamwork in certain critical situations, despite having all the necessary equipment, is the cause of a bad outcome. Therefore, modern devices especially on the ship's bridge are not enough by themselves to achieve safety during navigation.

The implementation of expert training and training of all subjects of the integrated system of protection and rescue will contribute to the ability of both competent authorities and the
population to protect themselves and become more resistant to disasters. Special attention will be paid to the training of all subjects of the integrated protection and rescue system so that the staff can provide appropriate assistance and protection to others in situations of risk, natural, and other disasters (National Strategy, 2011).

Therefore, we see that work is also being done on the Serbian national level in terms of raising the level of knowledge and skills of the population in general, in order to act as successfully as possible in extraordinary circumstances. When people find themselves in a difficult situation, especially when their lives are at risk, they instinctively put themselves first and in a panic tend to make successive mistakes, and helping other people is often left aside. If they were trained to act in such situations, they would be more useful to themselves and others. Working in a team is what should be strived for because a group of people contributing together is much more effective than an individual acting alone.

2. BRIDGE RESOURCES MANAGEMENT (BRM)

STCW Convention (STCW, 2010), as amended in 2010, entered into force on January 1, 2012. However, a transitional period of 5 years has been established, i.e. until January 1, 2017, in order to enable the gradual implementation of the provisions. According to the new requirements of the amendment of the STCW Convention from 2010, all ships must have a trained SSO (Ship Security Officer), appointed by the company and subordinate to the ship's commander. The task of the SSO is to train other crew members in aspects of safe ship protection.

So, in order to board the ship, it is necessary to undergo shipboard safety training. After completing the training, the trainee is issued a certificate of competence and is awarded a certificate marked D45, which implies competence for managing human resources on the command bridge (Bridge Resource Management - BRM). Today, it is an obligation for every deck officer to be trained to manage human resources on the bridge.

The purpose of BRM is to know the measures that must be taken, in order to demonstrate the acquired knowledge, skills, and, training at all times, especially in dangerous circumstances, through timely actions and the proper use of resources intended for a certain dangerous circumstance. The management of human resources on the command bridge is nothing but the use of all available resources potential (equipment, information, and human potential) for the safe conduct of life and work on the bridge. Safety on a modern ship, despite all the technical and technological improvements, is not satisfactory, because, in 75% - 96% of accidents on the water, the error of the crew is involved. The most common causes of accidents are human factors, lack of teamwork and communication, inexperience, stress, fatigue, and the like.

Also, recent research has shown that most accidents are not caused by the lack of technical knowledge of the crew, but by ignorance of the nature of the human factor, communication procedures, unawareness of the situation (people do not know what is happening around them), stress management and the like. Simply, the crew as a team did not know or were not trained on how to manage all available resources.

Some of the other factors that make it difficult to manage the crew on board are new sophisticated equipment and cultural differences among the crew. It takes time to learn the instructions and instructions for using the equipment. People who speak different languages have a problem with the realization of communication, which is one of the most important resources of team management on board.
Also, human behavior especially in dangerous circumstances is often unpredictable. Raising the general level of knowledge, skills, and practice of procedures, contributes to the reduction of human errors, and it is achieved that people believe that they can successfully complete the task, which strengthens their self-confidence and determination, and which is crucial for successful action in urgent and dangerous circumstances (Rothblum, 2010).

If it is possible to implement these processes in the life and work of the crew on board, then it is possible to achieve the goal, which is nothing but a more modern approach to something that many nameless, conscientious and responsible deck officers have been applying in their long-term practice since ancient times.

2.1. Management rules in the ship system

The ship system consists of parts, which together represent one organizational unit, namely:
- people,
- means (ship) - technique, equipment, devices,
- external conditions (environment, media) and
- organization (operational framework, which determines the mutual behavior of staff and the conditions in which staff perform their joint and individual tasks) (Chauvin, et al. 2013).

In order for a shipping organization to function successfully, it is necessary to establish:
- areas of responsibility,
- special levels of responsibility and
- constant and clear orders and responsibilities.

In order to manage the ship's system, it is necessary to issue clear and comprehensible orders and instructions. The person issuing the order must be sure that the person to whom the order is addressed has fully understood it. After the execution of the order, feedback on the execution must be given. Especially for cases of sailing at night or with limited visibility, the captain of the ship, for the sake of the safety of navigation, writes the order in the ship's logbook or order book, in addition verbally (Cavaleiro, et. al 2020).

The general organization of work on board is significantly different from the same on land for several reasons:
- due to the nature of the work, the ships are physically separated from the management (company),
- during the voyage, the ship, crew, passengers, and cargo are subjected to weather conditions that significantly affect them,
- crew members are under the influence of difficult natural conditions and under the influence of devices and machines 24 hours a day and
- crew and passengers are often people from different regions with different habits, etc.

The stay on the ship and the work of the crew members is organized in such a way that the ship can always function safely 24 hours a day, whether it is moored, anchored or sailing.

The main parts of such an organization are:
- guards – sea, and port,
- loading/unloading cargo and/or passengers,
- plant and equipment maintenance,
- ship arrivals and departures to/from the port,
- safety of the ship, passengers, cargo, and crew in ports and in navigation,
- surveillance for fire, leaks, or other hazards,
- supervision (control) of fire protection means and
- supervision (control) of means of rescue and survival.

Nowadays communication between the management and the crew emphasizes the dominance of the management. The ship's crew feels criticized, controlled, unimportant, not listened to by the management and with a constant feeling of possible repression shows signs of fear. In such a state of excessive supervision, individuals unconsciously stop using the acquired knowledge and experience.

The vertical functional organization of individual shipping companies emphasizes and highlights the commander as a key person for the realization of the company's interests. In this way, the commander possesses the "formal authority of the vertical organization" and can convey his decisions, that is, the company's decisions, to the crew as an unquestionable order (Weintrit, & Neumann, 2011).

In contrast to the aforementioned, shipping companies organized according to the system of joint decision-making between the company and the ship's management provide some clear advantages:
- interested parties exchange information with each other,
- when making decisions, the needs and opinions of both parties are taken into account and
- the needs of the ship become equal to the needs of the company, and that is the essence of putting power back on board.

In modern accidents, in a large number of cases, the crew was guided only by the commander's decisions, even when the circumstances clearly warned of danger and the need to take actions or measures contrary to those taken by the commander.

The stranding of the tanker "Amoco Cadiz" in 1978 and the sinking of the tanker "Erica" in 1999 are clear examples of blindly listening to the commander's decision, because in the mentioned accidents, the officers noticed irregularities in making them, but did not do anything about it.

Thus, the habit of obeying and complying with orders, even when they were absent, created confused reactions in the crew members, which eventually led to the only remaining solution, which was the instinctive need for personal rescue. In such cases, the weakness of the vertical organizational model is confirmed for the umpteenth time, which is most conducive to the creation of dependence on the part of the authorities and leads to disastrous consequences in the case of wrong decisions, as well as the scheduling of authorities. We can easily conclude that vertical, strictly centralized ship organizations are not a suitable basis for the transition to teamwork.

It is very easy in a highly developed technical-technological world to fall under the influence of technology in general, especially in the conditions of sophisticated technological solutions, which change day and night and transform into some better solutions.

The crew gradually gets the feeling that the technical systems will take care of any problems on board. The knowledge and feeling that technical systems can be scheduled is increasingly suppressed. Therefore, technology can affect the crew, as a dominant factor, expressed through current technical ship subsystems.
The moment when uncritical subjection and indulgence in technology lead to dependence on technology, which means that active knowledge and skills no longer represent the basic factors of making and implementing decisions, then we talk about technological uncriticalness as a form of relying on technological solutions. Therefore, technological uncriticalness is a form of negative influence of current technology, whereby an uncritical attitude towards the capabilities of the ship as a technical system appears, which leads to greater trust in the system than in personal knowledge (Cavaleiro, et. al 2020).

An example of such a phenomenon in maritime affairs is the "Titanic" accident, where the commander, due to the general belief of its unsinkability, himself fell under the influence of the ship's superiority, and for that reason, among other things, suppressed the acquired knowledge, experience, and caution.

That such attitudes are still present today and even more dangerous due to the potential impact on the environment is confirmed by the example of the collision between the passenger ship "Norwegian Dream" and the container ship "Ever Decent" in 1999. The officer of the "Norwegian Dream" relied on radar information until the last moment, which was not adapted to the conditions of the sighting.

The same elements of misinterpretation of the radar image and blind trust in data from ARPE are also observed in the collision between "Pyotr Vasev" and "Admiral Nakhimov", where the commander of "Vasev" himself fell under the influence of the so-called "radar hypnosis" and neglected all other sources of information, including his active knowledge and experience of visual observation and listening.

2.2. Leading and managing people in case of danger

Due to the specificity of navigation conditions in which danger can occur, regardless of experience and knowledge, it is impossible to predict all actions, measures and procedures for a given circumstance. In addition to the personal abilities of the ship's commander, other officers and each individual crew member, to carry out the prescribed procedures and instructions, the ability to conduct procedures is also required by coordinating, directing actions and behavior, adapting all the time to current conditions. First of all, the commander should recognize the danger that threatens, and then determine the time and manner, when he will establish a connection with the experts on land, for the purpose of technical support and/or rescue of people and property. First, after determining that there is a danger for the ship and the people on it, the commander will use the prescribed signal to announce the danger and alert the crew. The crew is obliged to act in accordance with the assigned duties immediately after the alarm signal, according to the ship's muster list. The crew members gather at assembly points, as well as the person in charge (officer or navigation watch member), who is obliged to bring a portable VHF device with him. In case of real and immediate danger to the ship or persons on board, the commander is obliged to report to the competent center or sub-center for search and rescue at sea. In the case of an extraordinary event of danger, when the commander assesses that the safety of the ship and the people on it is threatened, he is also obliged to immediately, through the ship's radio devices, get in touch with the competent center or sub-center for search and rescue at sea. In the event that the commander receives a distress call from another ship, or receives an order from the center to engage in a search and rescue operation, he is obliged to establish a connection.

The schedule of actions in the event of an emergency is as follows:

1. to act in the event of danger, the commander, first of all, uses the crew, and in the first place that part, which is specially trained to confront the type of danger that has arisen.
2. in the shortest possible time, i.e. from 5 to 8 minutes after collecting basic data about the
danger that befell the ship and persons, the commander decides to alert the service on land
and reports to the competent center or sub-center for search and rescue at sea.

3. when the danger is of limited scale and under the control of the crew, the commanding
officer will first call the ship-in-distress support team on land and

4. coordination of the search and rescue of people at sea, upon notification of a death, is taken
over by the center or sub-center for search and rescue at sea, according to the determined
areas of competence.

As soon as possible, when he judges that the conditions exist, the commanding officer is
obliged to request liaison with the ship's shore support team.

To the team members, the commander should communicate the current situation using data
on:
- position of the ship, weather conditions,
- number of crew, number of passengers, number of injured or missing crew members or
  passengers,
- the number of vehicles on board, the state of fuel, lubricants, ballast, and drinking water and
- preparatory actions for leaving the ship.

The order is issued exclusively by the commander when he judges that the actions taken to
bring the danger under control remain unsuccessful and that human lives would be endangered
by continuing to stay on the ship. In such situations, the commander must immediately order
the ship to be abandoned. These are most often explosions, collisions, or strandings, and the
safety of the people on board is directly threatened, and all rescue actions are disabled and a
death signal is sent.

2.3. Management of personnel during navigation

A detailed navigation plan facilitates safer navigation for deck duty officers on the bridge. The
plan consists of several phases. Each phase contains key execution elements related to the
safety of navigation.

The ship's itinerary includes:
- recognition of dangers in navigation areas (shallows, shipwrecks, and physical-geographic
  characteristics),
- sailing courses,
- plans of extraordinary circumstances, which will be used in cases of danger, and the sequence
  of actions in extraordinary situations and
- determination of priorities and distribution of responsibilities on certain parts of the navigable
  route (Weintrit, & Neumann, 2011).

A prepared and analyzed travel plan, approved by the commander, is a prerequisite for the safe
navigation of the ship. The planning phase is followed by the implementation of the planned
voyage, and many segments must be taken into account when it comes to manpower. First of
all, after all the previous preparations and assuming that the navigational preparation is well
done and that the command bridge is ready, someone should take care of the crew at all times
(Cavaleiro, et. al 2020).

In certain segments of the trip, attention must be paid to the rest of the crew members, but of
course in accordance with the available time. For this reason, all of this is planned before the
actual sailing and no mistakes should be made in this regard. Therefore, it is necessary to
anticipate the existence of fatigue and take special account of it. The availability of the crew must be sufficient at all times, and strict care must be taken to avoid a situation where one of the crew members needs to do more things than intended. The availability of the crew must be achieved within the limits of their daily duties (working hours), without interfering with the normal (safe) performance of routine work. Sudden needs in changes of work duties, as well as in the extension of working hours of crew members, must be in accordance with the STCW Convention regarding the keeping of a ship's watch. Since the ship sails in specific conditions and passes through many critical sectors (channels, straits, etc.), some additional procedures are undertaken during navigation. They refer to calling another officer to the command bridge or to the deck of the ship, in order to reduce the existing risk in a limited navigation area or to perform preparatory actions related to anchoring, preparation of equipment for mooring the ship in the port, etc. Changes to the travel plan are often made in order to safely navigate the ship in a restricted navigation area due to:

- navigation devices (unreliable or imprecise),
- compensation for the lost sailing time of the ship during the influence of unfavorable meteorological factors and
- change of port of destination, etc.

3. LEADERSHIP, CREW MANAGEMENT, TEAMWORK IMPROVEMENT (BTM)

Teamwork is the most widespread form of performing complex professional tasks, the realization of which requires either knowledge from different professional areas, or specialized knowledge from the same or similar professional areas. The purpose of creating teams and teamwork is to integrate the knowledge and experiences of team members when solving the same problem. Teamwork enables maximum use of individual knowledge, creative and innovative potential and increases the speed and flexibility of reactions to user and market requirements. The basic difference between a team and an individual is more than obvious. The team can handle a larger task, can perform a greater professional effort, and has greater knowledge and experience than one of its members, and based on everything presented, we can say that it can perform a complex task faster and with better quality. As the complexity of jobs increases, the hierarchical structure decreases by transferring responsibility to lower hierarchical levels so does the need for a heterogeneous, flexible, and competent workforce of various specializations. It is necessary to mention that in traditional vertically structured shipping organizations, there is no possibility of a common and correct approach to the use and analysis of work, and thus the possibility of noticing possible malfunctions and structural defects. Considering the above, it can be said:

- organizational factors of functionally organized shipping companies affect the quality of work of commanders, managers, and officers in regular and extraordinary circumstances,

- a pronounced hierarchical command structure can suppress the constant performance of duties and jobs, while free and interactive relationships prevent the affirmation of the mentioned concept and

- we should strive to introduce an efficient model of teamwork on board.

It is necessary to develop skills in planning, handling information, ability to influence others, negotiation skills, creativity, curiosity, tendency to learn and improve, teamwork, professionalism, self-confidence, socialization, responsible attitude towards work, correct relationship with other people, and strive for development and productivity. The current state of the ship, in which modern approaches to management are accepted but cannot be literally implemented due to the structure and existing culture, creates confusion between the wishes
and the possibility of accepting new management achievements. In fact, it is paradoxical that the water transport industry was among the first to dare to accept the principle of continuous training of seafarers and new methods of additional non-traditional education, knowledge renewal and training. All this goes through various specialist training in accordance with the IMO and STCW conventions, but no one had the strength to embark on the restructuring of the existing hierarchical structure on board, which is contradictory to teamwork and other elements of modern management. The current situation, in which the ship's commander and other management personnel are responsible for all mistakes, negatively affects the organization's desire to better train its employees. Teamwork on board can achieve greater creativity, greater job satisfaction, motivation, flexibility, better mutual communication, synergy, faster problem solving and implementation of ideas, better use of existing knowledge and skills of the crew, and the possibility of improvement by learning from other team members. Significant problems arise during the development of a new team or when new members arrive in the team, i.e. the departure of key members from the team, which has a special weight on a ship where crew members often change.

It should be noted that both the group and the team must meet at least three characteristics:

- have a purpose and goal of existence, and act in the direction of achieving that goal,
- have a leader, i.e. leadership and
- a specific structure, which can be very diverse, but is always in the function of achieving the purpose and goals of the group.

We can even say that there is no real teamwork on board, it would rather be said that it works in a group. On the ship, the situation in this context is further complicated, due to the frequent change of crew members, so the crew goes through frequent conflicts and changes, especially when the management staff changes, which also affects the performance (Weintrit, & Neumann, 2011). If the crew members are members of different nationalities and cultures, the situation becomes even more complicated. Apart from the fact that the ship is dislocated, so the crew works in specific conditions, far from their home, there are also cultural and language barriers that need to be overcome, because open communication is an important success factor in achieving goals. Through mutual communication, the team leader must explain what is to be achieved and make sure that the team members understand the company's intentions. For easier understanding and overcoming language barriers, it is good to use visual methods. After that, you can start determining the processes and procedures that will be used to achieve the set goals. It is important to create, with the cooperation of all team members, rules and norms that will be respected, because different cultural predispositions create different expectations and different approaches to problems. It is especially important to develop the habit of giving quick feedback in parallel with completing tasks. Since there are language problems, associates should be democratically guided and encouraged to communicate, since due to poor language skills it may happen that some team member feels inferior and is afraid to communicate with the team leader. The team leader must develop people management skills and choose the right approach to situations and to different team members, in order to facilitate mutual relations among members of a multicultural team and successfully resolve conflicts that arise due to different cultural heritage. These problems also occur on board, where feedback is extremely important. If the ship's crew is not led democratically and constantly emphasizes formal power, then feedback and trust will be absent or feedback will arrive too late to avoid causing more damage, and performance will be significantly reduced. We can add a cultural dimension to the previously mentioned team development cycle, which affects the development of a multicultural team. Disbanding the team must not and cannot happen on board, and the work must be done safely and efficiently. In addition, the ship's manager does not have a set time to develop the team, but the crew must function from the moment the new crew members arrive.
on board. Today, the influence of different foreign cultures is being analyzed, which could explain the complexity of the characters of different crews and the contradictions in culture, as well as language problems. There are many crews of different nationalities, so a compromise is resorted to, i.e. combining experienced crew members with those who have less experience. The lack of conflict management, which arises on board due to misunderstanding of cultural, religious, and other differences, causes weaker team effectiveness and permanently bad interpersonal relations, in a specific workplace where living and working conditions are completely different from the usual ones (Weintrit, & Neumann, 2011).

4. CONCLUSION

Fatigue and sleepiness of the management staff, which often result in nervousness on the ship, which is then transferred to all crew members, are a common cause of both work errors and poor interpersonal relations, as well as a significant decrease in effectiveness and increased costs for the ship owner. As the human factor is still the biggest cause of accidents on the water, one of the ways to reduce that negative impact is possible if every seafarer completed training in BRM and BTM or underwent certain training on simulators. Acquiring knowledge from BRM and BTM would greatly improve the interpersonal relationship on board and thus reduce the risk of an accident on board caused by the human factor.

REFERENCES


APPLICATION OF AHP AND MABAC METHODS IN CHOOSING A COMBINED CONSTRUCTION MACHINE FOR FLOOD PREVENTION AND EARTHQUAKE REMEDIATION

Nemanja Pribicevic¹, Đarko Bozanic², Dusko Tesic³

¹ University of Defence in Belgrade, Military Academy, Veljka Lukica-Kurjaka Street No. 33, Belgrade, Republic of Serbia, nemanjaprib@gmail.com
² University of Defence in Belgrade, Military Academy, Veljka Lukica-Kurjaka Street No. 33, Belgrade, Republic of Serbia, dbozanic@yahoo.com
³ University of Defence in Belgrade, Military Academy, Veljka Lukica-Kurjaka Street No. 33, Belgrade, Republic of Serbia, tesic.dusko@yahoo.com

Received: 4th September 2022
Accepted: 14th September 2022

Professional paper

Abstract: This paper presents the selection of the optimal combined construction machine - an alternative for flood prevention and earthquake remediation using the AHP-MABAC hybrid model. The AHP method was used to obtain the weighting coefficients of the criteria, and the MABAC method was used for analysis when choosing the best alternative. After completing this analysis, the alternatives are ranked from best to worst option. Based on the obtained rank, a decision is made to choose the best alternative, thereby increasing the efficiency in protecting and rescuing people, livestock and material goods affected by floods and earthquakes. In the conclusion, an overview is given of the importance and possibilities of applying AHP and MABAC methods when choosing the best alternative.

Key words: emergency situations, decision-making, AHP, MABAC

1. INTRODUCTION

Over the past years, Serbia has faced numerous disasters that have led to significant human casualties and enormous material damage, where natural disasters undermine the safety and survival of entire cities. Natural disasters take many human lives every day and destroy and degrade the environment in various ways, causing great material damage and losses. Natural disasters such as floods, earthquakes, droughts, fires, escarpments, and landslides are becoming more frequent. Therefore, the general goals that the social community strives for are an adequate response to such disasters and an increase in safety. In order to achieve this, to a certain extent, quick decision-making is necessary.

As a result of industrialization and development of the economy, large pollutions have occurred over time, which have left an indelible mark on nature. As one of the consequences, there are climate changes that have greatly influenced the increase in the number of natural
disasters and their intensity, and thus the consequences. A natural disaster is an elemental calamity whose consequences threaten the safety, life, and health of many people, material and cultural goods or the environment on a larger scale, and the occurrence or consequences of which cannot be prevented or eliminated by the regular action of competent authorities and services (Law on Reducing the Risk of disaster and emergency management, 2018).

The Balkans is an area prone to seismic activity and floods. Almost every year there are floods due to the appearance of torrential rivers due to a large amount of precipitation, which cause great damage to households and agriculture, and overflowing of large rivers is not rare either. On the other hand, we also witness of many earthquakes. In this context, preparations for defence against floods and for eliminating the consequences of earthquakes should represent a continuous process that serves the purpose of improving the entire system of protection and rescue.

The goal of this work is to create a model for decision support, by which the choice of a combined construction machine is made, which would be used in certain segments for flood prevention and remediation of consequences in the event of an earthquake. By applying the model, it would be significantly easier for decision makers to choose one type of combined construction machine from a set that includes a large number of these machines from different manufacturers.

In addition to the introduction, the work has three other units. The second part describes the methods that are applied. The third part includes a case study, while the last part contains the conclusion of the work.

2. DESCRIPTION OF METHODS

Decision-making represents the choice of one among an unlimited number of possibilities (Mora, 1980, cited in Cupic and Suknovic, 2010). In essence, decision-making is a process in which one is selected from a set of numerous possibilities, that is, alternatives based on certain criteria (Cupic M, Suknovic M, 2010). The persons who make the choice of alternatives are called decision makers (DM). To this day, many different decision-making methods have been developed, based on different mathematical models, which solve problems, that is, make decisions. In this paper, the AHP-MABAC hybrid model was used, where the AHP - Analytical Hierarchical Process method was used to determine the weighting coefficients of the criteria, and the MABAC (Multi-Attributive Border Approximation area Comparison) method was used to rank the alternatives.

2.1. AHP method

The AHP method was developed by Tomas Saaty (1980) and is one of the most famous and most frequently used methods in solving problems in the field of strategic management, finance, equipment selection, etc. It serves as an aid to DMs in solving complex decision-making problems involving many DMs. AHP is a multi-criteria technique based on decomposing a complex problem into a hierarchy. The goal is at the top of the hierarchy, while the criteria, sub-criteria and alternatives are at the levels and sub-levels of the hierarchy (Pamucar, 2018; Pamucar et al., 2016; Pamucar et al., 2011).

Apart from the hierarchical structuring of the problem, AHP differs methodologically from other multi-criteria methods in that it performs a comparison in pairs of elements at a given level of the hierarchy in relation to elements at a higher level. The comparison of pairs of elements is done based on Saaty's rating scale (Table 1).
**Table 1. Saaty's rating scale**

<table>
<thead>
<tr>
<th>IMPORTANCE</th>
<th>DEFINITION</th>
<th>EXPLANATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>of the same importance</td>
<td>The two elements are of identical importance in relation to the goal</td>
</tr>
<tr>
<td>3</td>
<td>low dominance</td>
<td>Experience or judgment slightly favors one element over another</td>
</tr>
<tr>
<td>5</td>
<td>high dominance</td>
<td>Experience or judgment strongly favors one element over the other</td>
</tr>
<tr>
<td>7</td>
<td>demonstrated dominance</td>
<td>The dominance of one element confirmed in practice</td>
</tr>
<tr>
<td>9</td>
<td>absolute dominance</td>
<td>Dominance of the highest degree</td>
</tr>
<tr>
<td>2, 4, 6, 8</td>
<td>intermediate values</td>
<td>Compromise or further division required</td>
</tr>
</tbody>
</table>

The corresponding hierarchical structure of the problem of comparing each criterion with each other can be represented by the following evaluation matrix:

**Table 2. Assessment matrix in pairs of criteria**

<table>
<thead>
<tr>
<th>Criteria</th>
<th>( c_1 )</th>
<th>( c_2 )</th>
<th>( c_3 )</th>
<th>...</th>
<th>( c_n )</th>
</tr>
</thead>
<tbody>
<tr>
<td>( c_1 )</td>
<td>-</td>
<td>( p_{12} )</td>
<td>( p_{13} )</td>
<td>...</td>
<td>( p_{1n} )</td>
</tr>
<tr>
<td>( c_2 )</td>
<td>10</td>
<td>-</td>
<td>( p_{23} )</td>
<td>...</td>
<td>( p_{2n} )</td>
</tr>
<tr>
<td>( c_3 )</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>...</td>
<td>( p_{3n} )</td>
</tr>
<tr>
<td>...</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( c_n )</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-</td>
</tr>
</tbody>
</table>

The values on the main diagonal are not shown, because the criteria are not compared with themselves, while the values in brackets represent the inverted ratio of preferences, so that \((p_{23})\) at the intersection of \(c_2\) and \(c_3\) has a real value in the following matrix \(1/p_{23}\). An approximate procedure consisting of the following steps is used to obtain the vector of weight coefficients of the criteria (Pamucar D, 2017):

**Step 1**: Rework the matrix of pairwise comparisons;
**Step 2**: Calculate the sum of the elements in each column of the processed matrix;
**Step 3**: Divide each element of the column by the sum of the values of that column;
**Step 4**: Calculate the sum of the elements in each row and then determine the mean value of each row.

The values obtained in this way represent the weighting coefficients of the criteria.

Finally, a special procedure is used to check the consistency degree of the initial decision-making matrix. The maximum permissible deviation from the ideal comparison is 10%.

**2.2. MABAC method**

The MABAC method is a more recent method developed by Pamucar and Cirovic (2015). The basic setting of the MABAC method is reflected in the definition of the distance of the criterion function of each observed alternative from the boundary approximate area (BAA). In the following part, the procedure for implementing the MABAC method is presented, which consists of 6 steps (Pamucar, 2018, Bozanic et al., 2016):

**Step 1. Formation of the initial decision matrix (X)**. In the first step, \(m\) alternatives are evaluated according to \(n\) criteria. Alternatives are represented by vectors \(A_i = (x_{i1}, x_{i2}, ..., x_{in})\), where \(x_{ij}\) is the value of the \(i\)th alternative according to the \(j\)th criterion \((i=1,2,...,m; j=1,2,...,n)\).
\[
X = \begin{bmatrix}
A_1 & x_{11} & x_{12} & \ldots & x_{1n} \\
A_2 & x_{12} & x_{22} & \ldots & x_{2n} \\
\vdots & \vdots & \vdots & \ddots & \vdots \\
A_m & x_{1m} & x_{2m} & \ldots & x_{mn}
\end{bmatrix}
\]  
(1)

where \( m \) indicates the number of alternatives, \( n \) indicates the total number of criteria.

**Step 2. Normalization of the initial matrix elements (N).**

\[
N = \begin{bmatrix}
A_1 & t_{11} & t_{12} & \ldots & t_{1n} \\
A_2 & t_{12} & t_{22} & \ldots & t_{2n} \\
\vdots & \vdots & \vdots & \ddots & \vdots \\
A_m & t_{1m} & t_{2m} & \ldots & t_{mn}
\end{bmatrix}
\]  
(2)

The elements of the normalized matrix \( N \) are obtained by applying the expression:

a) for criteria of the "benefit" type (the higher the value of the criteria, the more desirable):

\[ t_{ij} = \frac{x_{ij} - x_i^-}{x_i^+ - x_i^-} \]  
(3)

b) for criteria of the "cost" type (smaller criteria value is preferable):

\[ t_{ij} = \frac{x_{ij} - x_i^+}{x_i^+ - x_i^-} \]  
(4)

where \( x_{ij}, x_i^+ \) and \( x_i^- \) represent the elements of the initial decision matrix \( X \), where \( x_i^+ \) and \( x_i^- \) are defined as:

\( x_i^+ = \max(x_1, x_2, \ldots, x_m) \) and represents the maximum values of the observed criterion by alternatives.

\( x_i^- = \min(x_1, x_2, \ldots, x_m) \) and represents the minimum values of the observed criterion by alternatives.

**Step 3. Calculation of the weighted matrix elements (V).** The elements of the weighted matrix \( V \) are calculated based on the expression:

\[ v_{ij} = w_i \times t_{ij} + w_i \]  
(5)

where \( t_{ij} \) represent the elements of the normalized matrix \( N \), \( w_i \) represent the weighting coefficients of the criteria. Applying expression (5), we get the weighted matrix \( V \):

\[
V = \begin{bmatrix}
w_1 \times t_{11} + w_1 & w_2 \times t_{12} + w_2 & \ldots & w_n \times t_{1n} + w_n \\
w_1 \times t_{21} + w_1 & w_2 \times t_{22} + w_2 & \ldots & w_n \times t_{2n} + w_n \\
\vdots & \vdots & \ddots & \vdots \\
w_1 \times t_{m1} + w_1 & w_2 \times t_{m2} + w_2 & \ldots & w_n \times t_{mn} + w_n
\end{bmatrix}
\]  
(6)

**Step 4. Determination of the matrix of boundary approximate areas (G).**

BAA for each criterion is determined according to the expression:

\[ g_i = \left( \prod_{j=1}^{m} v_{ij} \right)^{1/m} \]  
(7)

where \( v_{ij} \) represents the elements of the weighted matrix \( V \).

After calculating the value of \( g_i \) according to the criteria, a matrix of borderline approximate values \( G \) (8) of \( n \times 1 \) format is formed (\( n \) represents the total number of criteria by which the choice of the offered alternatives is made).
Step 5. Calculation of the distance matrix of alternatives elements from BAA (Q).

\[ Q = \begin{bmatrix} q_{11} & q_{12} & \cdots & q_{1n} \\ q_{21} & q_{22} & \cdots & q_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ q_{m1} & q_{m2} & \cdots & q_{mn} \end{bmatrix} \]  

\[ G = [g_1 \ g_2 \ \cdots \ g_n] \]  

The distance of the alternatives from the boundary approximate value of the area \((q_{ij})\) is determined as the difference of the elements of the weighted matrix \((V)\) and the BAA value \((G)\).

\[ Q = V - G = \begin{bmatrix} V_{11} & V_{12} & \cdots & V_{1n} \\ V_{21} & V_{22} & \cdots & V_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ V_{m1} & V_{m2} & \cdots & V_{mn} \end{bmatrix} - [g_1 \ g_2 \ \cdots \ g_n] = [q_{11} \ q_{12} \ \cdots \ q_{1n}] \]  

\[ V = \begin{bmatrix} q_{11} & q_{12} & \cdots & q_{1n} \\ q_{21} & q_{22} & \cdots & q_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ q_{m1} & q_{m2} & \cdots & q_{mn} \end{bmatrix} \]

where \(g_i\) represents the BAA for criterion \(C_i\), \(v_{ij}\) represents the elements of the weighted matrix \((V)\). Belonging of the alternative \(A_i\) to the approximate area \((G, G^+ \text{ or } G^-)\) is determined based on the expression:

\[ A_i \in \begin{cases} G^+ \text{ if } q_{ij} > g_i \\ G \text{ if } q_{ij} = g_i \\ G^- \text{ if } q_{ij} < g_i \end{cases} \]

In order for the alternative \(A_i\) to be chosen as the best from the set, it is necessary that it belongs to the upper approximate area \((G^+\) according to as many criteria as possible.

Step 6. Ranking of the alternatives. The calculation of the values of the criterion functions by alternatives (12) is obtained as the sum of the distances of the alternatives from the BAA \((q_i)\). By summing the elements of the matrix \(Q\) by rows, the final values of the criterion functions of the alternatives are obtained:

\[ S_i = \sum_{j=1}^n q_{ij}, \ j = 1, 2, \ldots, n, \ i = 1, 2, \ldots, m \]  

3. APPLICATION OF THE MODEL

The hybrid decision-making model AHP-MABAC will show the determination of the best alternative according to certain criteria. On a concrete example, the selection of one of the four combined construction machines intended for flood prevention and remediation of the consequences caused by earthquakes will be shown, which represents the best choice for procurement to the Emergency Situations Sector, which are marked with A1, A2, A3 and A4 (for the evaluation of alternatives, the criteria were taken values of combined construction machines from four manufacturers).

3.1. Criteria description

Before starting the application of the method, the basic criteria are defined on the basis of which the best combined construction machine is selected. The basic criteria on the basis of which the best alternative will be selected are:

- criterion 1 \((k_1)\) – engine power in kilowatts (kW)
- criterion 2 \((k_2)\) – maximum speed in kilometers per hour (km/h)
- criterion 3 \((k_3)\) – depth of digging in meters (m)
criterion 4 (κ₄) – price in thousands of euros (1000 €)
criterion 5 (κ₅) – the volume of the bucket in cubic meters (m³)
criterion 6 (κ₆) – autonomy of work in hours (h)

Criteria κ₁, κ₂, κ₃, κ₅ and κ₆ are criteria of the "benefit" type, and criterion κ₄ is a criterion of the "cost" type.

3.2. Calculation of the weight coefficients of the criteria

Since the criteria were defined, the conditions were met for the application of the AHP method according to the steps defined in point 2.1, whereby the weighting coefficients shown in Table 3 are obtained.

Table 3. Weight coefficients of the criteria

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Criterion weighting coefficients (W)</th>
</tr>
</thead>
<tbody>
<tr>
<td>K₁</td>
<td>0.0751</td>
</tr>
<tr>
<td>K₂</td>
<td>0.0256</td>
</tr>
<tr>
<td>K₃</td>
<td>0.12197</td>
</tr>
<tr>
<td>K₄</td>
<td>0.40828</td>
</tr>
<tr>
<td>K₅</td>
<td>0.06402</td>
</tr>
<tr>
<td>K₆</td>
<td>0.30503</td>
</tr>
</tbody>
</table>

The degree of consistency of the initial decision matrix is 0.09657, which represents a deviation of less than 0.10, so it can be considered that the initial matrix of pairwise comparisons is consistent.

3.3. Choosing the best alternative

After obtaining the weight vectors, the best alternative was selected using the MABAC method. To obtain the best alternative, the steps from point 2.2 were applied. By applying the steps, the final values of the criterion functions of the alternatives shown in Table 4 are obtained.

Table 4. Ranking of alternatives

<table>
<thead>
<tr>
<th></th>
<th>The value of the sum of the alternatives by row</th>
<th>Rank of alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>A₁</td>
<td>0.3101</td>
<td>1</td>
</tr>
<tr>
<td>A₂</td>
<td>0.0755</td>
<td>3</td>
</tr>
<tr>
<td>A₃</td>
<td>0.0821</td>
<td>2</td>
</tr>
<tr>
<td>A₄</td>
<td>-0.2523</td>
<td>4</td>
</tr>
</tbody>
</table>

The results from Table 4 show that alternative A₁ is ranked as the first, that is, the most favorable, and alternative A₄ as the last, that is, the least favorable.

4. CONCLUSION

The fact is that floods and earthquakes, as natural disasters, are an actual problem of modern times. That is why it is still important to have adequate equipment, in order to act preventively, that is, to eliminate the consequences of floods and earthquakes as soon as possible.

This paper presents the application of the AHP-MABAC hybrid model in the selection of a combined construction machine for flood prevention and earthquake remediation for the needs of the Department of Emergency Situations. Upon completion of the analysis, the results show that alternative A₁ is ranked as the first, that is, the most favorable, and alternative A₄ as the last, that is, the least favorable. Based on all the above, it can be concluded that these methods can be used to successfully make a decision when choosing these types of funds. This research
provides only an initial framework for the further continuation of the research, that is, a more detailed elaboration of the criteria and their weighting coefficients.

REFERENCES


Cupic M, Suknovic M. (2010). Decision-making, Faculty of Organizational Sciences, Belgrade.


Pamucar, D., Djorovic, B., Bozanic, D., Cirovic, G. (2012). Modification of the dynamic scale of marks in analytic hierarchy process (AHP) and analytic network approach (ANP) through application of fuzzy approach, Scientific Research and Essays, 7(1), 24-37.


MIGRANT CRISIS AS A SPECIFIC RISK MODERN EUROPE

Dusko Tomic¹, Eldar Saljic²

¹American Univ. in the Emirates. Academic City. PO Box: 503000, Dubai, UAE, dusko.tomic@aue.ae
²American Univ. in the Emirates. Academic City. PO Box: 503000, Dubai, UAE, eldar.saljic@aue.ae

Received: 1st September 2022
Accepted: 10th September 2022

Original scientific paper

Abstract: Like any crisis in the human world, the migrant crisis can be approached without more comprehensive interpretations and deeper understanding. Nevertheless, recognizing intuitions at the first observations of European and Balkan "migrant events" is prudent, and beyond prejudice and pre-understanding, to search for the causes of the crisis. The ongoing migrant crisis has highlighted the need to create and implement a multidisciplinary model of understanding the 21st-century conflict. Models used so far halved from mega authorial theories and political doctrines, such as various pro-globalization or anti-globalization approaches, transitional neoliberal formulas, the pattern of "new world order," or "clash of civilizations," clashes of religions and cultures, world system, post-imperialism, various postmodern theories, doctrines of so-called soft and hard power, they have proven to be incompliant to events and therefore insufficient for a complete understanding of the contradictions and contradictions of the modern world.

Historically, the current migrant crisis has regained the importance of questioning the spatial dimensions of the European populist configuration. The current and previous migrant problems have reminded classical and contemporary geopolitical theories of the original understanding of this approach to social and political phenomena, long overdue by Rudolf Kjellen. In one of the earliest divisions of geopolitics, a deserved place was found by demo politics. The focused demo-political reflection gains importance in situations of growing demographic problems.

While geopolitics primarily encompasses processes of changes in space and area, demo politics touch on politically conditioned processes in the population. In seemingly chaotic demo politics, it reaffirmed the importance of a critical geopolitical interpretation of migrant processes. Even among the pro-non Eurocrats, for various ideological reasons, extremely inclined to specific geopolitical ideas and arrangements, it strengthened the sense of continental spatiality, accompanied by the knowledge that geopolitics "after all" has returned to European and world relations. In addition to many crises that have befallen Europe, the return of geopolitics has been contributed by the disruption sustained by the migrant wave.
The current migrant crisis is a causal-consequential crisis, which means that as an already emerging disorder, it causes many other diseases that would not be without its effect. Still, it is also caused by factors that have previously shaped it and may not be known enough until this moment. The driving and emergence of the migrant crisis have occurred in the past; its modern development encompasses the present, and, likely, the migrant crisis will be faced by Europe in the future. Hence, it is necessary to bear in mind the concrete historical dimension of the problem, which also contains specific chrono-political components. When something is not understood as before at one time, the development usually enables that if it is to be understood in the consequential time.

Key words: migrant crisis, geopolitics, security

1. INTRODUCTION

The migrant crisis cannot be understood beyond historical times; the time aspects of the migrant crisis are as important as the spatial ones. Therefore, the chrono-politics of the migrant crisis point to the interpretation and understanding of the time scale in which the crisis erupted and strengthened. It is, in fact, an intertwining of phases and stages in a genuinely lengthy historical background in which the population from the starting areas of the Middle East and North Africa towards Europe is observed, but also in the first moments of surprising local developments in Serbia. These regional and segmentary developments were designed and managed time/spatial tests for much more mass and dramatic migrant movements on a crucial European land route in the Balkans. It is, of course, a seemingly unmotivated launch of part of the Albanian population from Kosovo and Metohija in the northern direction, towards Serbia's border with Hungary and Croatia. For many observers, the movements of disciplined columns of Albanians through Serbia in the winter, during January and February 2015, eluded understanding, only later, with the mass encounter of out-of-European migrants, that the first misunderstood event would be fitted into a much larger migrant "puzzle."

2. MIGRATIONS - HISTORICAL DIMENSION

Throughout history, migrations have happened voluntarily or resulted from different forms of coercion. Migrant movements were within or across the borders of one territory, and smaller or larger groups of people participated.

The result is historical, social, and cultural differences, i.e., different reactions of individuals or groups to certain social occasions. In addition to external reasons, sometimes internal causes such as population growth, changing the living conditions of individual groups, and developing social awareness were significant for migration. The initial migrations were conditional on the search for food and the need to live in territories that offered better living conditions. What encouraged people to these migrations was to break the balance between the possibilities provided by the natural environment and the needs of the population in the territory. It was a movement due to man's inability to confront specific natural forces.

With the development of agriculture, man's interaction with nature becomes different, and no man can strike a balance with nature. Still, he initiates specific problems that will force him to re-migratory. By changing how we apply and use iron to make tools and weapons, there is an increase in food production and the emergence of specialized groups of people with particular occupations. Population growth causes excess populations not to find fertile parts of the territory, so fertile land should be fought for. This is due to forced migration due to conflicts between different groups of people in certain regions.

The ancient age was characterized by colonization due to population increases, forced migration due to wars and conquests, and forced displacement. Unlike the early medieval
migrations encompassing entire tribes and tribal alliances, medieval migration spanned only individual groups and social classes. Medieval rulers encouraged the settlement of Western European territories, especially groups that brought in more advanced agricultural production technologies, offering them better economic conditions and personal freedoms greater than the dominant population. Modern migrations arise only when strong states are strengthened and boundaries between different entities, i.e., when there are clear territories where political and social relations are maintained. We are talking about countries that do not quickly move borders, where there is a prominent political but social hierarchy, and when migration is generated for clear political and socio-economic goals.

The first large-scale migrations resulted from significant geographic discoveries between the 15th and 18th centuries. The inhabitants of Europe, spurred on by stories about the countries of the "New World" and their wealth, leave their residences and move to the "promised" land, thus conveying their language, culture, religion, and way of life. In this way, colonization has inhabited over two million people from Europe to the countries of the New World.

It is estimated that the slave trade relocated more than 8 million enslaved people from the In part of Europe was moving to the countries of the New World, and the Jews and the Mavri had to leave Spain in 1590 and head to the Ottoman Empire. Also, the Spaniards expelled protesters from parts of the Netherlands and Belgium, as did the French. In addition, two great migrations of Serbs took place on our lands, in 1690 and 1740, when over 180,000 were attracted to free ground, guaranteed freedom of religion, i.e., church-school autonomy abandoned the Ottoman Empire, and moved to the territory of the Habsburg monarchy. Arguably the largest mass migration in history took place in 1947, during the period of the emergence of two new, independent states, Pakistan and India.

It is estimated that more than 14.5 million people left their homes for political and religious reasons. The Muslim population inhabited Pakistan en masse, while members of the Hindu and Sikh communities headed for India.

### 3. MODERN MIGRANT MOVEMENTS, CAUSES, AND CONSEQUENCES

The latest migrant movements, the current few years, peaking in 2015 and early 2016, when hundreds of thousands of refugees from devastated war-torn areas of the Middle East, primarily from Syria, headed for European Union countries, are the most significant "migration of nations" known in recent history.

This large migration flow from the Middle East and Africa to Europe began in 2011 and has intensified particularly since 2014, reaching unprecedented proportions in 2015, vastly exceeding the number the United Nations projected for 2015. The total number of migrants worldwide in 2015 was projected to reach a maximum figure of 237 million, a severe growth rate from 1990 to 2000. In 2014, the total number of migrants worldwide was "only" 154 million. Even the most pessimistic predictions have proven to be a deficiency because the number of migrants is now on a continuously enormous rise (Simeunovic, 2015:2). The large influx of migrants towards the European Union is due to various geopolitical processes that, indirectly or immediately, have affected the whole process. It can mainly be said of five key geopolitical processes that have involved the situation in the Middle East, namely migrant movements toward Europe. The first represents the failure of the so-called "sovereign tycoons." The Arab Spring is an unfounded assessment of its continued expansion. The main reason can be sought in the inexperience of vital political actors in these areas to use the initial "critical" mass for political change.

The second is the spread of the conflicts in Iraq, Syria, Yemen, and the civil war in Libya. Syria, however, remains the only country in the region where there has been no change in the
political establishment. The third is the intensification of religious conflicts. The fourth is a tightening of relations globally, in terms of the support of significant powers to different Islamic states, primarily Sunni-majority Iran and Sunni-majority Iran. The fifth is the collapse of conditions and the proliferation of terror.

During the transition period, i.e., after the so-called "war on terror," in the Arab Spring, Islamist parties persecuted during the secular state fared better than the emerging parties and movements, establishing Islamic State with sharia law.

This led to the reinforcement of Islamist organization Jabhat-al-Nusra as an al-Qaeda (Al-Qaeda) outpost in Syria and later the creation of ISIS (ISIS), or so-called Islamic State (IS, formerly ISIS/ISIL). Islamic State, outside its home state in Iraq and Syria, declares nine caliphates (Adeus, 2016). In 2014, the so-called Islamic State (IS, formerly ISIS/ISIL) army in Syria and Syria was killed. Islamic State has captured parts of western Iraqi territory, namely eastern and central parts of Syria. Because of the war, more than 4 million Syrian nationals left the country, but because of the high prices imposed by smugglers, most initially, rather than in Europe, remained in Africa and Asia in the largest refugee camps. In the first nine months of 2015, more than 710,000 migrants arrived in Europe (Frontex, 2016).

In addition to geopolitical factors affecting the latest migrant movements, according to an analysis compiled by the United Nations High Commissioner for Refugees (UNHCR) in 2015, there are seven main reasons for the migrant surge toward European Union countries.

As a first reason, it cites a loss of hope, as many residents of Syria have lost all hope that the situation in their country can change rapidly in a positive direction. The second reason is poverty. Syrians who have taken refuge in neighboring countries face high living costs. This is also the case in countries that were richer than Syria, such as Egypt. The third reason is limited employment, both due to legal constraints and due to the large influx of migrants who have lowered labor costs and increased competition in the labor market in those countries.

The fourth reason for migration to the European Union is insufficient to aid and a lack of health care. Aid programs in countries facing a large influx of migrants face a lack of funding for such activities. The fifth reason is the barriers to restoring refugee status in Lebanon, which implies paying $200 for those who arrived by 2014, guaranteeing they would not work, a rented apartment contract, and the like. Also, under the new regulations in Jordan, any recent refugee registered must have a health certificate costing $42. The sixth reason is the small opportunities for education. Due to difficult living conditions, many are leaving school primarily to be engaged in the labor market. The seventh reason is uncertainty in countries around Syria, where refugees have taken mainly refuge. Fear of the spread of conflict to the territories of these countries, as well as adverse reactions from the dominant population to refugees, are the main reason for migration from these areas (UNHCR, 2015).

The large influx of migrants from the Middle East is the result of a "lack" of democracy or democratic regimes in these countries and the need for specific resources that these countries possess.

Many questions whether the latest migrant movements are spontaneous or organized, as most migrants are military-capable men, yet they do not stay to fight the so-called Islamic State. Also, why aren't they inhabiting much closer Islamic countries but crossing a massive road to Europe? Turkey alone is estimated to have taken in more than 2.5 million migrants from Syria, but the crisis only culminated as they made their way to Europe. It remains unclear how there have been no mass movements toward Europe from these areas despite the wars going on for years in Iraq and Afghanistan. Still, they began after the situation in Syria tightened (Nincic, 2016:89).
In addition, the Role of the European Union was such that it encouraged the migrant processes. On the one hand, the state of the economy in the Arab countries of the Mediterranean was exacerbated during 2008 by stagnation and crisis in the European Union due to the decline of exports to the EU market, which has remained the primary market for the Mediterranean and, in general, Arab countries.

On the other hand, the situation was further exacerbated by the EU’s decades-long demand for reforms by its standards, in the principle of "more for more," i.e., more reforms of the system to the taste of the EU (even beyond the real needs of the country in the country in hand) for more trade with the European Union, which was a de facto revolutionary program, because by that logic the highest level of EU integration would be achieved through a complete change of political system. Third, liberalization in the domestic market, under a free trade agreement with the EU (FTA) and EU-required reforms, accompanied by a reduction in social measures, have only made the situation in the east and south of the Mediterranean more difficult.

The practice of state subventions of food and fuel became challenging to sustain, especially after 2008, which was one of the generators of the protests, with corruption and the inability of ruling circles to cope with the overall situation. Protests against Arab dictators were initially greeted with sympathy in the EU, but with no clear goals in these processes, i.e., without realizing possible unwanted transition processes (Tadic et al., 2016:16). In such conditions, when more than 800,000 migrants from 110 countries are on their way to Europe, most of them from war-torn areas of Syria, Iraq, and Afghanistan, three realities are characteristic of European Union countries. The first, political, is characterized by confusion and confusion among Europe’s most influential countries over how to resolve the crisis. The second was where strategic decisions did not follow developments and were, therefore, very bad. Third, where European Union countries and other countries in the region, in operational terms, have failed to keep up with the chaotic and rapid “reproduction” of actors involved in the crisis.

Also, the lack of capacity of individual countries and differences in their economic power, on the one hand, i.e., the determination of migrants to reach Europe’s most developed countries, on the other hand, contribute to determining the trajectory and end of the migration goal, which made it even more challenging to resolve the crisis (Travner, 2016). The primary anomaly in resolving the emerging problem is the ban on refugee passage, which violates the global principle of freedom of movement of people, goods, and ideas on which the concept of the European Union is based. Then, a significant anomaly is contained in the fact that in 21st-century democratic Europe, we have a violation of the human rights of migrants, especially the right to naturalization.

The rise of xenophobia and the politics of hatred towards foreigners and neighbors are practiced by countries that are full of the mouths of democracy and who have given others many lessons about tolerance. Due to their ongoing anti-immigration behavior, such countries are beginning to resemble teachers teaching other classes they have not mastered. The walls are erected by countries where refugees do not intend to stay at all but only tend to pass through them as soon as possible (Simeunovic, 2015:3). In the latest wave, migrants leave the country of origin directly. Still, part of them is a "consequence" of secondary movements from refugee camps or elsewhere in Turkey or Lebanon. All of them, along with migrants from other areas of Asia or Africa, are pouring into the Turkish region, in many cases connecting and organizing and trying to reach Greek territory via coast and land, from where they continue their journey of so-called "haven." The Balkan route further to Europe. Many migrants spent considerable time on Greek territory, trying to consolidate their forces and resources and make some money to continue their journey to Western Europe using various smuggling channels.
Most of the migrants are Sunni from Syria, the majority of the population. According to data from the United Nations High Commissioner for Refugees (UNHCR), about 4.5 million have moved out of Syria out of 22.5 million, most of them to Turkey - 2.3 million, or Lebanon - about 1 million. But what follows every migrant movement is the high number of deaths on that migrant route. According to the International Organization for Migration, more than 40,000 migrants died from 2000 to 2014.

Of these, about 22,000 died heading toward Europe. The latest migrations, from early January to the end of April 2016 alone, killed 1,232 migrants, 376 on East Mediterranean, Central Mediterranean 851, and the West Mediterranean and West African routes five migrants (IOM: 2016). Over a million migrants have arrived in Europe from the Middle East to Europe in the last year alone is, in itself, worrying data. These are populations with different economic and social statuses and expressed language and cultural differences relative to the people of countries that are their final destination, causing other effects. In addition to the various economic and social problems, a particular concern is the security effects that migrant movements can have. Terrorism is one of the biggest security threats on a global scale. But terrorism and all other "accompanying" security threats can be closely linked to migrant movements. Bearing in mind that most migrants come from war zones, the real question is: what role, in the security sense, can the migrant crisis play, how realistic is its negative impact, and how can it be prevented or mitigated?

4. MIGRANT BOOMERANG EFFECT ON OLD EUROPE

In credible interpretations of the causes and consequences of the ongoing migrant crisis covering three continents, Africa, Asia, and Europe, an under-accepted historical lesson loom. Europe, gathered in part of the United Nations, seems unable to rethink the complexity of the causes that confronted it and then dramatically dragged it into the migrant crisis. Without considering the causes, it seems as if the migrant crisis is unfeasible, undated and freely left to spontaneous immerses.

In modern demographic and populist surveys, however, it has long been known that migration is not always spontaneous. It is possible to manage politically, and other means and is primarily done (B. Mirjana, 2013).

The outbreak and inflammation of the migrant crisis find very different and often incredible interests and motives, causes and reasons, responsibilities, and guilt... Thus, for example, the causes of modern migration are cited as the effects of significant powers, primarily: America, Great Britain, France, and Germany; the European Union and NATO; then Russia; regional powers such as Turkey and Israel; small countries such as Syria and its president, Bashar al-Assad; then: Iraq and the chaotic state after the liquidation of Saddam Hussein; international terrorism and the violence of the so-called Islamic State (IS, formerly ISIS/ISIL Islamic State (so-called Caliphate); militant Islam, Osama bin Laden, and al-Qaeda; financial interests of significant capital, the profit interests of multinational corporations and the energy sector (oil heist!); the actions of the IMF and non-transparent, i.e., cryptologic organizations such as the Trilateral Commission; rich and influential individuals such as oil sheiks or Gjergj Soros, etc.

Although the most potent causes of the migrant crisis need to be sought in the scapegoat of the residual and impoverished North African, Middle Eastern, and Central Asian countries affected by devastating conflicts, interventions, and wars, conflicting aspects of the "mainstream" media are recklessly overlooked and deliberately covered up. It leaves out effective European auto-reflexes that could form awareness of the negative feedback of high-risk conflicts in Europe’s neighborhoods with the inevitable boomerang consequences that occur on the Old Continent in the current time.
The media "singing" generation of sympathy and solidarity of a kind of Europeans with newcomers to refugees from the political destruction covered in non-European areas is based on Brussels recommendations and guidelines of NATO-based awareness. Thus, the created Euro-European and NATO empathy towards migrants - devoid of recognition and interpretation of the causes of the migrant crisis - makes it challenging to learn critically. Political instruments naturalize the migrant crisis, so in media shows, it is increasingly resembling a natural unfaithful situation that can barely be affected by human means.

The tacitly adopted agenda of the Centre of European political power reads: the right to perceive and experience the migrant crisis has a humane relationship, insight, and compassion for Europeans towards refugees, while the perception of the reasons for their departure, passage, and arrival on the territory of the Old Continent, for now, and perhaps permanently, is in the other direction. Guy Fay noted that: "The strength of this invading migrant flow is based on a sense of compassion for 'refugees,' especially those who come by boat and drown, created by the systemic media in unstable emotional public opinion (F. Guillaume, 2009)." Along with official empathy, impressions of awakening dangers grow. As key dangers to European peace and internal stability, certain types of intolerant and discriminatory phenomena toward foreigners (K. Milos, 2001). Indeed, discriminatory actions are growing in Europe, such as xenophobia, racism, Islamophobia, anti-Semitism, islamophobia, segregation, apartheid, etc. (H. Srecko, 2014).

In the political media generating "correct" collective sympathies for outside European migrants, however, there is an internal European amoral contradiction. Contrary to the civil indifference of the People's Union, this Eurocratic solidarity and sympathy for continued Euro-American interventions and wars by the affected countries of non-European nations continues to insist on a tolerant and humane attitude towards migrants. Humanism is necessary, but European cooperation in America's wars seems to be a causal incoherent "story for itself." At the same time, the arrival of migrant masses in Europe is a story that all Europeans should, without exception, share compassionately and compassionately. In terms of intercontinental responsibility, the burden of the migrant crisis is uneven and unbalanced. Therefore, consecutive Westerns, i.e., Euro-American military interventions in Asia and Africa, these wars and occupations in these areas are nothing to do with the stir of local life and migrant referrals to The Union's Europe. And they sure are!

5. MIGRATION FORMS OF CRISIS

Only a worrying look at the harrowing images of desperate migrants' faces is not enough to understand their refugee causes and expatriate reasons, as the media themselves result from tense selection and visual formation according to ideological instructions for political use. Therefore, in considering the migrant crisis, both psychological and crypto-political processes should be taken into account, not just those easily visible and transparent, as is ritually stated. The practice of concealed and secret policies has not prevailed in the modern conditions of "airy democracy"; moreover, the scope and weight and authoritarian practices are increasing daily.

Russian historian Valery Alexeyev believes that "the modern refugee problem is directed, implicated in a scenario of global destruction with clearly divided roles among global players – on the one hand, behind this exodus are the Persian Gulf oil sheik dynasty, on the other a political force from a former post-visa space dreaming of rebuilding the Byzantine Empire, and on the other, direct chaos in the Middle East, while presenting themselves to friends of Europe." Among the interpreters of causality are those who recognize the truly unacceptable methods and practices of social engineering (Simeunovic, 2015) in modern migration processes. It is precisely this kind of demo - political management of the population's spatial
destiny- that expresses a haughty tendency to decide and act outside of insight and public participation. From there, the current migrant crisis cannot be comprehended only in its visible consequences, especially not without the interpretive appreciation of the crypto-political practice that shaped it.

The mass emergence of outside European migrants on the Old Continent clearly indicates a more prolonged and extensive crisis disruption. The migrant crisis, after all, is just one of the crises as part of several interactive crises that have hit Europe in the last dozen or so years. The peak of the 2015-2016 migrant crisis servitude was the first and second financial crisis that rocked Europe in 2008 and 2011, and then with the war crisis in Ukraine and the debt crisis in Greece, long and agonizing problems have not yet ended. All of this has affected the disruptions of institutional, normative, and procedural foundations of the United Nations, which found itself in exquisite circumstances of the transformation of its structure, i.e., the change of its design. Transition to something that is not yet known enough and sure (Cirjakovic, 2013).

6. DEPARTURE POINTS AS SPACES OF MIGRATION

Isn't it understandable that before every migrant passes and arrival is scouted and recognized, the departures of migrants? Interpreters need accurate insights into the conditions of migration departures from transient and incoming spaces. Without clear insights, there would be confusion over the origins and exact addresses of newcomers who, at a point of maximum confusion, would have emerged with the impression that the migrants had come unreasonably, out of nowhere and out of nowhere.

In every migrant crisis, movement laws operate in the physical space. In addition to the human factor, migration stresses the exceptional importance of geography. Migrant departures and arrivals stand in a symmetrical physical, kinetic and logical relationship between the movement of migrants. The areas from which migrants move from their countries to cross-border destinations are the starting areas and migration countries. Whether refugees will ever return to their departures, when and how they will do so depends on the sequence of concrete historical circumstances. History testifies to many examples that temporary migrations have been transformed into permanent immigration states of changed demographics of the population over time. The driving migrant motives point to two individuals. Collective forms of consciousness and will: a) the intention to leave their own country where, for solid reasons, they no longer want to stay, and; b) the intention to get into those "promised countries" that are shaped in consciousness and emotion as spaces of positive desire. Migrant aspirations, therefore, are, in a specific sequence, twofold: negative about the dominant countries that are leaving and positive ones about the countries they want to reach and stay in.

To understand the oscillation of negative and positive migrant aspirations in the basic directions and routes of movement towards Europe, it is necessary to interpret what disappoints, fluctuates and reassures the perspectives of life in their own countries. Likewise, it is essential to keep in mind everything that attracts them, makes them determined, and drives the intentions of habitation in "promised countries" on another continent. Collective psychology is essential! It is necessary to question that psychic point of prettifying between the desire to stay and leave, which is marked as the decisive pull factor. It is known that in war migrations, the most significant number of refugees are kept in the nearest safe areas, mostly in countries directly bordering countries covered by conflicts and war. In the current migrant crisis, this is not a literal case. Although the number of refugees from Syria, Iraq, and Afghanistan is in the camps in Lebanon, Jordan, and Turkey, their migrant intentions vastly exceed those of the countries. The horizon of outcomes are the wealthiest parts of the European Union and not, for example, some developed and wealthy Arab countries, such as Saudi
Arabia, Kuwait, Bahrain, the United Arab Emirates, etc. There is no thought that more and more Arab migrants could be directed toward Israel! Old Europe has become a migrant refuge - an eschaton of potentially millions of refugees from Africa and the Middle East.

7. TRANSIENT COUNTRIES ON MIGRANT ROUTES?

To get to some spaces, you must go through some. Passing is a physical, kinetic, and logical inter-member, a shop located at a distance between the departure point and the comings. Moving towards the finish line is like a journey.

Migrants move and travel. Geographers use politics to determine the routes. On their way to destination countries, migrants pass through countries where they do not want to stay or settle. The uninterrupted migrant dies included short-lived migrant arrivals and departures. Migrations can be very tiring and torture, long and transcontinental. That's exactly what's happening right now. Migrant crises have, in most historical cases, been caused by wars or unbearable economic woes. Each migrant crisis exhibits social, political, and cultural premises based on a distinct demographic—migrations, especially in large climates and mass numbers of migrants, also manifest as passage and crossing. The corner would seem to be a literal meaning of targeted movement and targeted change of place of residence in space.

The current migrant crisis has reminded Europeans and the world of two primary routes of entry into Europe of the West: from the Asian Middle East and North Africa. By conventional geographical terms, migrants are stranded in Europe from the countries of the Maghreb (Marco, Algeria, Mauritania), Libya and Tunisia, and the Middle East. The two seas and land migration routes to Europe from other continents are millennials old and have been going on since its name. European geographical, cultural, and political concepts existed. The sea route passes through the Mediterranean Sea, through which a migrant wave sweeps the coasts of Spain (Iberian - narrow Gibraltar); Italy (Apennine - island of Lampedusa), and; Greece - (Aegean - numerous islands and straits). Albania and the three South Slavic countries stretching along the eastern part of the Adriatic coast have not yet been touched by the Mediterranean migrant flows.

The land route, which stretches from the Gulf of Thessaloniki in the Aegean, begins in Greece and runs through Macedonia and Serbia, flowing into Central European Hungary and semi-Balkan Croatia. The "Balkan route" used by the masses of migrants from Turkey's direction to Central and Northern Europe is an ancient two-way route of Euro-Asian penetration and bloating conquest and occupation. Countries from the Mediterranean rim of Europe and the Balkan Peninsula have not been the final destinations for migrants in most cases. The state territories of these countries are transiting, highlighting the internal European migration gap between the countries of last admission and those that are more or less a transit route, therefore, countries of temporary access. The secondary migrant goal is defined as moving, passing, or traveling through countries that are on the way of movement but not permanently staying there. A much more critical primary and final goal is for the vast majority of migrants to reach those countries designated as prosperous and permanent residency among migrants and their organizers. In doing so, however, countries represented as temporary and transient residency are no less exposed to a variety of pressures, risks and.1

---

1 As an example of the unscrupulous behavior of European politicians towards friendly transit countries such as Serbia, it may serve the point of French politician Nicolas Sarkozy, who has proposed keeping migrants in pass countries. See: "BND: 1.5 million arrive via Serbia in EU izbeglica", "Europe will have to build collective refugee centres. Former French President Nicolas Sarkozy proposes that they be raised in Serbia and Bulgaria," daily Informer, September 7, 2015, p.7
One of the biggest threats to transit countries on the European mainland is, therefore, due to increased control, installed ramps, barriers, and wire walls, and the literal closure of borders on migrant routes, such countries reluctantly convert to collected lands, populist reserves in the areas "behind the limes," "landfills" of legally undefined newcomers, refugee camps, quarantines, camps, etc.

In this way, the transit character of transient countries would be perverted into permanent temporary, perhaps even for decades of "internally displaced persons" shelters. It has proven, namely, that in the absence of mutual information and agreement, however hesitating, transitional countries are finally forced to self-protective measures to restrict and thwart the entry of illegal migrants, their quick summation and transport to exit points, as well as prevention of forced return and the "voluntary return" of migrants to passing moments. After partially stopping and organizing migrant flows on European soil, an additional danger has been raised for transit countries on the Balkan route. Among the emerging risks are the most significant forced return of undocumented migrants and definitively established status to the narrow and extended stay of the unsuitable interstate and interstate belts, the so-called No Man's Land. Such actions are likely to trigger the need for stricter measures to restrict and legalize the entry and exit of migrants into the state territory of vulnerable countries, which, at the culmination point, will not rule out the coordinated use of repressive apparatus: the army, gendarmerie, and police.

8. CONCLUSION

After all, let's ask ourselves what it points to, what it means, and what makes social, historical, political, and human sense for the EU to emphasize Europe and European Serbia, the current migration crisis. The migration crisis is one of several catching-up problems in the crisis area of modern Europe, primarily the part that is politically and legally constituted in the European Union. Sequencing, segmentary and component crises with amplifier and multidimensional effect shape the whole of the Internal Crisis of the European Union.

Previous chapters have mentioned some dimensions regarding the causal-consequential relations of the migrant crisis. We are talking about a series of intertwined dimensions, among them: 1)Vremenska, istorijska - hronopolitička; 2) pro store(Time, Historical - Chronopolitan; 2) Spatial, Territorial - Geopolitical; 3) human, populist, demographic - demo politics; 4) Economic, economic - geo-economic; 5) Cultural, religious, spiritual – geo-cultural, and; 6) media – geoinformatics.

Recognizing the specific properties of historical arithmetic time and the politically divided spaces of chronopolitics and geopolitics – the interpretation of the migrant crisis can be directed toward other critical dimensions of its manifestation, which it says include geoeconomics, geodimetric, geo-culture, and Geoinformatics.

If the dimensions of the migrant crisis are interpreted interactively, understanding a complex crisis event is complemented. The event's elaborate spatial reflexes form a Geo-Six formula that contains essential dimensions of the current migrant crisis. Expressed in the spirit of postmodern times, prone to numerical and acronyms, you could say that the action of the G 6 forces is at work. Unlike many of the internal European conflict events of the previous decades, which have provoked the appearance of the interior and local migration, and on which the importance of the unbreakable relationship between politics and space through accurate geopolitical analysis has been addressed, the current migration crisis has been at the forefront of absent demographic issues and their unbreakable connection to the world of politics.

The ongoing time sequence of population launches from neighboring continents to Europe with a high probability indicates the beginning of a more extended era of transcontinental mass
migrations. I perceived and interpreted spaces of the migrant movement to reaffirm the interpretive credibility of geopolitics. From there, with chronopolitical and geopolitical perceptions in the proper plan of interpretation and understanding comes the demographics in its intensely politically conditioned, i.e., A "politicized" form of demo politics.

Rational and systematic, the political mode of perceiving the political conditionality of demographic trends removes fears of an arbitrary and unscientific approach. The political factor in migration is almost always noticeable and, in particular historical cases, dominant. Reluctant and mass war migrations of the population are politically provoked, directed, and shaped. Therefore, in their interpretation and understanding, the inevitable application of a com-binary political and demographic method is unavoidable. The current three-continental migration crisis has demonstrated the necessity of deeper political inclusion in demographics and the consideration of a static and dynamic relationship in population movements in start-up, transient and incoming spaces.

After all, the migration crisis has strengthened the scientific need to understand the threatened relationship between the human factor and politically, that is, the state-defined territories through which they move and where they wish not to move. From there, it is necessary to say that only by methodically recognizing the dimensions and causes of the complex migrant crisis can a complete insight and deeper understanding of its perhaps surprising forms and perspectives relative to the whole of Europe and especially the European Union as its partially integrated part.

REFERENCES

Kjelen Rudolf, (1923). Drzava kao zivotni oblik. Moderna drzavna teorija, izdanje DJ. DJurDjevica, Beograd- Sarajevo,
Knezevic Milos, (2001). Evropa iza limesa, Slobodna knjiga, Beograd,
Makinder Halford, (2009). Demokratski ideali i stvarnost. Studija politike obnove, Metafizika, Beograd,
Replacement Migration: Is It A Solution To Declining And Ageing Population? United Nations Population Division,
Abstract: The relationship between essence and form and the terms derived from them - essential and formal, is one of the key questions of philosophy and science, which reflects on the practice of every human activity. In order to show this difference as plasticly as possible in reality, the expression - a suit does not make a man - is often used. It does not take much wisdom and knowledge to understand that the suit does not make the man, but apparently (formally) our perception of the person we see will start from his suit.

This work is an attempt to outline the development path of military science in our country, in the period of half a century, that is, since the first Symposium on Military Science in 1970. The basis of the hypotheses in this work is as follows: The status of military science in our country is more formal than essential. In confirming the mentioned hypothesis, the required number of scientific works were used, as well as the personal experiences of the author of the work, who in his professional military career performed important duties related to military science.

Key words: form, essence, military science

1. INTRODUCTION

In considering any phenomenon or process, the question usually arises - where (temporally) to start. Such an approach is also applied in the determination (location) of the research problem, when it comes to the methodology of scientific research. For this reason, in this paper, the beginning of consideration of the status of military science in our country is placed in 1970, that is, the time when the first Symposium on Military Science was held. In the period after that symposium until today, military science, essentially and formally, was not established in our environment, and it ranged from attempts to identify, define and classify, through denial of existence, renaming it as defense sciences, to attempts to establish it based on law. The reference points of our analysis are the few scientific gatherings on military science (defense science), between which various processes of legal, organizational and functional foundation of military science (defense science) took place. All this points to the fact that we have not entered into the essence of military science, and, therefore, all the appearances (forms) have only the surface character of futile attempts. The attitude of politics towards the army was
directly reflected in the attitude towards military science. The status of military science was
the least asked by those who deal with it, be it formally.

2. ESSENTIAL ASPECT OF THE STATUS OF MILITARY SCIENCE

Essence, essence or essence (Greek οὐσία [ousia], Latin *essentia*), is the basic property of a
being or phenomenon that can explain various special and complex events. Essence is that by
which something is exactly what it is; the nature of things, that without which it would not be
what it is. A thing cannot lose its essence without ceasing its existence.

Essence constitutes the permanent nature of a thing, the foundation of its determination and a
constant source of essential properties. In relation to the changing states of a thing, the essence
is that which is true and real which remains unchanging. In contrast to existence, the fact that
something is, essence marks what that something is (lat. *quidditas* – "goodness"). Essence is
that general and necessary that transcends all individual things, although there is no separate
existence outside of individual beings. In the logical sense, essence is the inner first principle
that allows something to exist, and its concept is expressed by definition.

Heidegger determines the essence of a thing in relation to its source: "The source means that
from where and with what a thing is what it is and what it is." We call the fact that something
is, the fact that it is as it is, its essence. The source of something is the source of its essence." As
an example, Heidegger states that the artist is the source of the work of art, but the work of
art is also the source of the artist, it makes it what it is. And the source of both of them is art.

Thus, as Hegel said: "...the absolute determination of the essence must be found in every
experience, in everything that is real, as well as in every concept".

In 1970, a strong initiative was launched in the then SFR Yugoslavia to establish the
foundations of military science. The State Secretariat for National Defense played a key role
in this. The introductory paper on military science at the symposium was presented by General
Stevo Ilić. He expressed the opinion that "all sciences, scientific disciplines, scientific theories
that study the specific problems of preparing and conducting ONOR can be included in one
single system of sciences". (Ilić, 1971:189) with us, it has a double meaning - a narrower and
a wider sense. Military science in the narrower sense of the word ("general military science")
means the so-called pure military sciences: strategy, operations, tactics, and under military
science in a broader sense, apart from general military science, all scientific disciplines studied
by ONOR are understood, regardless of which parent science they belong to (Figure 1).

This rudimentary understanding of the system of military sciences, although it did not attract
the attention of the scientific public in the SFY, nevertheless, took root in the armed forces
of the SFY and practically lasted until the collapse of the state. Although from the beginning
of the disintegration of the SFY, in 1991 until the NATO aggression on the FRY (1999), the
focus was on war, discussions on military science did not stop. On the contrary, it was precisely
in that period that there were the most of them. More significant activities in that period were
the symposiums on military science in 1994 and 1997, as well as the project of the Institute of
War Art "History of War Art" completed in 2000.
Was the scientific thought about military science rounded off in the mentioned period? It's not. Why? So no consensus was reached on the key questions: What is military science; What is the name of that science (Warcraft, Polemics or...); Is it a systematic science or a system of sciences; What is the subject of military science (war, armed struggle or military activity, or armed forces or something else) and other basic questions, without which there is no science. Also, the scientific public in FRY, SC, and later in Serbia was not very interested in military science. From the mentioned period, the year 1997 is significant, when the scientists of the Institute of War Skills gave two classifications of military science systems (Visnjic, Kovac, Jan, 1997 and Kovac, Jan, 1997). For reasons of adapting that system to the system of sciences in Serbia, we will present only one approach (Figure 2).
Before the NATO aggression on the FRY, the Institute of War Skills began work on the project "History of War Skills", which was completed and the results published in a three-part edition in 2000. Therefore, the project related to the history of a (military) science. For the results of the project, the Institute received the “Transplantation of Wisdom” award at the book fair in Nis in 2000. Few people today even mention that project.

After the NATO aggression against the FRY and the dissolution of the State Union of Serbia and Montenegro (2006), when Serbia became an independent and independent state, the fact is that few people deal with military science and its status in society. Military science had the same status as the army in our country.

However, more concrete moves towards defining military science and its status in society have been made since 2010, when the Law on Higher Education in Serbia was passed, which did not recognize military science. In a magical way, the Ministry of Education, Science and Technological Development accepts the suggestion of the Ministry of Defense to change its attitude towards military science. And, look at the miracles - the point of the Law is changed, but instead of being called military science, the phrase defense science is used. As if by default, the most ardent advocates of military science accepted the new name wholeheartedly, and everything they understood as military science was called defense science. In practice, the University of Defense is even being formed (the second and successful attempt) and the Symposium on Defense Sciences - SIMNOD 2011 is being held.

As it happens in our country, despite the symposium held, the formation of the University of Defense and the recognition and status of scientific workers in the Army and the Ministry of Defense, "someone" thought of bringing back military science. This is especially so after the adoption of the Law on Military Education in 2018.

What is military science (military science), what is the subject of those sciences, how are they classified and many other questions await answers. Of whom?

**Essentially, military science does not exist in our country!**
But let's not worry too much about the fact that military science does not exist in our country. The representative of the Czech Republic, which we looked up to when forming the Defense University, at SIMNOD 2011 said: "Definitions of military science that can be found in dictionaries and encyclopedias are quite general and are not very helpful for understanding the nature of those sciences. Military sciences, as such, do not exist. They are just a combination of "normal" sciences, used in a military context to achieve military goals. This enables military researchers to engage in (inter)national scientific cooperation in the field of those general sciences. By combining the findings and scientific results of those groups, as well as their application in a much narrower, military context, it is possible to achieve specific military and political goals that are set at the national level" (Lodowyckx, 2011:78).

3. FORMAL ASPECT OF THE STATUS OF MILITARY SCIENCE

The word "form" is of Latin origin and has the following meanings: shape, appearance, figure, exterior, outer side; mold, model; established appropriate behavior. The question of the form of individual things and phenomena is one of the earliest questions that people discussed. According to Aristotle, the general in things is form, and it, together with matter, is the basic principle of every individual thing. In philosophy, form is what sets a formless thing into a shaped being, i.e. that which brings a being into being, whether it is the form of an inanimate body or an organically living one. The modern natural-philosophical notion of form says that matter (as a shaped being) is actually energy that appears as form: (http://www.enciklopedija.hr/Natuknica.aspx?ID=20136).

The attribute "formal", derived from the word "form", has several meanings, including: legal, express, principled, determined and others. However, the word "formal" is also used to emphasize that something is being carried out beyond the essence, for the sake of order, as our people would say. The just-mentioned folk definition of the word formal (for the sake of order) is the subject of our view of the status of military science in our country.

Thus, after the aforementioned Symposium on Military Science in 1970, military science received a certain legal organizational and functional form. In the system of military education, master's studies in military sciences are introduced and a scientific staff begins to be created, although, as we have already shown, it is not completely clear what military science is, nor is it formally recognized by society, even if it exists. Simply, the young man of military science understood it according to the prevailing attitude at the specific moment. Of course, that young scientist had a benefit only in the military environment, the obtained diplomas are not recognized in society.

But inertia has its own laws. The flywheel of the introduction of military science received its legal aspect with the adoption of the Law on Military Schools and Military Scientific Research Institutions, but only after the dissolution of the SFRY ("Official Gazette of the SFRY", no. 80/94, 85/94-ispr I 74/99; "Official Gazette SCG", no. 44/2005). Unrecognized in society, the system of military science values itself. Thus, the title of assistant professor, associate professor and professor in the field of military science - War skills could be obtained by a person in the Army who is not a doctor of science, if he graduated from the School of National Defense and has published works. Later, that aspect was slightly modified, and a person who completed the School of National Defense with the preparation of additional work at the level of a master's degree could obtain the academic title of Doctor of Science. Certainly, persons who were masters of military sciences had the opportunity to defend doctoral dissertations in those sciences as well. The number of unrecognized scientists in society multiplied. Thus, in the military education system, but only in it, we had a somewhat complicated situation. Namely, there was the so-called career and scientific training. This led to such a situation that
quite a few people took advantage of the opportunity to complete the highest levels of both forms of training (School of National Defense and Doctorate in Military Sciences).

And then one of the turning points. Since 2011, the higher education system in the country has been "accepting" defense sciences in the socio-humanistic field, which is the reason for the formation of the University of Defense. However, that state system of higher education only accepts the accreditation of Defense Management, which has its specifics only in the Military Academy - Military Management. Nonsense upon nonsense. An entire science (military science, revalued as defense science, was "stuffed" into defense management). Blagojevic and Starcevic write about this: "Such a solution led to the devastating fact that the military scientific theory from which the field of management arose was classified in the narrower scientific field of military management." Military management further incorporated all primary military subjects such as tactics, operations, strategy, leadership and command, defense logistics. The study programs were unnaturally harmonized, so that they contain the required number of courses that have the term management in the title, which resulted in the introduction of the following subjects: management basics, security management, crisis management, human resources management, at the expense of primary military or other important social subjects. (e.g. philosophy, political system, constitutional law, sociology of war and the military, history of war art, rhetoric, international relations)” (Blagojevic, Starcevic, 2019:170).

However, this is not the end of the nonsense. When it comes to elections for teaching positions, the Rector of the University of Defense, by his decision in 2012, "cancels" (puts out of force) the still existing (therefore valid) Law on Military Schools and VNIU and "determines" that the election is carried out according to the Law on higher education in Serbia. Otherwise, the Law on Military Schools and VNIU will remain in force until 2018, when the Law on Military Education was adopted ("Official Gazette of RS", No. 36/2018). Thus, in military education until 2018, a dual law (military and state law) was in force.

And then comes Bologna. The military education system is collapsing. The School of National Defense and the later formed Higher Studies of Security and Defense, which were considered the highest level of training in the defense system, are losing their primacy, which is given to basic academic studies at the Military Academy. Mentorship of the graduation thesis of military academy cadets (Targeting at night and in conditions of low visibility) is more valued than the final thesis of students of the National Defense School (Geostrategic position and security challenges of the Republic of Serbia, for example). And until 2018, those who graduated from the School of National Defense could become assistant professors, part-time or full-time professors. No comment needed.

If Bologna brought anything good, it was the differentiation of the so-called career from scientific training at the Military Academy and the University of Defense. But, there was a race to acquire references for selection into teaching positions, because, objectively, military science was not recognized in society for a long time. Thus, the catchphrase was born - "who chases M does not wear a helmet". Objectively less valued teaching staff (undergraduate studies) are given primacy over extremely experienced and proven teachers at the School of National Defense and at the Advanced Studies in Security and Defense. But, that staff from basic studies "has time" to achieve references, while proven teachers from the School of National Defense are not in that position, nor does their age allow them. It is not difficult to judge what is the essence and what is the form.

However, the choice of the current rector of the University of Defense shows that the helmet is still important for military science. Namely, a general was appointed to that position, who at the time of appointment did not have an academic title higher than assistant professor. And
it is known that the rector is chosen from among the regular professors. Thus, a new slogan was created - *from doctor to rector in two years*. Given that the current rector's working life is being extended two by two, and there are also elections for higher positions, he will probably reach the rank of full professor.

In the constellation of new political relations towards the Army, certainly positive in the last few years, there is also a new approach to military science, with the intention of establishing it in the defense system, i.e. the University of Defense and the Military Academy. The work is in progress, so this is not the time to comment on this initiative, except for the real desire that this time the effort will succeed. But essentially, not formally.

4. CONCLUSION

Essence carries form, just as a man wears a suit, and form does not carry essence, just as a suit does not carry a man.

Essentially, military science does not exist in our country. Formally, both in the legal, organizational and functional sense, military science, under various names and concepts, took root. The attitude towards military science depended on the attitude towards the Army (armed forces). In this sense, some legal, organizational and functional solutions were really (and still are) only a form, without real substance.

Now comes the essence. At least we hope so.

REFERENCES

Blagojevic, Srdjan, Starcevic, Srdjan (2019), Nauke odbrane ili vojne nauke – pola veka bez odgovora; Vojno delo br. 7/2019; str. 178-188.

Вишњић, Душан, Марчек, Јан, Ковач, Митар, (1997), Појам система војних наука, Зборник радова са симпозијума о војној науци „Војна наука и војна доктрина“, Сектор за школство, обуку, научну и издавачку делатност, Институт за војностратегијска истраживања, Београд.

Илић, Стево, (1971), Класификација наше војне науке, у: Војна наука, Војноиздавачки завод, Београд,


Марчек, Јан, Ковач, Митар, (1997), Научна угледеност система војних наука, Војно дело, бр. 1. 


EDUCATION OF RISK MANAGERS: A NEW APPROACH

Aleksandar Petrovic¹, Zeljko Marinkovic², Vladimir Ristic³

¹ University of Defence in Belgrade, Military Academy, Veljka Lukica-Kurjaka Street No. 33, Belgrade, Republic of Serbia, aleksandar.n.petrovic@va.mod.gov.rs
² University of Defence in Belgrade, Military Academy, Veljka Lukica-Kurjaka Street No. 33, Belgrade, Republic of Serbia, zeljkomarinko@gmail.com
³ University of Defence in Belgrade, Military Academy, Veljka Lukica-Kurjaka Street No. 33, Belgrade, Republic of Serbia, vladaristic@gmail.com

Received: 14th September 2022
Accepted: 15th September 2022

Abstract: For the past two years the COVID-19 pandemic has changed every aspect of human activities, especially the process of education. In circumstances where face-to-face teaching is no longer an option, the only solution is to adopt new ways of learning. Advanced Distributed Learning (ADL) is no longer a possibility, it is rather a necessity. Today, there are a lot of platforms supporting ADL, with noticeable expansion in variations and editions during the past year. The focus of this paper will be put on how to educate risk managers using various learning management systems (LMS) and different program packages and software regarding online learning. Some of the most popular and most used ADL platforms, with their advantages and disadvantages, will be presented.

Key words: education, risk manager, ADL, LMS

1. INTRODUCTION

The proper education of risk managers is essential for a successful process of risk assessment in every human activity where negative events are likely to occur. The main task of risk managers is to identify the possible challenges and threats, to measure and determine the probability of their occurrence and, finally to calculate the risk and recommend the necessary measures to mitigate it. This process is impossible without education and constant training. For the past couple of years, the COVID-19 pandemic has influenced everybody and everything. After such a disaster, the process of education may become extremely challenging. The institutions (schools, faculties etc.) which do not adapt to a new reality may find themselves in a problem: how to organize and conduct teaching without the physical presence of students and teachers. In higher education, the application of Information and Communication Technologies (ICTs) in form of e-learning is already changing teaching and learning processes. Many pedagogical and socio-economic factors have driven higher learning institutions to adopt e-learning. These include greater information access; greater communication via electronic facilities; synchronous learning; increased cooperation and collaboration, cost-effectiveness (e.g. by reaching different students and in greater numbers) and pedagogical improvement through simulations, virtual experiences, and graphic
representations. Both trainers and learners can choose more appropriate applications which are flexible in time, in place, personalized, reusable, adapted to specific domains and more cost-efficient (Sife et al., 2007, p.57). Fortunately, there are a lot of means to overcome this issue and ensure the constant process of education. Advanced distributed learning (ADL) gives the possibility to conduct online classes synchronously, asynchronously or blended. There are also a lot of platforms supporting ADL, which may be used for learning. All of these facts relate to the education of risk managers, as well.

The paper discusses the application of ADL platforms in the process of risk managers’ education and training, specifically disaster risk managers and risk managers for risk assessment in the protection of people, assets and business in the system of education in the Republic of Serbia.

2. E-LEARNING

Technological innovation tremendously influenced the transformation of the education system, especially in the last decade and increased the efficiency in conducting administrative tasks and the learning process (Sife et al., 2007, p.58). ADL leverages the full power of computer, information and communication technologies through the use of common standards to provide learning that can be tailored to individual needs and delivered anytime, anywhere including in-residence. ADL also includes establishing an interoperable „computer-managed instruction environment“ that supports the needs of developers, learners, instructors, administrators, managers and family (Curda and Curda, 2003, p.2). The learning process is significantly aided by the integration of ICTs and online resources. E-learning refers to the use of ICTs to enhance and support teaching and learning processes. It is the instructional content or learning experiences delivered or enabled by electronic technologies and it incorporates a wide variety of learning strategies and technologies. It is thus an alternative solution, which enlarges accessibility to training and becomes essential to complement the traditional way of teaching (i.e. face-to-face). This fact comes to the fore in COVID-19 pandemic conditions, where the possibility of using traditional teaching means is minimized or does not exist at all. There is a big leap in using various platforms for distributed learning and communication, in general. There are new platforms and/or new, improved versions of existing ones, daily. In this paper, two of them are presented, as possible tools for risk managers' education: MOODLE and ILIAS.

2.1. Moodle platform

Moodle represents a Learning Management System (LMS) software package with numerous advantages. All materials are open source and free of charge. Besides that, Moodle enables the creation of effective and efficient online learning, as well as the development of users’ community using sound pedagogical principles (Beatty and Ulasewicz, 2006, p.36). Its wide usage is reflected in the support of various learning methods such as blended learning, ubiquitous learning, and flipped classroom and represent the leading Learning Management System (LMS) in Northern American and European universities (Costello, 2013). The popularity of the Moodle platform lies in its simplicity and wide spectrum of services provided (chat, forums, surveys, etc). Additionally, Moodle usage may ease the students’ engagement and create meaningful connections among different course segments (Carvalho et al., 2011), allowing simple communication and discussion among users (Beatty and Ulasewicz, 2006; Chao, 2008; Churchill, 2009), and give timely teachers’ feedback to students. In the end, the users are allowed to download and upload materials anytime and anywhere and to use software from any electronic device they possess, such as a computer or mobile device (Carvalho et al., 2011; Lonn and Teasley, 2009). Moreover, Moodle allows teachers to observe the learning
process and to create a safe, democratic and interactive environment where the user with all of their specifics is put on focus.

Moodle is a platform that has been constantly updated. Many different versions of this software package are being released on a monthly basis. The main advantage of this software is its large community of users, free-of-charge usage and simplicity of basic features. Of course, for some more advantage usage, certain training is needed. But, as mentioned, there is a large community and everyone is willing to assist. Moodle gives a lot of options for teachers and students, as well. Bearing that in mind, only their creativity is the limit, and there are only a few things that cannot be done via this platform. These restraints also relate to any other ADL platform and represent the limits of online learning, in general. About advantages and disadvantages of different LMS will be discussed later in the paper.

2.2. Ilias platform

ILIAS is also an open-source LMS intended for web-based education. It has been designed at the University of Cologne in Germany. Since then, both versions for business and public schools have been developed. The name of this software package comes from an acronym (ger. Integriertes Lern, Informations und Arbeitskooperations System) which stands for the system for integrated learning, information and cooperation in business. The system was made in 1998 and it has been developing since then. Due to a large and active network of programmers and users, ILLIAS is constantly developing new applications and features. Its integrated tools allow organizations and educational systems to develop web-based education that fulfils their needs. Like Moodle, the usage of the ILLIAS platform expanded tremendously during the pandemic. ILLIAS offers similar options but in a different environment. It is very simple for basic usage, while for more demanding projects additional training is needed, especially for teachers and course creators. The software gives the possibility to a teacher to follow the activities of the students by different parameters (the number and frequency of system logging, the time spent on a system, the status of given tasks, the results of given tests, etc.) Almost every parameter of students` activity can be monitored. The special focus regarding course designing is put on learning outcomes which determine further course development. Moreover, the teachers are given the possibility to conduct an evaluation of their teaching materials and to receive feedback, through surveys and questionnaires. It is good to stress, that of many options in the ILLIAS, the possibility of incorporating pre-made courses in the SCORM package (Sharable Content Object Reference Model) is a very useful tool. The ILLIAS supports SCORM versions 1.2 and 2004 the 3rd and 4th editions which give additional benefits for teachers. This practically means that it is possible to create courses in different software packages for ADL such as Articulate 360, H5P, Camtasia, Adobe Captivate etc, and simply incorporate them into the ILLIAS LMS. The significance of SCORM usage lies in the fact that it enables observation of users` success and it gives the option of re-usage of teaching materials, depending on individual needs.

3. EDUCATION AND TRAINING OF RISK MANAGERS

The process of education and training of risk managers in the Republic of Serbia is defined by various legislative acts. As mentioned before, the paper focuses on education for disaster risk managers and risk managers responsible for risk assessment in the protection of people, assets and business. For both occupations, it is necessary to have a proper license. The license can be obtained only if the proper education/training is given by a licensed legal entity. This means that education on risk managers is delegated to the legal entities and state administration is only responsible for the control and conducting of examinations. Legal entities which apply for an educational license have to fulfil a range of criteria: teachers with proper education and experience, facilities and appropriate teaching materials and a fully developed curriculum for
the course approved by the state administration. Once an obtained license is valid for five years period. A very important part is control of teaching quality. State administration and responsible Ministry should conduct announced and unannounced control to gain insight into the teaching process. But real control is always in the end when trainees come for the exam, where they have to show what they have learned, thus if learning outcomes have been fulfilled.

3.1. Education of disaster risk managers

In the Republic of Serbia, disaster risk assessment can be conducted by licensed legal entities that have a minimum of three fully employed licensed risk managers. For someone to gain a disaster risk manager license, it is necessary to finish a course which will provide them with the essential knowledge to pass the exam, but what is more important, it will give them practical advice on how to properly conduct a disaster risk assessment. At the end of the course, the exam is necessary to be passed. The commission appointed by the Ministry of interior affairs organizes and carries out the exam, on the business premises of the responsible legal entity. The course is set into 30 classes, each class 45 minutes, divided into three main topics: the system of protection and salvation and crises management; disaster risk assessment and plan of protection and salvation. The first (general) part of the course focuses on theoretical knowledge about the system of protection and salvation and crisis management, while the second (specific) part of the course processes disaster risk assessment and protection and salvation plan. In Table 1, an example of the course curriculum is given.

Table 1. Disaster risk assessment course – curriculum

<table>
<thead>
<tr>
<th>Topic</th>
<th>Teaching unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>General part</td>
<td></td>
</tr>
<tr>
<td>System of protection and salvation</td>
<td>Legislative regulative</td>
</tr>
<tr>
<td></td>
<td>Concept, structure, subjects and carriers of the system</td>
</tr>
<tr>
<td></td>
<td>Standards in the field of protection and salvation</td>
</tr>
<tr>
<td>Crisis management</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Concept, classification and characteristics of crisis</td>
</tr>
<tr>
<td></td>
<td>Concept, principles and specificity of crisis management</td>
</tr>
<tr>
<td></td>
<td>System and crisis management bodies</td>
</tr>
<tr>
<td></td>
<td>Crisis management leadership</td>
</tr>
<tr>
<td></td>
<td>Communication in crisis</td>
</tr>
<tr>
<td>Specific part</td>
<td></td>
</tr>
<tr>
<td>Risk assessment and protection and salvation plan</td>
<td>Endangerment assessment</td>
</tr>
<tr>
<td></td>
<td>Risk assessment</td>
</tr>
<tr>
<td></td>
<td>Scenarios production</td>
</tr>
<tr>
<td>Production of protection and salvation plans</td>
<td>Production of protection and salvation plans based on risk assessment</td>
</tr>
<tr>
<td>Workshop 1</td>
<td></td>
</tr>
<tr>
<td>Workshop 2</td>
<td></td>
</tr>
</tbody>
</table>

This example of the course curriculum gives a very clear insight into what topics and areas are covered. Through workshops, trainees are taught how to identify and analyze all potential dangers, how to assess risks and what risk treatment should be conducted. They also learn how to produce a protection and salvation plan based on the risk assessment. All course is planned to be carried out face-to-face, on the business premises of the licensed legal entity.
3.2. Education of risk managers for protection of people, assets and business risk assessment

Risk managers in this field are also trained and prepared for the exam by licensed legal entities. The course lasts for 36 classes and it covers a variety of topics, according to the standard SRPS A.L2.003:2017 Security and resilience of the society – risk assessment. The topics are as follows: the concept of risk management and assessment, security of the organization, risk assessment in various aspects of business and methodology of risk assessment in the protection of people, assets and business. The course also contains two workshops where trainees are being taught how to produce risk assessments by themselves. At the end of the course, all the trainees are obliged to pass the control exam.

4. ADL IN THE EDUCATION OF RISK MANAGERS

As shown previously, both of the courses contain theoretical and practical parts. For theoretical parts, it is more than suitable to organize courses via ADL, using one of the proposed LMS platforms. The courses may be planned as synchronous and asynchronous. In the synchronous part, trainees could be taught about basic principles regarding different risk assessments, according to the given curriculums. After each topic is covered, a short knowledge assessment should be conducted and the teachers would have a clear insight into the trainees’ progress. In the asynchronous part, the trainees could be given various exercises connected with the topics covered in the synchronous part. Also, LMS software packages offer the possibility for the trainees to ask questions, discuss and debate interesting and unclear matters. They can also assess the teachers’ ability to transfer knowledge, their methods, and their behaviour during classes. All of this represents very useful feedback, so the teachers and course designers would be able to increase the quality of the teaching process. Another advantage of risk managers’ education based on ADL is that groups of trainees can be larger which directly affects the overall costs to be lower.

E-learning offers a lot of options and this crisis period enabled ADL to develop rapidly. Most academic institutions willingly or not transferred to this model of education. Web-based learning, distributed work and e-cooperation exploded during the Covid-19 crisis (Redondo et al., 2021). Since the pandemic started, it has been noticed a significant increase in solutions for e-learning, including tools and methods such as video conferences, virtual teaching, digital libraries and numerous software for web-based learning.

On the other hand, there are some disadvantages of the proposed ADL model for risk managers. Firstly, all the workshops still have to be conducted face-to-face, which means that at some point in time, all the trainees have to come to business premises. There is also a question of motivation during e-learning classes. It is often noticed that the concentration and motivation of the students are on a lower scale when they follow classes online. It is explained by the fact that they are usually at their homes; they don’t have the ’feeling’ that they are in class; the control role of the teacher is diminished etc. Lastly, the ADL education model means that all the trainees possess technical and other conditions fulfilled – computer, stable internet connection and separate individual working space, which is not often the case.

Bearing everything in mind, the e-learning education process for risk managers should be considered an option, especially in these uncertain crisis times. The first step needs to be the incorporation of this model of training into legislative regulative by giving the option to the licensed legal entities to choose which education method they will use (face-to-face, e-learning or a combination of both).
5. CONCLUSION

The appropriate education of risk managers today is more important than ever. We have all witnessed what kind of negative impact the Covid-19 pandemic has had, particularly on the education system. So why is proper education/training of risk managers so significant? If they are not trained, they will not be able to identify possible challenges, dangers and threats. Furthermore, they will not be capable to calculate the probability of negative events, thus analyzing possible risks. Without risk identification, no measures for its mitigation will be planned. In this situation, the vulnerability of everyone (individuals, businesses, society etc.) is increased and resilience is reduced. The consequences can hardly be measured.

The proposed education model for risk managers in this paper does not exclude traditional (face-to-face) teaching. On the contrary, it discusses and points out that in a crisis, such as the Covid-19 pandemic where physical presence is not an option should be possible to find an alternative. In regular conditions, ADL platforms could be used as an aid for traditional teaching with all its options and features. Of course, all of this should be recognized by responsible ministry and state administration ensuring legislative support. After that, certain efforts have to be made regarding teachers’ education on how to completely use various LMS platforms where developers, designers and managers should be involved. The goal is to make a stable education system for risk managers so that they will be well prepared to deal with all the challenges, risks and threats.

REFERENCES


CONFERENCE ORGANIZERS

REGIONAL ASSOCIATION FOR SECURITY AND CRISIS MANAGEMENT

S4 GLOSEC GLOBAL SECURITY
COORGANIZERS

FACULTY FOR SECURITY STUDIES – EDUCONS

KARLOVAC UNIVERSITY OF APPLIED SCIENCES

FACULTY OF OCCUPATIONAL SAFETY UNIVERSITY OF NIS

COLLEGE OF BUSINESS AND TECHNICAL EDUCATION, DOBOJ, BOSNIA AND HERZEGOVINA

RESEARCH CENTER BANJALUKA

FACULTY LOGISTICS CELJE
INTERNATIONAL Scientific-Professional Conference - Security and Crisis Management - Theory and Practice SeCMan - International Forum "Safety for the Future" 2022 (8 ; 2022 ; Sremska Kamenica)

Tiraž 70. - Bibliografija uz svaki rad.

ISBN 978-86-80692-09-8 (RASCM)

а) Кризи менаџмент -- Зборници б) Ванредне ситуације -- Управљање -- Зборници в) Безбедносни сектор -- Зборници

COBISS.SR-ID 74870025