

Security Aspects of Critical Infrastructure Protection in Anthropogenic Disasters: A Case Study of Belgrade

Vladimir M. Cvetković (✉ vladimirkpa@gmail.com)

Faculty of Security Studies, University of Belgrade, Gospodara Vučića 50, 11040 Belgrade, Serbia

<https://orcid.org/0000-0002-3450-0658>

Andrija Kezunović

Scientific-Professional Society for Disaster Risk Management, Dimitrija Tucovića 121, Belgrade, Serbia.

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Abstract

Recognized as the basis for maintaining the functionality of the community in disaster conditions, the protection of critical infrastructure is one of the most important measures to improve the resilience of society. Starting from the fact that society can be affected by various natural and anthropogenic disasters, the subject of this chapter refers to a comprehensive analysis of the security aspects of critical infrastructure protection in anthropogenic (man-made) disasters. On the other hand, the social goal of the research is to determine the level of public awareness of the importance of protecting critical infrastructure from these disasters. By applying the quantitative research tradition, quantitative research was realized in the area of the city of Belgrade, in which 200 respondents were interviewed by the method of random sampling. The obtained research results unequivocally indicate that preventive action in this area should be mainly focused on the adoption of strategies based on which plans are made to prevent the occurrence of these disasters, as well as operational procedures for the protection of critical infrastructure.

1. Introduction

Critical infrastructure, in theory, does not have a single conceptual definition, and often its conceptual definition depends on the field of research in which it is determined, but also the country in which it is done because in almost every country it is defined differently (Cvetković, 2013; Hromada & Lukas, 2012; Mijalković & Cvetković, 2013; Murray & Grubestic, 2012). Nevertheless, the conceptual definitions of critical infrastructure both in-laws and regulations, international and national, and in theory mostly indicate that these are assets and assets of the greatest importance for all activities (functioning) of both the economy and society (Trbojević, 2018; Herega, 2010).

Globalization and the technological revolution have made every type of infrastructure and the systems that belong to it complex and important for modern society (Marjanović, 2019). Mijalković and Cvetković (2013) define disasters as a characteristic, momentary, real danger for people and goods. Also, they state that these are harmful, unforeseen, unfortunate events that have harmful consequences for people, their property, natural resources, and infrastructure, which no society can not only prevent and solve without support but also help and use the resources of the wider community. societies or communities. Disasters are often divided into natural disasters, technological disasters, and their background is extremely complex (Mladjan & Cvetkovic, 2013).

Man-made when they occur cause great damage to critical infrastructure facilities such as oil, gas, water, water distribution, communication, traffic, and transport, etc., and have an extremely negative impact on society, the environment, and the economy (Petrova, 2011). Man-made disasters are different and have different characteristics and bring with them different hazards, these are mainly hazards that occur in industrial and technical conditions, they can be: different accidents, such as traffic accidents, then different dangerous procedures, specific activities of people who they can lead to human casualties, or injuries and various diseases and many other dangers to human health. It can also be property damage,

dams on dams, infrastructure failures, damage to the environment that can be caused by various chemical spills, toxic waste, but also industrial pollution, and fires. In addition to the above, it can also be nuclear radiation (Cvetković, 2021; Cvetković, Filipović, & Gačić, 2019).

2. Phenomenology Of Anthropogenic Disasters

Anthropogenic or man-made can be of different forms, ie different phenomena (Lin Moe & Pathranarakul, 2006; Martin & Rice, 2012; Wang, 2000). Therefore, in the studies of disasters, they are defined differently, they are accidents, ie disasters that a person intentionally or unintentionally causes by his actions. The formulation of anthropogenic disasters is less commonly used, ie man-made disasters (Cvetković, 2020). Technological, ie man-made disaster that most often occurs due to the malfunction of the technological infrastructure or the mistake of people in the structure of its use or control, but also a combination of both (Arata et. Al., 2000). They represent different types of accidents that man has caused intentionally or unintentionally. Usually, they are defined as a sudden and uncontrolled event or a series of events that got out of control during the management of certain means of work and during the handling of dangerous substances, whether in production or transport, during their trade or processing, as and disposal and storage. These can be fires, various accidents in all types of traffic, explosions of all kinds, for example in mines and tunnels, downtime of cable cars for transporting people, demolition of dams, accidents at power, oil and gas plants, accidents in the handling of radioactive and nuclear materials, and whose consequences endanger the safety and lives of people, material goods and the environment "(Jakovljević, 2006: 106).

In the Law on Disaster Risk Reduction and Emergency Management (Official Gazette of RS, no. 87/2018), man-made disasters, ie accidents are defined as events that occur suddenly and that are not controlled, or they are events over which the ability to manage such as working equipment or the use of hazardous substances in production, processing or transport and distribution, but also in storage and disposal. Technical - technological disasters have their factors, and the most significant of them can be related to human technological or organizational errors that occur in warehousing, transport, and many other processes (Shaluf, 2007, 2008). These disasters are often classified as industrial; construction; nuclear; computer and transport "(Cvetković, 2019b). The characteristics of man-made disasters are therefore different, and thus they bring with them significant risk factors. Some of these factors are chemical complexes; accidents and incidents in the chemical industries; different types of accidents inconvenient and warehouses in production; various accidents during the transport of dangerous goods; nuclear explosions; accidents and incidents involving nuclear weapons; accidents with the disposal of radioactive waste and materials of that kind, but also careless and careless handling of the same (Cvetković, 2019b).

Based on the aforementioned classifications, it can be said that the causes of man-made disasters, ie the factors of the same are different industrial factors that are most often related to the chemical industry. But also various accidents in the production, transport of dangerous goods and those caused by nuclear weapons or their consequences (Shaluf, 2007: 708). This can most often be associated with radioactive waste and material and careless handling in handling it because these materials are often associated

with nuclear weapons. Nuclear and radiological disasters include all situations that arise as a result, ie consequence of human error, but also various unexpected and extraordinary events, equipment failures, etc., as well as various forms of action by people from evil intentions. These disasters have extremely great harmful consequences. These disasters can have both short-term and long-term consequences, both for the people and the environment that are directly affected by them and beyond, on people and environments that are not directly affected by them. Their effects, for example, radiation are not available to the human senses and cause a feeling of helplessness and vulnerability in people, but also various traumas (Vazquez et. al., 2010). Sources of endangerment with radioactive materials are primarily nuclear power plants, but they can also be plants for the production and processing of nuclear fuel or radioactive waste, but also various institutions that use nuclear reactors for scientific research (Cvetković et al., 2019, p.52). These disasters have as a consequence a serious violation of human health, safety, and quality of life in general. Also, the consequences are extremely large and negative for the environment. All of the above occurs because the consequences of nuclear disasters are most often closely related to the radiation they cause (Vazquez et. al., 2010).

On the other hand, industrial disasters are events that occur in the manufacturing sector primarily goods but the provision of services in some economic activities, are extremely unfavorable and unfavorable events for people, their health, and the environment and production. With the development of this sector, the occurrence of these disasters became more frequent. "Mechanical processing of raw materials and serial production make life easier for modern man, but make it difficult to achieve his relative safety" (Cvetković, 2020, p. 122). They are rare, but when they do, their consequences are often great for both people and the environment (Zio & Avenc, 2013). These disasters differ based on the industry in which they occur. Their most common division is into severe industrial disasters in the extractive and processing industries, they are divided into severe ones: for example, in energy, metallurgy, and mining, but also in the chemical and construction industries; light industrial disasters, for example, those industrial disasters that occur in the production of construction materials, wood, tobacco, textiles and many other similar industries (Cvetković, 2020).

Unlike them, transport or traffic disasters are a common occurrence, they are different types of traffic accidents in all types of traffic. Their consequences are multiple, not only for the wider social community but also for its smaller parts, such as families. In our country, traffic accidents of all kinds are quite common, especially traffic accidents in road traffic. Their causes are numerous, often it is a high speed, poor infrastructure, different weather conditions, for example, rain, snow, fog, etc., it can also be inadequate road markings, poor penal policy or its poor application, but also various human impacts factor.

The causes of man-made disasters can be various (Al-ramlawi, El-Mougher, & Al-Agha, 2020; Chakma, Hossain, Islam, Hasnat, & Management, 2020; Kaur, 2020; Olawuni, Olowoporoku, & Daramola, 2020; Thennavan, Ganapathy, Chandrasekaran, & Rajawat, 2020), and their consequences often cannot be seen. Taking into account that all man-made disasters occur under the influence of natural forces, man or their actions, or in combination under the influence of these two factors (Shaluf, 2007). For example, the

cause of a man-made disaster caused by nuclear or radiological factors can be caused under the influence of natural forces, so that there would be some damage to the facility in which nuclear and radiological research is performed. Also, the same disasters can happen by human error, not by attention, but also by malfunction of certain devices used for nuclear or radiological research. The same disasters can occur by making a mistake that would cause a man-made disaster under the influence of natural forces, such as earthquakes, people in fear or panic (Eagle & Davies, 1992).

It can also be noticed that industrial and transport man-made disasters are often connected, although this is not the rule. Industrial disasters can also occur as a result of natural and human factors, but both. Namely, in industrial production, for example, floods can cause technical and technological disasters, but the same can happen by human error during production, for example, errors that lead to failure that causes the spillage of hazardous substances (Quarantelli, 1990). Traffic-transport man-made disasters are often the result of human error or negligence, for example during the transport of dangerous goods, the transport vehicle was moving at high speed, which led to an error and man-made disaster - transport. In the media, one can often see reports of major transport disasters that occurred on the water, ie in sea transport with oil spills from tankers, which ran aground by human error, and this led to a breakdown due to which the oil spilled (Couch & Coles, 2011).

3. Critical Infrastructure Protection

Anthropogenic disasters are prevented, ie protection from them is carried out by preventive action. For that purpose, a whole series of preventive measures are adopted, which is regulated by various laws and regulations. Also, there must be a legally regulated procedure to eliminate their consequences. It is also necessary that all those who are engaged in activities that can lead to a higher risk of accidents take all necessary actions to prevent it, both its impact on humans and the environment in general. Also, all those who deal with activities that can be the cause of man-made disasters are legally obliged to organize and implement protection against these disasters, both for people and the environment, as well as material goods (Savić & Stajić, 2006).

Every company, ie company, must have a Plan for protection against the consequences of accidents, ie man-made disasters. For example, the Law on Environmental Protection has defined SEVESO plants as plants that must have a specified plan. SEVESO plants are plants in which activities are carried out in which it is present or it can be a dangerous substance in quantities that are prescribed but also greater than attributed. There are several laws related to dealing with when disasters that occur, and following them, various strategies, regulations, procedures, and bylaws are adopted. For protection and rescue, when all types of disasters occur, including man-made disasters, and within the Protection and Rescue Plan, it is mandatory to take the following measures: "early warning and preparedness (readiness); mobilization and activation; protection and rescue by types of hazards; civil protection measures; use of force and subjects of protection and rescue "(Cvetković et al., 2019). Based on the above, it can be said that the reaction and protection from man-made disasters are conditioned by preparedness for them, therefore it is necessary to constantly improve it. Disaster preparedness and the types of protection that

are undertaken concerning them can be divided into: "Preparation and regular updating of both actions and policies related to disasters, ie preparation for action related to them" (Cvetković, 2020). It is necessary to strengthen and maintain systems, but also to predict these disasters, early warning systems for them, constant monitoring of possible dangers, ie risks, but also communication-related to them, and telecommunication systems should be used, because they enable fast-forwarding of this information.

Local communities can often be affected by technical and technological disasters, because within or near them there can be a whole range of, for example, plants, research institutions, etc., which can be the cause of these disasters (Cvetković, 2019a; Cvetković & Filipović, 2018; Vukoje, 2012). For the local community to be ready for this type of disaster, various activities are carried out within its framework. To this end, an entire subculture can be developed within which experiences and knowledge are exchanged on how to react before, during, and after these disasters (Helsloot & Ruitenbergh, 2004). This method is often the most common when it comes to preparedness, sewing, but also when it comes to eliminating the consequences of disasters. It can be said that local communities must be educated, informed, and even trained on how to act before, during, and after disasters. Based on the above, it can be said that the local community, to provide adequate protection and response to man-made disasters, is primarily left to itself. However, adequate laws and strategies exist and it is only necessary that they are properly implemented and implemented, at least when it comes to Serbia. For the local community to be ready, the best way to achieve this is education on man-made disasters and training of its members to react and protect when they occur.

The state is a key factor for reacting to man-made disasters because its role is extremely great in these situations. After all, based on that reaction one can see how organized and ready one country is for all kinds of unforeseen events, ie crises - disasters. In the Republic of Serbia, several laws and strategies deal with this area. State bodies and ministries are the most important for protection against technical and technological accidents, and the role of the National Assembly is important when adopting various strategies related to them. The government has extremely broad powers because it ensures the construction and development of protection and rescue systems, and it is also in charge of the planned connection of parts of those systems and the tasks set within them. Also, it forms the Republic Headquarters for Emergency Situations when man-made disasters occur. In addition, he appoints the chief, commander, and members of that staff. The government is a key factor in providing and seeking international assistance in situations where these disasters occur (Tatić, 2016).

4. Methodological Framework Of Research

The subject of the research is a comprehensive analysis of the security aspects of critical infrastructure protection in anthropogenic (man-made) disasters. The scientific goal of the research is to describe the methods and techniques necessary for integrated risk mitigation and protection of infrastructure from disasters caused by technical and technological hazards. On the other hand, the social goal of this research is to determine how much the general public is aware of the importance of protecting critical

infrastructure from technical and technological disasters. For the research, various data were collected to analyze the current situation in this area in the Republic of Serbia, Europe, and the world.

Sample and Survey Questionnaire

After a systematic analysis of many scientific papers dealing with the issue of critical infrastructure, the instruments that were used to conceptualize the survey questions were identified. During the development of the survey questionnaire, the jump-economic and cultural environment in which the research is conducted was taken into account. For data collection, a survey questionnaire was used, which was delivered to the respondents in person and via the Internet. Using a random sampling method, 116 respondents were interviewed directly in the central city square, while 84 respondents were interviewed electronically, which is a total of 200 respondents. Data were collected by allowing respondents to rate certain statements from 1 (absolutely disagree) to 5 (absolutely disagree).

Approximately 200 respondents took part in the survey, of which 132 were males and 68 were females. When it comes to education, 50 men surveyed had secondary education, 72 higher education, and 10 masters or doctoral degrees. The distribution of professional qualifications of female respondents was as follows: there were 48 respondents with secondary education, 18 with higher education, while two of them had a master's or doctorate. When it comes to the age structure of the respondents, it is divided into three categories. The first from 20 to 35 years, the second from 35 to 45 years, and the third from 45 to 55 years. It is easy to see that the second age group from 35 to 45 is the most represented among the respondents.

Data analysis

After completing the survey, each questionnaire was given a unique code to allow verification of the entered data, and then the data was entered into a database supported by the statistical software SPSS. Before conducting the analysis, and after collecting the data, the data for the analysis was prepared. Data preparation consisted of data editing, coding, and statistical adjustment of data. Data editing included procedures to determine whether there were missing, unclear, and erroneous answers? Data coding involved assigning certain symbols to response modalities to more successfully monitor certain response categories and structures. After completing the data preparation, the first step was to analyze each issue or measure on its own. In the program for statistical data processing (SPSS), all data obtained by the survey were arranged and classified. Using descriptive statistical analyzes, the distributions of answers to the questions were determined.

5. Results

To the question "Assess your knowledge of what a critical infrastructure is", the respondents gave answers that indicate a big difference in the answers of male and female respondents. Based on the data in the table, it is clear that the highest percentage of male respondents gave a grade of 5, and the female opposite a grade of 1. The percentage of men chose grade 5 in 27% of cases and women 1 in 13% of

cases. Based on education, it can be noticed that those with a university degree with the highest grade 5 rate their knowledge of what is critical infrastructure in 24% (Table 1).

Table 1
A comparative view of respondents' responses based on gender.

		Rating					Total
		1	2	3	4	5	
Gender	Male	8%	11%	11%	10%	27%	66%
	Female	13%	6%	5%	5%	7%	34%
Total		23%	16%	16%	15%	34%	100%

Then, when asked "Assess the knowledge of the population of our country about what is critical infrastructure", male and female respondents rated this knowledge with a score of 3 in 22% of cases and a score of 1 in 10% of cases. When the answers to the same question are observed based on education, they are arranged so that those with secondary education grade 4 in 14% of cases, which is the highest percentage of grades in this question. The lowest percentage is for those whose education is a master's or doctorate with grades 1 and 3 at 2%.

After that, the respondents were asked the question "Assess your knowledge about the consequences of technical and technological disasters", and the answers to it when analyzed indicate that male respondents rate their knowledge of the above with a grade of 3 in most cases, more precisely in 22%, and among the respondents, ie females, the dominant grade is 1 in 10% of cases. The most common percentage is grade 4 for those with higher education, followed by grade 5 for those with secondary education. For those respondents with a master's or doctoral degree, the most common grade is also 5, in 3% of answers. Then they were asked the question "Assess the knowledge of the population of our country about what are man-made disasters." Based on the data, it can be noticed that the most common grade for male respondents was 4 with 21.5%, while for women the most common grade was 3 with 15.5%. When the answers to the same question are analyzed based on the education of all respondents, it can be seen that grade 3 is most common among those with secondary education with 15.5%, while for those with higher education it is grade 5 with 13.5%. Those with a master's or doctorate's degree also most often chose the same grade in 1.5% of cases. Other estimates, as well as the ones given, are given in Graph 6.

The next question they were asked was, "Assess the importance of critical infrastructure for the state and society." Based on the answers of the respondents and the conducted statistical analysis, it was noticed that in male respondents the most common grade is in the percentage of grades 5 with 19.5%. For females, it is grade 3 with 9.5%. On question number 5, based on the education of the respondents, it can be noticed that among those with secondary education, the most common grade is 5 with 16%. For those

with a university degree, it is a grade of 3 with 13%, and for those with a master's or doctoral degree, it is a grade of 5 with 3%.

After that, the respondents were asked the question "Assess whether the activities of your work organization can lead to man-made disasters." According to the obtained grades, ie statistical results of the same, it can be concluded that male respondents give the lowest grade 1 in 17.5% of cases, but also grades 4 and 5 in 18% and 17% of cases, which can be interpreted as ignorance but not all in organizations where the above may occur. On the other hand, in women, grade 1 is dominant with 12.5%. The results of the survey, ie. their analysis shows that those with a university degree with a high grade of 4 rates the possibility that the activities of their work organization lead to a man-made disaster in 13.5% of grades, while those with a high school diploma usually rate it with the lowest grade of 1 with 16%. Interestingly, 3% of the total 6% of those with a master's or doctoral degree evaluate the above with a grade of 1. It can be concluded that those with a university degree assess that the activities of organizations in which they work lead to technical and technological disasters.

In addition, the question "Assess the need for critical infrastructure from man-made disasters to provide specially trained staff" received interesting answers, bearing in mind that the answers of both male and female participants in the survey are the same, ie distributed in the same way. Thus, both men with 24.5% and women with 14% rate 5 as necessary to protect specially trained staff from these disasters. Other answers also coincide in terms of representation. Grade 5 is the most represented percentage when the results of the survey are analyzed based on the education of the respondents. In contrast, different answers were received to the question "Assess the need for personnel who protect critical infrastructure from technical and technological disasters". Interestingly, the results here indicate that male respondent's rate this attitude with a score of 4 in 25%, ie this score is dominant, while females still dominate with a score of 5 the need for these staff to be specially educated. However, both sexes are in favor of the training and education of these staff. with secondary education, they rate it with the lowest grade 1 in 14.5% of answers, while those with higher education still rate it with grade 4 in as many as 22.5% of answers. It is interesting that those with the highest education with a master's or doctorate grade it with a grade of 1 in 2.5% of cases, which is not a negligible percentage if we take into account that they make up 6% of the total number of respondents.

The question "Evaluate the activities of work organizations in your environment can lead to man-made disasters" is interesting because both male and female respondents have a dominant grade of 3 with 46% and 21%, respectively, also for male respondents grade 5 is completely neglected and its percentage is 0. The answers of the respondents of both sexes indicate indecision because it is a middle grade. On the same question, based on the statistics of grades based on education, it can be concluded that none of the certain groups believe that the activities of work organizations in your environment can lead to man-made disasters because their answers are dominated by grades between 1 and 3. Respondents were also asked the following question: "Assess the system of protection and rescue from man-made disasters in the Republic of Serbia." The grade that is most represented in this issue is grade 3 with 19.5% for males and 16% for females. Such answers lead to the conclusion of indecision, which may be a consequence of

the respondents' lack of information about the above. On the same question, but when analyzing the respondents' grades based on education, it is noticeable that respondents predominantly chose grades 1, secondary education 22.5%, and master's or doctorate 3%, while university graduates mostly chose grades 1 and 2 with 10 % and 9%. The absence of high grades in higher percentages indicates a bad opinion of the said system.

The next question in the survey was "Assess your readiness for a man-made disaster", and the answers received from both men and women indicate that the respondents are highly rated on this issue. Namely, the male respondents chose grades 4 and 5 as their answer, 18%, and 16.5%, and the female grade 4, 10.5%, which are the most selected grades. So it can be concluded that respondents of both sexes highly value their readiness in case of this disaster. The same question is when the answers are analyzed based on the professional qualifications of the respondents, high grades are dominant. Thus, for those with secondary education, it is a grade of 4 with 18.5%, with a university degree it is a grade of 3 with 11% bass, as well as for a master's or doctorate with 3%. The next question was "Assess the degree of risk of technical and technological disasters in the Republic of Serbia." The answers, ie the assessments stated by the male respondents are arranged in such a way that 16.5% rate it with the highest grade 5. On the other hand, the female respondents rated the above with a grade of 3 in most cases. The conclusion based on the results is that the majority of male respondents believe that there is a high level of risk of these disasters in the Republic of Serbia. To the same question, grade 3 is the most dominant answer among those with secondary education and higher education, but grade 5 is most prevalent among those with a master's or doctorate. It can be observed that those with the highest education are both the most educated and the most knowledgeable to change this.

To the question "Assess the protection of critical infrastructure in the Republic of Serbia", respondents of different sexes equally answered with a high score of 4. Male respondents did so with 20.5%, and females with 15%. It can be concluded that both sexes are highly valued. This question received a grade of 4 for those with secondary education and a master's or doctorate, which is the most common percentage of these categories of respondents with 22% and 3.5%. In higher education, however, grade 2 prevailed with 11.5%, although grade 4 was immediately next with 10%. The next question was, "Assess the readiness of the competent services for technical and technological disasters in the Republic of Serbia." Male respondents gave the highest score in the majority of 22%, and female respondents the lowest 9%. This can hardly lead to a firm conclusion, but perhaps the female sex is more cautious, timider. On the other hand, male respondents are traditionally more informed about the above, or at least it is considered as such, which gives his assessment certain credibility. Based on the analysis, it can be noticed that grade 5 is most prevalent among those with secondary education with 17% and those with masters or doctorate with 3%. While for those with a university degree, grade 2 with 12.5% is the most common. However, their grade 4 is immediately behind grade 2 with 11.5%. These results indicate that the respondents highly assessed the readiness of the competent services for the above, in total. When asked, "Assess the level of taking preventive measures to protect critical infrastructure in the Republic of Serbia", 26.5% of respondents rated it with 5, while 11.5% of respondents rated it with 3. Mentioned

indicates that the male part of the respondents rated it higher. All this indicates that prevention measures aimed at protecting critical infrastructure were rated the highest.

The next question in the survey was to assess the level of education of young people about the importance of critical infrastructure in the Republic of Serbia and for male respondents, it received almost the same number of grades 1, 2, and 4 in percent, while for females the dominant grade is 5. To the same question Respondents of all categories of education answered with 4, which means that they highly evaluate the education of young people in this area in our country. In contrast, the question "Assess protection from man-made disaster in the world" received the lowest and highest grades of both sexes, ie 1 and 5. Identity, but also the difference in ratings can be understood as a difference in information and knowledge of the area. part of the question. Based on the answers of respondents of different backgrounds who answered this question, it can be seen that it was rated 1, 2, and 3. The frequency of all types of disasters that occur in the world does not instill confidence in protection from them, and the team from man-made disasters.

In addition, respondents were asked, "Assess your fear of critical infrastructure failure due to a man-made disaster." The answers to it in both sexes are almost identical, with a dominance of grades 3, in males and 4 in females. When analyzing the results of the survey, ie the answer to the same question based on the education of the respondents, it can be seen that in all three categories the grade is the most represented grade 3, with the fact that in higher education and grade one is equally represented. The next question was "Assess the possibilities of your evacuation in case of a man-made disaster of critical infrastructure in your environment." The answers of the respondents of both sexes are such that they rate it with a grade of 5, ie they evaluate the possibility of their evacuation with the highest grade. Based on the results of the survey, it can be concluded that both sexes do not consider these disasters possible in their environment or believe that they can be evacuated quickly if these disasters occur in their environment. And when the answers of the respondents are analyzed based on their education, the dominant grade is 5 in all three categories. Thus, it can be concluded that the respondents highly evaluate the possibility of their evacuation in the case of the above. The next question, "Assess the possibilities of evacuating your community in the event of a man-made disaster of critical infrastructure in its environment" indicates that male respondents received almost 2 and 5 percentages in percentage, and 3 and 4 in female respondents. respondents are at least insecure or uninformed about the evacuation. Based on the education of the respondents, the same indecision and high percentage of answers of the respondents of each category can be noticed. The next question in the survey was "Assess the degree of man-made risks in your environment." The answers, ie the grades of both sexes are the highest percentage of the answer 2.

These results confirm that the respondents in their environment do not perceive anything as a possible cause of man-made disasters. It can be noticed that the respondents with secondary education and masters or doctoral degree chose the highest percentage of 2, and those with higher education chose grade 4. Therefore, it can be concluded that the respondents mostly think that the degree of this risk in their environment is relatively small., although there are those with different attitudes and grades, they are

in the minority. In contrast, to the question "Assess the possibilities of a man-made disaster of critical infrastructure in the Republic of Serbia in the coming period", respondents of both sexes answered similarly with a score of 5. For male respondents, this rating received 24%, and for females 18 % rating. Based on the results of the answer to this question, it can be concluded that the fear and high assessment of the possibility of this adverse event is a consequence of frequent natural disasters in the Republic of Serbia, and respondents are aware that they can affect other disasters.

The next question referred to the assessment of the most probable cause of man-made disasters in the world. Unlike other questions in this and the following questions, the respondents were asked to complete one of the five offered answers. The answers offered to respondents of both sexes in this question were: 1, nature; 2, man; 3, technology; 4, industry, and 5 all of the above. Answers 3 and 4, ie technology and industry, received the most answers from respondents of both sexes. Considering their accelerated development, such attitudes of the respondents are not surprising. The same answers dominate when the answers of the respondents are analyzed based on education. Because those with a high school diploma and a master's or doctorate most often chose technology as their answer, and those with a university degree chose industry. In contrast, the next question was "Who in the Republic of Serbia deals with the protection of critical infrastructure"? The answers offered were: 1, the army; 2, police; 3, specialized civil services; 4, private companies and 5, others not listed. Based on the answer to this question, it can be concluded that male respondents believe that it is the police, and females that it is done by specialized state services. And based on the education of the respondents, the answers do not differ much. Those with secondary education believe that specialized state services deal with the above, while those with higher education believe that the police do it. Those with a master's or doctorate were mostly considered to be done by private companies.

Finally, the respondents were asked the question "What worries you the most about the protection of critical infrastructure from technical and technological disasters", and the answers offered were: 1, it is conducted by inadequate staff; 2, irregularly maintained; 3, not monitored regularly; 4, outdated protection system and 5, all of the above reasons. Respondents of both sexes most often chose the answer in an inadequate cadre, which is surprising because they cited specialized state services and the police as their answers to who is protecting the above. Although these answers may be related to distrust in state institutions, they may also be a consequence of respondents' lack of information. And based on education, the results indicate that those with secondary education and master or doctorate chose the most, the answer is conducted by inadequate staff, however, those with higher education more often chose as their answer is not monitored regularly.

4. Discussion

Overall, the results of the survey indicate that respondents are mostly informed about what is critical infrastructure, and what are man-made disasters and disasters in general. This can be explained with the help of Marjanović's statements, which he stated at the end of his research, where he states that critical infrastructure has long been present in the history of people, ie civilization, but that it has gained a new

dimension in the modern world (Marjanović, 2019). In his research, Trbojevic claims that the protection of critical infrastructures is a security issue of the greatest importance because it is crucial for the state and society and their functioning. Infrastructures for food production, primarily food and water, but also traffic, energy, information, health, chemical, nuclear, etc. are of the greatest importance (Trbojević, 2018). That is why it is encouraging that the research conducted for this paper found that respondents are mostly informed about what are disasters, critical infrastructure and man-made disasters, or dangers. However, the answers regarding education, protection, and evacuation in case of these disasters are mostly related to personal attitude about it, because none of the respondents is specially educated or trained about all of the above. This means that in the survey they gave answers based on their opinion on their readiness for protective critical infrastructure and education and evacuation in situations when man-made disasters would occur. In 2013, Mijalković and Cvetković pointed out the effects of natural disasters on the occurrence of man-made disasters. It is therefore worrying that this study found that participants in this study were uninformed about the evacuation of their communities if these disasters occurred.

When it comes to prevention, Cvetković (2017) found in his research that 20.5% of respondents believe that competent services will certainly help them and that there is no need to prepare for possible disasters. Observing the whole research, ie its results, it can be said that in our country the attitudes regarding the protection of critical infrastructure about man-made disasters caused by man-made dangers depend on education, ie education. It cannot be said that there is a broader awareness of all citizens about the consequences of the above, but also about how the critical infrastructure is sewn, which it protects, and in what way. Knowledge of this area, ie topic, is mostly general and related to general information. It cannot be concluded that there is a strategy based on which citizens are prepared for everything that could happen in the event of a man-made disaster, but also that they are aware of the importance of protecting critical infrastructure from them. In the conclusion of his research from 2013, Marjanović and Nađ state that "rapid changes and the emergence of non-state actors in the security system contribute to the state monopoly on critical infrastructure protection being divided between experts, academia, professional associations and technology community, business sector and nonprofits.. Private security companies need to increase the capacity and quality of their products and services. This is the only way to become a key part of a public-private partnership in the field of critical infrastructure protection "(Marjanović and Nađ, 2013, p. 89). It is stated in contradiction with the results of the research conducted for this paper, based on which it can be concluded that the citizens of the Republic of Serbia believe that it should remain within the competence of state services. Based on the results of the research conducted for this paper, it can be said that in our country the general public is at least uninformed about critical infrastructure and that this data could be misused to the greatest extent by a foreign factor. Both Matić and Miljković (2013) pointed out in the same year that critical infrastructure needs to be protected in cyberspace, which is certainly necessary, but above all, it should be done by protecting the availability of information about them that could make it vulnerable to, for example, terrorist attacks. World powers like Russia must constantly monitor everything that can tame their critical infrastructure, which Petrova (2011) pointed out, emphasizing the importance of prevention

for that. The Republic of Serbia, at least based on available data but also the research conducted during the preparation of this paper, shows the greatest weakness in the field of prevention of all kinds, including the preventive protection of that infrastructure.

Based on the results obtained by the survey, it can be concluded that the citizens of our country are quite uninformed about the prevention of this type. The same can be said for the prevention of technical and technological disasters because the research indicates that the citizens of our country do not have adequate knowledge on how to act in that direction, which means that there is no preventive education, training. There has been a lot of research on this topic in the world, and it can be said that Serbia is not an isolated case in the above. However, one should not be comforted by that. This was pointed out by Rovins and Winningham (2010) in their research, pointing out that many countries are simply waiting for disasters of this kind without doing much to act preventively in their prevention. The results of the research conducted for this paper do not differ to the greatest extent from the research conducted in the world regarding the protection of critical infrastructure and protection against technical and technological disasters, but they are certainly worrying. Most citizens of our country, at least according to this research, only roughly know the possible consequences of these disasters, and the knowledge about possible actions and evacuation before and after them is superficial and insufficient, which is a great danger. In the end, the citizens of the Republic of Serbia are very little informed about the consequences for the person but also for the health of the community and the environment. These consequences were pointed out in 2005 by Lillibridge and Brennan with special reference to public health. Based on this, but also the research with which it was compared, it can be said that the protection of critical infrastructure from man-made disasters should therefore be both preventive and reactive, but prevention is key to mitigating or preventing their consequences.

5. Conclusion

Critical infrastructure must be protected from disasters of all kinds, even man-made disasters, and preventive action is extremely important for that. Preventive action in this area should mainly be aimed at adopting strategies based on which plans are made to prevent these disasters, but as they often cannot be avoided, it is necessary to develop action plans when they occur. These plans should primarily envisage rescuing and protecting the population from their consequences, but also protecting critical infrastructure. In addition, it is important that within the preventive action, citizens, but also members of various organizations are prepared to act when they occur. Anthropogenic disasters are such that they can leave permanent consequences for countries, their inhabitants, but also the natural environment. Their consequences can be a permanent destruction of infrastructure, even critical ones, but also injuries to people and their deaths. Also, they leave lasting consequences for nature and everything that lives in it, that is, the flora and fauna. The protection of critical infrastructure from man-made disasters should therefore be both preventive and reactive, because only in this way can it be ensured that it is not permanently damaged or destroyed and their functions cease. The significance of this infrastructure is such that it would have lasting consequences for societies and countries where something similar happens.

In the Republic of Serbia, the protection of critical infrastructure is given significant attention by the state, ie the bodies and institutions responsible for the above. However, it cannot be said that citizens are ready to react in case they happen. The above primarily refers to the extent to which citizens are individually ready to protect themselves in the event of man-made disasters. Also, it cannot be said that citizens act preventively in the direction of their protection from them. There have been no major man-made disasters in our country in the last two decades, but there have certainly been minor disasters that could be classified under this term. Nevertheless, it cannot be said that something has been done in this period regarding the readiness of citizens for them, and the infrastructure and even critical infrastructure are often not in a satisfactory condition, which indicates that there is a possibility of various disasters and that it is necessary to take measures. to prevent them. Protection of critical infrastructure from man-made disasters is carried out preventively because when they occur, their consequences are significant for both people and the environment. In addition, the protection of critical infrastructure from disasters caused by technical and technological hazards requires constant and planned activities in this area, both in the training of personnel dealing with it and in educating the population, as well as in modernizing the equipment used for that purpose. Finally, it can be said that protection from disasters caused by technical and technological hazards of critical infrastructure is approached strategically and systematically at all levels.

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