UDC 343.2/.7 + 343.985.4
DOI: 10.56215/naia-herald/2.2023.41

Critical infrastructure as an object of criminal encroachment: General characteristics and features of the investigation organisation

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■ **Abstract.** New technologies used in infrastructure systems add complexity to the management and protection of these systems, and therefore, the consideration of issues related to criminal attacks on critical infrastructure and the organisation of investigations are becoming increasingly important. The main goal was to identify the problematic aspects and unique features of organising pre-trial investigation of crimes committed at critical infrastructure facilities. The methodological tools of scientific research were based on the diagnostic method for studying social and legal phenomena, analytical, dogmatic, comparative legal, formal legal, and modelling methods. Based on the results of the study, the current state of criminal law norms regulating the grounds for criminal liability for criminal offences involving critical infrastructure was comprehensively analysed. Based on the assessment of the current state of criminal legal protection of critical infrastructure facilities, it is established that it is insufficient and needs to be improved. It is proposed to supplement the norms of the special part of the Criminal Code of Ukraine with additional qualification criteria that would establish criminal liability for encroachment on critical infrastructure facilities. The issues of the development of a unified concept of protection of critical infrastructure facilities from criminal offences through a comprehensive scientific and practical approach to the development and assessment of forensic support for countering criminal offences involving critical infrastructure are updated. Specific steps are outlined to improve laws and regulations that define the specifics of organising investigations at critical infrastructure facilities and conducting priority investigative (search) actions in this regard. The practical significance of the results obtained lies in the development and argumentation of conclusions and proposals for improving the system of protection of critical infrastructure from criminal encroachments

■ **Keywords:** protection of critical infrastructure facilities; high-risk facilities; investigation of criminal offences; emergency situation; investigative and operational group; incident site inspection

■ **Suggested Citation:**
Yefimenko, I., Slipchenko, V., & Vaško, A. (2023). Critical infrastructure as an object of criminal encroachment: General characteristics and features of the investigation organisation. *Scientific Journal of the National Academy of Internal Affairs,* 28(2), 41-51. doi: 10.56215/naia-herald/2.2023.41.

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■ Received: 12.03.2023; Revised: 30.05.2023; Accepted: 26.06.2023

Introduction

Ensuring the security of critical infrastructure is a complex and long-term process that requires an organisational and integrated approach (Vasyutynska, 2021). It is inherent in any civilised country, with no exception for Ukraine, where, in the context of a full-scale Russian invasion, the key priority of the national policy is to protect critical infrastructure facilities from criminal encroachments. For example, according to the Office of the Prosecutor General (2023), of all recorded missile strikes, more than 70% were coordinated specifically in critical areas of state activity. According to these facts, the National Police of Ukraine alone opened more than 80,000 criminal proceedings, including those provided for in Article 438 of the Criminal Code of Ukraine (Violation of the laws and customs of war) (Crimes committed by..., 2023; Yurii Belousov: We consider..., 2023).

The analysis of legal literature shows that the study of problematic aspects of pre-trial investigation of criminal offences involving critical infrastructure facilities is relatively new. For the most part, they relate to issues of ensuring cybersecurity at critical energy facilities. In particular, considering external threats to NATO member states, S.D. Ducaru (2017) emphasises the security of energy infrastructure through the feasibility of an integrated network approach that will help reduce vulnerability and increase the sustainability of critical infrastructure in the Alliance's energy sector. Similar views are held by R. Lordan-Perret *et al.* (2019), O. Batiuk & I. Yevtushenko (2022), noting that the proper functioning of the energy system depends on the smooth operation of its interconnected sectors of critical infrastructure, and therefore, attacks on this infrastructure can cause a cascade effect. According to D.M. Nicol (2018), H. Zhu *et al.* (2021), one of the most dangerous types of threats to critical infrastructure facilities is and remains unauthorised access to their information and telecommunications systems. In this regard, as the researchers note, the digitalisation of society, despite significant advantages and opportunities, significantly increased the level of cyber threats and contributed to the emergence of new ways of committing criminal offences involving critical infrastructure facilities (Chowdhury & Gkioulos, 2021; Al-abassi *et al.,* 2022). These criminal acts can manifest themselves not only in so-called Internet espionage, or for example, illegal acquisition of information with restricted access, but also in illegal possession of other people's property, blocking users' access to the relevant system resources and/or destruction or damage to the relevant infrastructure in general.

Along with this, physical threats are no less dangerous. These may include those potential hazards that caused the occurrence of a crisis situation at the critical infrastructure facility that threatens the life and health of the personnel of this facility and/or the local population in the area of residence in which it is located, and the safety of other citizens and/or their financial situation. The risks at critical infrastructure facilities can manifest themselves in the form of sabotage, terrorist acts, theft, deliberate destruction and/or damage to property necessary for their functioning, etc. It is important to note that these criminal acts, unlike cyber torts, can lead to the death of a large number of people, cause physical or moral suffering, cause significant material damage, and cause irreparable damage to the environment, which makes it impossible for people to live in a certain territory and ultimately poses a threat to the future existence of humanity.

Despite the relevance and great practical significance of this topic, in departmental regulations[1,2] do not provide practical recommendations on the algorithm of indicative actions of authorised bodies when responding to applications and reports of criminal offences committed at critical infrastructure facilities and the specifics of the investigation methodology of this category of torts. This circumstance, as a result, led to the choice of the topic of research, the main purpose of which was to investigate the problematic aspects and features of organising pre-trial investigation of criminal offences at critical infrastructure facilities.

Materials and Methods

The regulatory framework for scientific research was laws and bylaws, the norms and provisions of which regulate certain issues of security and sustainability of critical infrastructure. In particular, the latter may include the Criminal Code of Ukraine[3], the Code of Civil Protection of Ukraine[4], laws of Ukraine "On the Main Principles of Ensuring Cyber Security of Ukraine"[5], "On the National Security of Ukraine"[6],

[1]Order of the Ministry of Internal Affairs of Ukraine No. 575 "On Instructions on the Organisation of Cooperation of Pretrial Investigation Bodies with Other Bodies and Units of the National Police of Ukraine in the Prevention of Criminal Offences". (2017, July). Retrieved from https://zakon.rada.gov.ua/laws/show/z0937-17/print.

[2]Order of the Ministry of Internal Affairs of Ukraine No. 357 "On Instruction from the Organization of Response to Statements and Reports About Criminal, Administrative Offences or Events and Operational Information in Bodies (Subdivisions) of the National Police of Ukraine". (2020, April). Retrieved from https://zakon.rada.gov.ua/laws/show/z0443-20#Text.

[3]Criminal Code of Ukraine. (2001, May). Retrieved from https://zakon.rada.gov.ua/laws/show/2341-14#Text.

[4]Code of Civil Protection of Ukraine. (2012, October). Retrieved from https://zakon.rada.gov.ua/laws/show/5403-17?find=1&text=%D0%B0%D0%B2%D0%B0%D1%80%D1%96% D0%B9%D0%BD%D0%BE#Text.

[5]Law of Ukraine No. 2163-VIII "On the Main Principles of Ensuring Cyber Security of Ukraine". (2017, October). Retrieved from https://zakon.rada.gov.ua/laws/show/2163-19#Text.

[6]Law of Ukraine No. 2469-VIII "On the National Security of Ukraine". (2018, June). Retrieved from https://zakon.rada.gov.ua/laws/show/2469-19#Text.

"On Critical Infrastructure"[1], the Decision of the National Security and Defence Council of Ukraine of October 30, 2021 "Strategy For Ensuring State Security"[2], etc. The theoretical basis of the research was scientific works that examined certain aspects of the organisational and legal basis for ensuring the safety of critical infrastructure facilities (Biryukov, 2015; Yurii Belousov: We consider..., 2023). Data on criminal legal protection of critical infrastructure facilities were also important (Taran & Sandul, 2019; Kucherina & Olejnikov, 2021). The basics of forensic support for countering criminal offences at critical infrastructure facilities were identified as important (Batiuk & Yevtushenko, 2022; Fediuk, 2022).

From a methodological standpoint, the study is based on the general laws and categories of the theory of cognition. To solve the research tasks, a diagnostic method of cognition of social and legal phenomena and concepts in their development and interdependence was used. Formal logical methods of analysis and synthesis, induction, deduction, analogy, etc., were the basis for the study and analysis of laws and regulations, analytical materials, concepts, and opinions of researchers on individual issues that were included in the subject of study. Other theoretical and empirical research methods were also used. For example, with the help of descriptive-analytical and hermeneutical methods, the analysis of interpretations of legal (juridical) categories was carried out, definitions and clarifications of the terminology were formed, and proposals were developed to improve the current Ukrainian legislation on the topic under study. Comparative legal and formal legal methods were used to analyse laws regulating certain issues related to the organisation of pre-trial investigation and the specifics of conducting individual investigative (search) actions. With the help of data analysis, conclusions and proposals were formulated to improve the national system for protecting critical infrastructure by making appropriate changes and additions to the provisions of laws and bylaws that regulate certain issues of criminal liability for encroachment on infrastructure facilities, as well as the specifics of organising investigations of this category of criminal offences.

The empirical basis of the study consists of analytical and statistical materials of the Ministry of Internal Affairs (MIA) of Ukraine, the Office of the Prosecutor General, and the Security Service of Ukraine on issues related to the pre-trial investigation of criminal offences related to damage or destruction of critical infrastructure facilities in 2022-2023 as a result of Russian military aggression against Ukraine (Crimes committed by..., 2023).

Results

General characteristics of criminal offences targeting critical infrastructure

In a general sense, criminal offences involving critical infrastructure can be divided into those that, firstly, are directly aimed at destroying or damaging critical infrastructure facilities. That is, when the perpetrator deliberately commits an act aimed at disrupting the normal functioning of life support facilities, which is the main goal. The motives in this case may be different and do not affect the qualification of a socially dangerous act. Secondly, those where the disruption of critical infrastructure facilities is not an end goal for the perpetrator, but a means of achieving another goal, which may or may not be directly related to these acts. For example, considering such a criminal offence as sabotage (Article 114 of the Criminal Code of Ukraine)[3], then the subject of its criminal encroachment may be specific critical infrastructure facilities that ensure the security and protection of the state in the economic, environmental, military, political or any other sphere, illegal interference in which contributes to the weakening of the state. These facilities may include power plants, water, oil, and gas pipelines, bridges, dams, reservoirs, information and telecommunications systems, railway stations, airports, sea or river ports, and other business entities, regardless of their ownership forms, that produce or provide vital functions and/or services for the state and its population, violation of the operating mode of which may lead to unpredictable consequences for the national security, defence of the country, and the well-being of its citizens. Therewith, a mandatory feature of the objective side of criminal offences involving critical infrastructure facilities is the presence of a causal relationship between criminal acts and socially dangerous consequences.

Depending on the significance of the facility, the nature of the consequences caused may have a facility-based, local, regional (industry), state, and sometimes international level of danger. As an example, such facilities can include enterprises, institutions, and organisations that ensure the functioning and development of the food, chemical, nuclear industry, military-industrial complex, financial sector, civil protection of the population, etc. In this context, the main factors that affect the qualification of criminal offences that encroach on the regular functioning of critical infrastructure facilities are the category of

[1]Law of Ukraine No. 1882-IX "On Critical Infrastructure". (2021, November). Retrieved from https://zakon.rada.gov.ua/laws/show/1882-20#Text.
[2]Approved by the Decree of the President of Ukraine No. 56/2022 "On the Decision of the National Security and Defence Council of Ukraine. Strategy For Ensuring State Security". (2022, February). Retrieved from https://zakon.rada.gov.ua/laws/show/56/2022#Text.
[3]Criminal Code of Ukraine. (2001, May). Retrieved from https://zakon.rada.gov.ua/laws/show/2341-14#Text.

their criticality, the scale and nature of socially dangerous consequences caused, the number of forces and means involved in their elimination, the organisation of participants in the criminal offence, the methods of its commission, and the purpose and motives that prompted the perpetrator(s) to implement criminal actions.

With this in mind, criminal offences against the security of critical infrastructure are mostly mixed in nature, which refers to other laws and regulations that define the most important infrastructure facilities for the state and its society, the procedure for their identification, registration, categorisation, and certification, as well as rules for their operation, protection, and safety. According to the Law of Ukraine "On Critical Infrastructure"[1], the list of these facilities should be contained in the appropriate automated register, the development and maintenance of which is entrusted to the authorised central state authority in the field of critical infrastructure protection. The complexity of this issue lies in the fact that at the time of the study, the specified body and register have not yet been established in Ukraine, and this, in turn, makes it difficult for an authorised official to make correct operational-tactical and procedural-based decisions on the prevention, detection, termination, disclosure, and investigation of criminal offences involving critical infrastructure facilities.

The provisions of the law of Ukraine on criminal liability also do not give clear answers to this issue. Despite the fact that the Criminal Code of Ukraine (hereinafter - CC of Ukraine)[2] does not define such a generic object of criminal offences as "security of critical infrastructure", a similar concept is contained in the dispositions provided for in Article 259 (Deliberately false information about a threat to the security of citizens, destruction or damage to property) and Article 360 (Intentional damage or destruction of telecommunications networks) of the CC of Ukraine. In particular, Part 2 of Article 259 referred to the qualification features of this criminal offence if its subject is "critical infrastructure facilities". A similar term is used in the note to Article 360 of the CC of Ukraine, combined with such an assessment category as "grave consequences". In other words, the consequences that led to the termination of the provision of telecommunications services at critical infrastructure facilities.

Not limited to these articles, critical infrastructure can also act as an object, subject, or place of commission of other criminal offences. Considering the special importance of certain sectors of critical infrastructure for the functioning of the state, the legislator identified special types of criminal offences related to the destruction or damage of property. This means those independent elements of criminal offences, the objective side of which is characterised by the commission of a socially dangerous act, which consists in the destruction or damage of separately defined critical infrastructure facilities. These facilities included enterprises, institutions, organisations of their systems and structured elements that ensure the activities of the electric power industry, the nature reserve fund, housing and communal services, nuclear energy, transport communications, the military-industrial complex, etc. (Anufriev *et al.*, 2023).

Along with this, the security of critical infrastructure can also act as an additional qualification feature of criminal offences under Articles 194 (Intentional destruction or damage to property), 195 (Threat of destruction of property), 196 (Negligent destruction or damage to property), 197 (Violation of obligations to protect property), 219 (Bringing to bankruptcy), 233 (Illegal privatisation of state and municipal property), 270 (Violation of fire or man-made safety requirements established by law), 280 (Coercion of transport workers to fail to perform their duties) of the CC of Ukraine[3]. Therefore, it is proposed to separately supplement the dispositions of these criminal law norms with additional qualification features in case these acts encroach on critical infrastructure facilities. Under this condition, the subject of these criminal attacks can only be those facilities that are not classified as special types of criminal offences provided for in the CC of Ukraine. These proposals will provide additional guarantees for the protection of critical infrastructure from criminal attacks and play an important role in the proper organisation of pre-trial investigation of criminal offences involving critical infrastructure.

Features of organising the investigation of criminal offences involving critical infrastructure

The specifics of organising the investigation of crimes committed at critical infrastructure facilities are informing the authorised bodies in the field of critical infrastructure protection about the occurrence of an emergency situation at the facility, in order to carry out urgent actions to eliminate its consequences, conduct rescue and restoration work. After an emergency situation occurs at a critical infrastructure facility, the critical infrastructure operator must immediately notify the relevant sectoral and functional authorities in the field of critical infrastructure protection, local executive authorities and civil-military administration.

[1]Law of Ukraine No. 1882-IX "On Critical Infrastructure". (2021, November). Retrieved from https://zakon.rada.gov.ua/laws/show/1882-20#Text.
[2]Criminal Code of Ukraine. (2001, May). Retrieved from https://zakon.rada.gov.ua/laws/show/2341-14#Text.
[3]Ibidem, 2001.

The information in the message must contain data on the time and place of the incident, its circumstances, consequences, the intended or already known cause, the organisation of medical care for injured persons, their number, the estimated number of victims, etc.

The organisation of emergency rescue operations should be carried out immediately, while simultaneously taking measures to restrict access to the scene of an accident by unauthorised persons. The scene of an accident must be assessed regarding the likely location of potentially dangerous objects on its territory. This will ensure the safety of persons involved in the elimination of the consequences of an emergency and conducting procedural actions. The complex of dangerous factors that occur after an explosion or fire is also considered by determining the danger and emergency zones[1]. The presence of people within the "danger zone" and any work within it is prohibited (The Security Service…, 2013). Elimination of the consequences of an emergency situation is carried out only after the final elimination of dangerous factors in the area of emergency rescue operations. If there is information about possible radiation, chemical or bacteriological (biological) contamination of the environment, the work should be carried out with the participation of qualified specialists in the relevant field of knowledge in compliance with all existing facility or departmental instructions (Ratushnyi *et al.,* 2020; Tertyshnyk, 2022).

The next feature of organising a crime investigation is the organisation of protection of the scene of an accident and the involvement of the necessary participants in its conduct. Having received a message about the occurrence of an emergency situation at the critical infrastructure facility, the relevant investigation team is urgently sent to the scene of the incident. Depending on the nature of the emergency situation and the category of criticality of the facility, representatives of various law enforcement agencies may arrive at the scene, which complicates the process of making operational decisions by authorised subjects of the national critical infrastructure protection system. Therefore, it is proposed to regulate the formation and activities of permanent departmental and interdepartmental teams for the investigation of criminal offences involving critical infrastructure facilities. In the future, this provided an opportunity to organise and conduct joint exercises to work out the notification scheme, the immediate departure system, and coordinate the actions of each participant of the investigation team at the incident site.

Such an investigation team should include a prosecutor, an investigator (group of investigators), a forensic specialist, and employees of the relevant operational units, depending on the jurisdiction of the criminal offence. In cases where the disruption of critical infrastructure facilities was caused by an explosion, an explosives specialist from the relevant expert service is involved in the inspection. Specialists of pyrotechnic units of the state emergency service may also be involved, but it is necessary to consider their lack of practical skills in the detection, registration, and removal of objects of forensic significance. When the victims are found at the scene, a specialist in the field of forensic medicine is involved in the examination. Depending on the circumstances and the number of victims, it is advisable to involve emergency doctors and psychologists to participate in the examination. If it is necessary to use police tracking dogs, specialist dog handlers are invited to conduct the inspection (Selyukov, 2022). Competent assistance can also be provided by employees of a critical infrastructure facility who are aware of its design features (Batiuk, 2021).

Before starting the inspection, each of the investigation team participants must be provided with special personal protective equipment (respirators, hard hats, gloves, overalls, etc.) and the necessary technical equipment for its implementation (photo and video cameras, dosimeters, rangefinders, etc.). In order to facilitate the process of cognition, it is advisable to involve a specialist operator of an unmanned aerial vehicle in the inspection, which would allow the participants of the inspection to analyse the scene of the incident from top to bottom and better simulate the past event. In addition, the use of UAVs will significantly speed up the inspection, which will have a positive impact on the time of restoration work (Yefimenko, 2022). Without violating the principle of unity of command, depending on the scope of the necessary work, it is recommended to allocate the relevant subgroups of investigators, specialists, and operational workers as part of the investigation team, including a separate group that would ensure security at the scene of an accident and communicate with the media.

The last stage of the investigation of criminal offences is to conduct an incident site inspection. In criminal proceedings involving critical infrastructure facilities, an incident site inspection is one of the most complex and important investigative (search) actions with a clearly defined specifics of its implementation. Delay in the examination inevitably leads to the loss of evidence and a change in the primary environment due to the instability of individual traces and conditions that resulted in this event. At the same time, the importance of functioning of critical infrastruc-

[1]Order of the Ministry of Energy and Coal Industry No. 282 "On the Approval of Methodological Recommendations for the Execution of Works During the Liquidation of Oil and Gas Wells and Open Oil and Gas Fountains". (2015, May). Retrieved from https://ips.ligazakon.net/document/FN011106.

ture facilities requires prompt elimination of the consequences of an emergency (Komisarov *et al.,* 2022). Therefore, with the arrival of the investigation team at the scene, emergency rescue operations may not yet be completed. At this stage, all efforts should be coordinated for careful video and photo recording of the situation that is observed at the time of arrival.

If many criminally significant traces may be lost, it is advisable to conduct an inspection in parallel with emergency rescue operations. If possible, the investigator should immediately coordinate their actions in such a way as to ensure the preservation of criminally significant traces located next to the restoration work. First of all, those facilities that require immediate restoration or evacuation should be examined. Upon arrival at the scene, the investigation team should assess the extent of the emergency and the presence and number of victims. If there are victims at the scene, it is necessary to find out whether they were provided with assistance and, if necessary, take urgent measures to provide it. Next, measures are taken to protect the scene of the accident, link it and, if necessary, expand it.

Before starting the inspection, the safety of the persons participating in it must be ensured. All necessary measures are being taken to prevent unauthorised persons from appearing at the scene, including in the "danger zone". Investigation team is also outside of it. Group members should be instructed to comply with personal safety measures. If there is a risk of an explosion, the inspection does not begin without involving the relevant specialists of the explosives service. When explosive devices or unexploded ordnance are detected at the scene, the team leader, together with the relevant specialist, makes a decision on their neutralisation or/or destruction at the scene of the event or outside it. Neutralisation or destruction of explosive objects is carried out by a qualified specialist in compliance with all existing rules and instructions for performing such work (Klymas, 2022).

Due to possible large-scale destruction and the large number of facilities that need to be examined, the inspection time increases, and sometimes even up to several weeks. In this case, the territory of the scene of an accident is divided into smaller sections, the inspection of which is entrusted to a specific investigator of this group. The investigator's interaction with other participants in the examination should be organised in such a way that he has the opportunity to constantly maintain communication with them. The investigator also needs to consider the fact that the relevant (departmental) commission can simultaneously conduct an internal investigation at the scene of the incident. Therefore, the investigator needs to familiarise themself with the functional duties of the chairman of this commission and its composition. The results of an internal investigation can serve as auxiliary materials for planning and conducting further procedural actions (Taran *et al.,* 2020; Syvodyed, 2023).

During the inspection, special attention is paid to the places of destruction or damage to critical infrastructure facilities, their systems and elements, and the presence of foreign objects within their borders. If they are difficult to describe, their diagrams, plans, and photo images are attached to the protocol, and competent employees are invited to log them. If particularly dangerous objects (nuclear, chemical, thermobaric ammunition, etc.) are found at the scene of an accident, the inspection is immediately stopped until the arrival of appropriate specialists. If the facility is completely destroyed and is a construction ruin, it is necessary to carry out disassembly, first examining the destroyed fragments.

It is advisable to conduct other investigative (search) actions simultaneously with the inspection. Operational officers are instructed to identify eyewitnesses and victims, organise the protection of the scene and traces that were not examined, collect information about persons who were within the event, preserve technical documentation describing the activities of the critical infrastructure facility, help in carrying out rescue operations, etc.

Discussion

Analysing the current state and prospects for improving the legislative regulation of the grounds for criminal liability for crimes that encroach on critical infrastructure facilities, O. Taran & O. Sandul (2019) point to the fact that the provisions of the current CC of Ukraine do not contain specially defined norms that would provide for liability for socially dangerous acts that encroach on critical infrastructure facilities. Considering this circumstance, the authors propose to introduce a separate article in section 1 of the Special part (Crimes against the foundations of national security), which would provide for criminal liability for encroachment on critical infrastructure facilities[1].

Denying the feasibility of implementing these changes and additions, S.Ye. Kucherina & D.O. Olejnikov (2021) argue that at the present stage, the level of criminal legal protection of critical infrastructure facilities is insufficient and unsystematic. The reason for this is that, first of all, the legislation of Ukraine on criminal liability does not have an individualised approach to critical infrastructure in general and its facilities in particular. That is, criminal

[1]Criminal Code of Ukraine. (2001, May). Retrieved from https://zakon.rada.gov.ua/laws/show/2341-14#Text.

legal protection of critical infrastructure facilities is carried out at the level of the subject of other objects of criminal offences of a more general nature, and secondly, the current legislation, which establishes responsibility for socially dangerous acts, does not consider current trends in the development of organisational and legal bases of critical infrastructure, as a result of which the ability to fully protect the interests of the state and society, which are implemented in this area, is lost. Given the above, researchers propose to review the list of general objects of criminal legal protection and to include the protection of critical infrastructure in the tasks of the CC[1] of Ukraine. These changes, according to the researchers, will contribute to the introduction of separate criminal liability for encroachment on critical infrastructure facilities, which in the future will provide it with additional protection through existing criminal legal means.

Holding similar views, V. Fediuk (2022) draws attention to the provisions of the Law of Ukraine "On critical infrastructure"[2] in the preamble of which it is noted that this law is a component of legislation in the field of national security. Despite this, when forming an idea of "critical infrastructure facilities", the legislator draws attention to the importance of their functioning not only for national security but also for the economy of the country, its defence, and other areas of state activity that affect national interests. In other words, this means that the vital interests of a person, society, and the state depend on the proper functioning of critical infrastructure facilities, the implementation of which ensures the state sovereignty of Ukraine, its progressive democratic development, and safe living conditions and the well-being of citizens.[3] In this context, encroachments on critical infrastructure cannot only affect relations in the field of ensuring the foundations of national security. Violation of the operating mode of critical infrastructure facilities destabilises other public relations and creates obstacles to the implementation of functions, the production of goods, and the provision of services that are vital for people and the country's activities. Researchers define "vital goods and services" as those goods and services that meet the basic needs of the country and its citizens, including the functioning of the national security and defence systems. In turn, "vital functions of the state" imply any activities of the state or private structures that create conditions and mechanisms for human life and functioning of the country in peacetime, in conditions of emergency and martial law and a state of war (Sakhanyuk, 2020; Franchuk *et al.,* 2021).

Therefore, agreeing with V. Fediuk (2022), when defining areas for improving the criminal legal protection of critical infrastructure facilities, it is necessary to consider a number of their inherent features and criteria that determine their social, political, and economic significance for ensuring the country's defence, security of citizens, society, the state, and the rule of law. In fact, such criteria include, firstly, the provision of functions and/or obedience by these facilities that are vital for the state and its society, secondly, the existence of external and internal challenges and threats (their vulnerability) in relation to these facilities, thirdly, the probability of causing significant (major) damage to the normal living conditions of the population, and fourthly, the scale and duration of elimination of negative consequences in case of unauthorised interference in their work (Biryukov, 2015; Tkalya, 2022). Given the above, researchers refer to these facilities enterprises, institutions, and organisations that are of strategic importance for the economy and security of the state, are potentially dangerous, classified as civil protection, are subject to mandatory protection and defence in an emergency, are particularly important for the energy sector and the oil and gas industry, provide the activities of conference communication systems, emergency services, payment services and electronic communications, ensure the functioning of the agricultural and industrial complex, food industry, educational institutions, healthcare, cultural and educational and national-patriotic education, etc.

Summing up the above, it is worth noting that the security and protection of critical infrastructure facilities in criminal law have different generic objects. This gives grounds to consider the prospects for improving the criminal legal protection of critical infrastructure within the framework of making certain dispositive additions to existing norms, through the establishment of additional qualification features in the event that these acts encroach on critical infrastructure facilities. For example, Part 2 of Article 194 of the CC of Ukraine[4] is proposed to be supplemented with a note if: "intentional destruction or damage to someone else's property, which caused large-scale damage to critical infrastructure facilities." In this case, only those critical infrastructure facilities that are not classified as special types of criminal offences under Articles 194-1 (Intentional damage to electric power facilities) 252 (Intentional destruction or damage to territories taken under state protection and objects of the nature reserve fund), 411 (Intentional destruction or damage to military property) 270-1 (Intentional destruction or

[1]Criminal Code of Ukraine. (2001, May). Retrieved from https://zakon.rada.gov.ua/laws/show/2341-14#Text.
[2]Law of Ukraine No. 1882-IX "On Critical Infrastructure". (2021, November). Retrieved from https://zakon.rada.gov.ua/laws/show/1882-20#Text.
[3]Law of Ukraine No. 2469-VIII "On the National Security of Ukraine". (2018, June). Retrieved from https://zakon.rada.gov.ua/laws/show/2469-19#Text.
[4]Criminal Code of Ukraine. (2001, May). Retrieved from https://zakon.rada.gov.ua/laws/show/2341-14#Text.

damage to housing and communal facilities) may be the subject of this criminal offence.

Special attention should be paid to the specifics of organising pre-trial investigation of criminal offences involving critical infrastructure facilities. In this context, forensic methodology becomes important (Yefimov & Pyrig, 2022), which is the basis for developing appropriate recommendations for organising and conducting pre-trial investigations of certain types of criminal offences (Mudretskyi, 2019). Given the totality of objective and subjective features that allow qualifying a socially dangerous act as a specific criminal offence, criminalistics proposed to classify criminal offences, including by the object of criminal encroachment (Guseva, 2019). In this regard, it is worth noting that at the present stage of the development of criminalistics, the definition of individual methods for investigating criminal offences at critical infrastructure facilities is still in its infancy. The reason for this is that, firstly, for Ukrainian legislation, public relations on the protection and security of critical infrastructure are relatively new, and secondly, due to the lack of full functioning of the central state authority in the field of protection of critical infrastructure, in Ukraine, the corresponding list of facilities has not yet been formed.

Along with this, exploring the problematic aspects of forensic support of criminal offences at critical infrastructure facilities, O. Batiuk (2021) suggests that their content include such elements as forensic characteristics of criminal offences at critical infrastructure facilities; circumstances to be established and proved; features of detection of criminal offences at critical infrastructure facilities; typical investigative situations that arise at the initial and subsequent stages of the investigation; typical versions and features of Investigation planning; features of using special knowledge; features of interaction of relevant participants in criminal proceedings; features of the organisation of investigation team in the conditions of its work at the critical infrastructure facility where emergency situation has occurred; identification of the causes and conditions that contributed to the commission of a criminal offence; features of using forensic information databases in the investigation of the relevant category of criminal offences, etc.

Given the above, it can be concluded that at the present stage of the development of forensic science, topical issues of the methodology for investigating criminal offences at critical infrastructure facilities are open for discussion and require further scientific research. Considering the limits of the paper, the specifics of organising pre-trial investigation of criminal offences involving critical infrastructure, and, in this case, conducting an incident site inspection as one of the most complex investigative (search) actions of this category of criminal offences were revealed.

■ Conclusions

Thus, the results of the scientific analysis indicate that the legislation on critical infrastructure and its protection is part of the legislation in the field of national security, the norms and provisions of which determine the legal and organisational basis for the creation and functioning of the national system for the protection of critical infrastructure. Persons guilty of violating these regulations are liable as defined by law. Thus, critical infrastructure facilities can be the object, subject, or place of commission of a criminal offence not only at the national level, but also be the subject of consideration by international instances. Despite the urgency of this issue, the level of criminal legal protection of critical infrastructure facilities in the norms of the current Criminal Code of Ukraine is insufficient. The main reason for this is that due to the lack of a fully functioning central executive body in the field of critical infrastructure protection, Ukraine has not yet formed a statutory register of critical infrastructure facilities. In addition, the process of identifying critical infrastructure facilities is permanent and may change depending on internal and external challenges and threats that affect the level (degree) of protection of national interests.

At the same time, the functioning of the national system of protection of critical infrastructure forces the legislator to supplement certain norms of the special part of the CC of Ukraine with additional qualification features that would provide for liability for destruction or damage to critical infrastructure facilities. In this context, the types of criminal offences involving critical infrastructure can be conditionally divided into special, that is, those that encroach on the object of a particular sector of critical infrastructure (Article 194-1 of the CC of Ukraine) and general (Article 194 of the CC of Ukraine), encroach on other, not separately allocated critical infrastructure facilities.

Considering the importance of the functioning of critical infrastructure facilities, from a practical standpoint, additional regulatory and methodological support is also required for issues related to the priority actions of authorised subjects for the protection of critical infrastructure after receiving information about the occurrence of an emergency situation at the critical infrastructure facility, their interaction on the prevention, detection, termination, disclosure, and investigation of criminal offences involving critical infrastructure facilities, as well as the specifics of organising priority investigative (search) actions under a state of emergency.

■ Acknowledgements

None.

■ Conflict of Interest

None.

References

[1] Al-abassi, A., Jahromi, A.N., Karimipour, H., Dehghantanha, A., Siano, P., & Leung, H. (2022). A self-tuning cyber-attacks' location identification approach for critical infrastructures. *Institute of Electrical and Electronics Engineers Transactions on Industrial Informatics,* 18(7), 5018-5027. doi: 10.1109/TII.2021.3133361.

[2] Anufriev, M.I. *et al.* (2023). *Scientific and practical commentary on the Criminal Code of Ukraine*. In I.M. Kopotun (Ed.). Kyiv: "KNT".

[3] Batiuk, O. (2021). *Forensic support for combating crimes at critical infrastructure facilities*. Lutsk: Volyn Polygraph.

[4] Batiuk, O., & Yevtushenko, I. (2022). The importance of the science of forensics in ensuring countermeasures against crimes at critical infrastructure facilities. *Honor and Law,* 2(81), 42-47. doi: 10.33405/2078-7480/2022/2/81/263764.

[5] Biryukov, D.S. (2015). Protection of critical infrastructure in Ukraine: From scientific understanding to the development of policy principles. *Scientific and Information Bulletin of the Academy of National Security,* 3(4), 155-170.

[6] Chowdhury, N., & Gkioulos, V. (2021). Key competencies for critical infrastructure cyber-security: A systematic literature review. *Information and Computer Security,* 29(5), 697-723. doi: 10.1108/ICS-07-2020-0121.

[7] Crimes committed by the Russian military during the full-scale invasion of Ukraine. (2023). Retrieved from https://www.npu.gov.ua/news/zlochyny-vchyneni-viiskovymy-rf-pid-chas-povnomasshtabnoho-vtorhnennia-v-ukrainu-stanom-na-29052023.

[8] Ducaru, S.D. (2017). The security of critical energy infrastructure in the age of multiple attack vectors: NATO's multi-faceted approach. *Europolity-Continuity and Change in European Governance*, 11(1), 5-20. doi: 10.25019/europolity.2017.11.1.01.

[9] Fediuk, V. (2022). The Law of Ukraine "On Critical Infrastructure": Issues of criminal law. In *International scientific conference* (pp. 229-233). Riga: Baltic International Academy. doi: 10.30525/978-9934-26-229-6-59.

[10] Franchuk, V.I., Pryhunov, P.Ya., & Melnyk, S.I. (2021). Security of critical infrastructure facilities in Ukraine: Organizational and regulatory problems and approaches. *Social and Legal Studies*, 3(13), 142-148.

[11] Guseva, V. (2019). Forensic classification of crimes: Current state of scientific support and prospects for further research. *National Law Journal: Theory and Practice*, 3(1), 151-156.

[12] Klymas, R. (2022). Inspection of the fire site in the presence of explosive objects by specialists of the research and testing laboratories of the State Emergency Service under martial law. In *The European choice of Ukraine, the development of science and national security in the realities of large-scale military aggression and global challenges of the 21st century: Materials International scientific-practical conferences* (pp. 440-444). Odesa: "Helvetyka" Publishing House.

[13] Komisarov, O., Batyuk, O., & Pavlov, S. (2022). Forensic and military combat support against terrorist and sabotage threats at critical infrastructure facilities. *Honor and Law*, 4(79), 33-39. doi: 10.33405/2078-7480/2021/4/79/251498.

[14] Kucherina, S.Ye., & Olejnikov, D.O. (2021). Current state of criminal and legal protection critical infrastructure facilities. *Information and Law,* 1(36), 90-98. doi: 10.37750/2616-6798.2021.1(36).238187.

[15] Lordan-Perret, R., Wright, A.L., Burgherr, P., Spada, M., & Rosner, R. (2019). Attacks on energy infrastructure targeting democratic institutions. *Energy Policy,* 132, 915-927. doi: 10.1016/j.enpol.2019.06.025.

[16] Mudretskyi, R. (2019). Forensic classification of methods of countermeasures against judicial review of criminal proceedings. *Entrepreneurship, Economy and Law*, 6, 306-312. doi: 10.32849/2663-5313/2019.6.57.

[17] Nicol, D.M. (2018). Cyber risk of coordinated attacks in critical infrastructures. In *2018 Winter simulation conference (WSC)* (pp. 2759-2768). Gothenburg: Publisher Institute of Electrical and Electronics Engineers Inc. doi: 10.1109/WSC.2018.8632318.

[18] Ratushnyi, R.T., Loyik, V.B., Synel'nikov, O.D., & Koval'chuk, V.M. (2020). *Organization of emergency and rescue work: Training manual*. Lviv: Lviv State University Security of Life Activities.

[19] Sakhanyuk, O.M. (2020). *Types of vaccines and their development. Vaccination as the most effective method of protecting the population from infectious diseases.* Retrieved from https://www.dec.gov.ua/wp-content/uploads/Conference/2020/6/section/9/s9f3.pdf.

[20] Selyukov, V. (2022). Prospects for improving legal regulation in the field of canine activity in Ukraine. *Entrepreneurship, Economy and Law*, 11, 153-158. doi: 10.32849/2663-5313/2020.11.26.

[21] Syvodyed, I. (2023). Investigating genocide and ecocide in wartime conditions. *Scientific works of the Interregional Academy of Personnel Management. Legal Sciences*, 2(62), 59-64. doi: 10.32689/2522-4603.2022.2.9.
[22] Taran, O., & Sandul, O. (2019). Issue of criminal liability for offences against critical infrastructure objects in nuclear industry. *Nuclear and Radiation Safety,* 3(83), 58-67. doi: 10.32918/nrs.2019.3(83).07.
[23] Taran, O.V., Sushchenko, V.D., Yefimenko, I.M., Khutoryanskyi, O.V., Griga, M.A., & Kuchmenko, S.V. (2020). *Investigation of crimes against production safety*. In S.S. Chernyavskyi (Ed.). Kyiv: National Academy of Internal Affairs.
[24] Tertyshnyk, V.M. (2022). *Constitution of Ukraine. Scientific and practical commentary*. Kyiv: Alerta.
[25] The Prosecutor General's Office considers Russian attacks on energy facilities as part of the crime of genocide. (2023). Retrieved from https://www.ukrinform.ua/rubric-ato/3668749-v-ofisi-genprokurora-rozgladaut-ataki-rf-na-energoobekti-ak-skladovu-zlocinu-genocidu.html.
[26] The Security Service of Ukraine prevented attempts to hack the state electronic system in the field of construction. (2013). Retrieved from https://ssu.gov.ua/novyny/sbu-zapobihla-sprobam-zlamu-derzhavnoi-elektronnoi-systemy-u-haluzi-budivnytstva-video.
[27] Tkalya, O.V. (2022). National interests and values as the basis for the existence and development of the national state. *Legal Scientific Electronic Journal,* 4, 58-61. doi: 10.32782/2524-0374/2022-4/12.
[28] Vasyutynska, L.A. (2021). Theoretical aspects of infrastructure research in the context of the project approach. *Problems of Innovation and Investment Development,* 25, 16-22. doi: 10.33813/2224-1213.25.2021.2.
[29] Yefimenko, I. (2022). Modern possibilities of using unmanned aerial vehicles by police bodies and units: International and domestic experience. *Scientific Bulletin of the National Academy of Sciences*, 27(3), 65-77. doi: 10.56215/0122273.65.
[30] Yefimov, M.M., & Pyrig, I.V. (2022). *Methods of investigation of certain types of criminal offenses*. Dnipro: Bila K.O. Publisher.
[31] Yurii Belousov: We consider enemy attacks on critical infrastructure as a component of the crime of genocide. (2023). Retrieved from https://www.gp.gov.ua/ua/posts/yurii-bjelousov-ataki-voroga-na-kriticnu-infrastrukturu-mi-rozglyadajemo-yak-skladovu-zlocinu-genocidu.
[32] Zhu, H., Zhang, Ch., Ramirez-Marquez, J.E., Wu, S., & Monroy, R. (2021). The integration of protection, restoration, and adaptive flow redistribution in building resilient networked critical infrastructures against intentional attacks. *Institute of Electrical and Electronics Engineers Systems Journal,* 15(2), 2959-2970. doi: 10.1109/JSYST.2020.3039466.

Критична інфраструктура як об'єкт злочинного посягання: загальна характеристика й особливості організації розслідування

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■ **Анотація.** Нові технології, які використовують в інфраструктурних системах, додають складності управлінню та захисту цих систем, а тому розгляд питань, пов'язаних зі злочинними посяганнями на критичну інфраструктуру, й організація розслідувань набувають важливого значення. Основною метою було дослідження проблемних аспектів та унікальних рис організації досудового розслідування злочинів, які вчинено на об'єктах критичної інфраструктури. Методологічний інструментарій наукового дослідження ґрунтувався на діагностичному методі для вивчення соціальних і правових явищ, аналітичному, догматичному, порівняльно-правовому, формально-юридичному й методі моделювання. За результатами дослідження було комплексно проаналізовано сучасний стан норм кримінального права, які регулюють підстави кримінальної відповідальності за кримінальні правопорушення, об'єктами яких є критична інфраструктура. На підставі оцінювання сучасного стану кримінально-правової охорони об'єктів критичної інфраструктури встановлено, що вона є недостатньою та потребує вдосконалення. Запропоновано доповнити норми Особливої частини Кримінального кодексу України додатковими кваліфікаційними ознаками, які встановлювали б кримінальну відповідальність за посягання на об'єкти критичної інфраструктури. Актуалізовано питання розроблення єдиної концепції захисту об'єктів критичної інфраструктури від кримінальних правопорушень за допомогою комплексного науково-практичного підходу до формування та оцінювання криміналістичного забезпечення протидії кримінальним правопорушенням, об'єктами яких є критична інфраструктура. Окреслено конкретні кроки з удосконалення нормативно-правових актів, які визначають особливості організації розслідування на об'єктах критичної інфраструктури та проведення у зв'язку із цим першочергових слідчих (розшукових) дій. Практична значущість одержаних результатів полягає у формуванні та аргументації висновків і пропозицій з удосконалення системи захисту критичної інфраструктури від злочинних посягань

■ **Ключові слова:** захист життєво важливих об'єктів; об'єкти підвищеної небезпеки; розслідування кримінальних правопорушень; надзвичайна ситуація; слідчо-оперативна група; огляд місця події