

DEFINITION OF HAZARDS AND THREATS OF THE NATIONAL MARITIME AREAS

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Abstract: *The report shall identify the hazards and the threats acting on the security and safety of the territorial waters considering the time-spatial impact on the national maritime areas.*

Keywords: *hazards and threats, security and safety, maritime areas*

In the Black Sea, which has always been the object of particular attention because of its geo-strategic importance, are located sea space of the Republic of Bulgaria and its maritime border of 378 km. They fit in the Mediterranean-Black Sea region, which is currently developing as a significant importance to the global economy. Through it pass important energy, information and transport communications. National interests of our country objectively in terms of dependence on all businesses related to shipping and related activities in the region. The successful implementation of large-scale maritime and economic activities is directly linked to prospects for economic prosperity of our society, and here - and ensuring national sovereignty. A significant part of the gross domestic product of the Republic of Bulgaria is associated with exploiting the sea or carried on the Black Sea coast. The realization of large-scale energy infrastructure, communications and transport international projects in the first two decades of the century, for which our country has already taken relevant commitments is dependent on the environment of safety and security in the region.

Definition of main concepts

National maritime spaces – defined in the UN Convention of Law of the Sea 1982, whose norms are reproduced in national documents (Fig. 1).

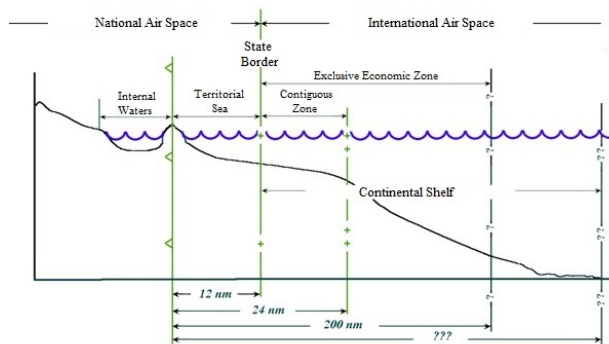


Fig. 1 Categories Maritime spaces (general case)

According to the Law on maritime spaces, inland waterways and ports of the Republic of Bulgaria, the Bulgarian maritime spaces are five legal categories: internal waters, territorial sea, contiguous zone, exclusive economic zone and continental shelf, which are characterized by varying degrees of sovereignty. In them the state has not only important rights and interests but and greater responsibilities. This affects the wide variety of aspects, such as the emphasis is placed on a economic activity, the shipping and industrial exploitation (including offshore activity), while ensuring security and safety for all users of the marine space.

Meaning of the word „hazard“, according to Dictionary of Bulgarian language is: „Opportunity, probability of being located manifestations have happened something worse, uncomfortable; threat.“ [13]

The interpretation of the term „hazard“ in various documents, seen from the point of view of the author, and is as follows:

„... Potentially damaging physical event, phenomenon or human activity that may cause loss of life or injury, property damage, social and economic disruption or environmental damage.“ Hazards can include hidden conditions that may represent future threats. They can have different origins: natural (geological, hydrometeorological and biological) or be caused due to human activities (environmental degradation and technological hazards). Hazards can be single, sequential or combined depending on their origin and impact. Each hazard is characterized by location, intensity, frequency and probability. [3]

„... A possible source of harm.“ [10]

„... An intrinsic property of a dangerous substance or physical situation, with a potential for causing harm / damage to human health and / or the environment.“ [4]

Meaning of the word „threat“ mentioned in the Dictionary of Bulgarian language are two: 1. „Apparent or declared intent to cause someone evil, unpleasant; intimidation“; 2. „Danger, allow the emergence of something unpleasant, bad“. [13]

J. Avramov consider the notion hazard as an activating the potential destructive factors, without having clarity when, for what purpose and in what form will begin to act. According to him, the threat gives new qualities of the environment, determining a greater degree of certainty of the probability for manifestation of a destabilizing factor. [6, p.113]

According to D. Ionchev the threat is condition of the medium, which precede the loss of control or the occurrence of crisis. To see the threat does not want either competence or look - it is obvious. [6, p.115]

The threat according to D. Bahchevanov is appropriate to be presented as a „violation of relative stability of any of the elements of security, regardless of the reasons for this instability.“ [7]

B. Mednikarov endorsed the following understanding of that concept „... is such a state of the medium directed against government institutions, NGOs, individuals and legal entities in the national maritime areas in which there is a clear possibility of negative impacts on their interests.“ [6, p.115]

In a thesaurus of Bulgarian language, the words „hazard“ and „threat“ are considered as synonyms. On the other hand, K. Kolev, distinguishes the two concepts. He considered the „threats“ as „deliberate information and physical attacks or sabotage“, while „hazards“ refer to the „natural disasters or unintentional accidents of an occasional nature.“ [7]

From the above, it is clear that the „hazard“ and „threat“ are terms which in theory made no commonly accepted definitions. For this reason, for the purposes of this study, they are used under the following working definitions:

Hazards - processes or phenomena that have unintended character which could cause injury or loss of life, property

damage, social and economic disturbances or have a harmful effect on the environment.

Threats - processes related to human activity aimed at obtaining some kind of advantage, but leading to negative consequences for the society or the activities in the national maritime areas.

From the foregoing, we can conclude that hazards could be bound with safety¹, while the threats are directly related to security².

According to the team of authors [8], the synthesis of the sources and conditions of the hazards and threats covers:

Initial assessment - includes the following operations: detection, identification, description and explanation.

Qualitative and quantitative analysis - performed on the sources and conditions for realization of the hazards and threats and includes:

✓classification of the sources and conditions of the vulnerabilities present their distribution in groups and conditions when considering their options for self and co-impact system.

✓prioritization of the sources and conditions of the vulnerabilities represent their distribution in the resistance of the components of critical maritime infrastructure. Prioritization is performed in frequency, duration and range of the impact of the vulnerability.

Summarized evaluation of the possible negative consequences of occurred hazards and threats focuses on the duration of compromised functioning of the port facilities and the related: direct losses (delay of handling, costs for repairs and others) and indirect losses (redirected cargo, lost income from unrealized loading and unloading, etc.).

European Union strategy

„European Union Strategy for Maritime Security” provides policy and strategic framework in maritime security, and it is aimed at strengthening mutual assistance between Member States and to the prevision of opportunities for joint contingency planning of security management risk, of conflict prevention, of crisis response and of crisis management. It helps for enhanced cooperation between the civil and military authorities and participants.

The strategy sets out the main threats to maritime security, which are multifaceted and can damage the strategic interests of the EU and its Member States. The following risks and threats are identified:

➤threats or use of force against the rights and the jurisdiction of the Member States on their maritime areas.

➤threats to the security of European citizens and economic interests in the sea due to acts of foreign aggression, including maritime disputes, threats of the sovereign rights of Member States or armed conflicts.

➤cross-border and organized crime, including maritime piracy and armed robbery at sea, human trafficking and smuggling of immigrants, organized criminal networks that facilitate illegal immigration, trafficking weapons and drugs and smuggling.

➤terrorism and other deliberate unlawful acts at sea and in ports against ships, crew and passengers, important maritime and energy infrastructure, including cyber attacks.

➤spreading of weapons of mass destruction, including chemical, biological, radiological and nuclear threats.

➤threats to free ship handling, such as denial of access to the sea and the straits and obstruction of maritime corridors.

➤environmental risks, including unsustainable and unlawful exploitation of natural and marine resources, threats to biodiversity, illegal, unregulated and unreported fishing, environmental degradation caused by illegal or accidental disposal of chemical, biological and nuclear contamination, specifically discharged into the sea chemical munitions and unexploded ordnance.

➤potential impact on the security of natural or manmade disasters, extreme events and climate change on maritime transport system and in particular the marine infrastructure.

➤illegal and unregulated archaeological research and looting of archaeological sites.

Nature of the hazards and threats

While most hazards cannot be avoided, it is not the case with the threats. Seeking to understand and anticipate future dangers and threats, studying the past and monitor the present, then the risk to occur fatal disaster can be minimized. Knowledge of the nature and consequences of the various hazards that could be expected with a certain frequency, level and potential geographic impact is great, but the lessons which a person takes are few. Due to the change in the security environment and safety, coastal countries and regional organizations are necessary to know the hazards and threats in the maritime areas.

The wide range of geophysical, meteorological, hydrological, ecological, technological, biological and even socio-political hazards alone or in a complex interaction might endanger the life and work at sea. Hazards and threats, on the basis of their origin, most often are subdivided into natural and technological. When environmental degradation continues to rise, the intensity, frequency and impact of hazards are also affected.

Identifying hazards – they relate to possible damage from natural disasters³ or accidental incidents during their activity at sea.

Natural hazards – these are natural processes or phenomena occurring in the biosphere that may constitute a damaging event. They can be divided into three broad categories - hydrometeorological, geological and biological, as their diversity, geographical range and types of impacts may vary significantly.

✓hydrometeorological – natural processes or phenomena of atmospheric, hydrological or oceanographic nature. In the general case, the occurrence of limit-critical hydrometeorological conditions, even if not resulting in the deposition of direct damage to perform the activities of the Sea, it is reason to take preventive measures to reduce the adverse consequences to remedy the situation.

▪ extremely strong winds (wind power over 25 m / sec) - similar weather conditions with low intensity and prevailing northeast wind direction occur in the waters of the relevant maritime areas in the Black Sea.

Possible consequences - little direct impact on sites of the offshore industry, but possible medium and heavy indirect consequences of collisions with ships (nearby to offshore installations), left without steering and not underway due to the effects rendered by the meteorological phenomenon.

▪ extreme waves (more than five bale) - similar meteorological phenomena with low intensity are observed in the waters of the relevant maritime areas in the Black Sea.

Possible consequences - from small to medium direct effects on objects of the offshore industry, but possible medium and heavy indirect consequences of collisions with ships (nearby to offshore

¹ Maritime safety is related to unintentional threats, risks and challenges. It focuses on the preservation and protection of human life, material resources and goods carried by the harmful effects of human errors, labor and the environment (under-utilized technologies, dangerous working conditions, stationary and mobile surface and underwater navigation hazards involuntary dangerous maneuver excitement, low or high temperatures, high humidity, earthquakes, etc.)

² Maritime security is focused on preventing the application of intentional damage to marine objects (ships, ports and port facilities) and their staff (crew) through sabotage, vandalism, illegal crime (trafficking in people, drugs, weapons, goods), terrorist and piracy.

³ Hazards with an undetermined nature in terms of time and scale of manifestation, and thus the uncertainty of the consequences. To some extent protection is based on frequency of appearance in the available statistical database.

installations), left without steering and not underway due to the effects rendered by the meteorological phenomenon.

- tornado – such a weather conditions with low intensity are observed in the waters of the relevant maritime areas in the Black Sea.

Possible consequences - from small to medium direct effects on objects of the offshore industry, but possible medium and heavy indirect consequences of collisions with ships (nearby to offshore installations), left without steering and not underway due to the impact incurred by the climatic phenomenon.

- mists (with limitation of visibility below 20 m) - similar weather conditions with low intensity are observed in the waters of the relevant maritime areas in the Black Sea.

Possible consequences - possible medium and heavy indirect consequences of collisions with ships (located near the site of the offshore industry) due to the effects rendered by the meteorological phenomenon.

- extreme temperatures - similar weather conditions with low intensity are observed periodically in the waters of the relevant maritime areas in the Black Sea.

- other (typhoons, tropical cyclones, ice drifts, etc.) - Similar weather phenomena observed in the waters of the relevant maritime areas in the Black Sea.

✓geological - natural earth processes or phenomena that include processes of endogenous or exogenous tectonic origin.

- earthquakes - the territorial waters of the Republic of Bulgaria are located in the area of activity of Kaliakra-Shabla seismic area, which is the second intensity seismic active area in Bulgarian spaces with predictable seismic activity of an earthquake with a magnitude of more than 7 Richter scale in the time period 70-100 years.

Possible effects - from major to severe catastrophic scale of the consequences caused by the rupture of submarine pipelines, detachment of the surface offshore facilities from their dead anchors and start their uncontrollable drift in a southerly direction, unpredictable marine pollution arising from the spill of oily substances. Similar effects were observed in a seismically active regions of the Caspian Sea, in which registered cases even sinking of the oil-upstream gas.

- other (tsunamis, volcanic activity and emissions, geological active leap, etc.) - Similar geological phenomena observed in the waters of the relevant maritime areas in the Black Sea.

✓biological - processes of organic origin or those transmitted by biological means, including exposure to pathogens, toxins and bioactive substances. Examples of such events are: outbreaks of epidemics, plant or animal disease and extensive invasion by microorganisms.

Technological hazards - they are related to technological or industrial accidents, infrastructure failures or certain human activities, which can lead to loss of life or injury, property damage, social and economic disruption or environmental degradation, as they are sometimes called anthropogenic hazards. Examples of such risks include: industrial pollution, unauthorized disposal of radioactive or toxic waste, industrial and technological disasters (explosions, fires, spills, etc.). Depending on the reason that lead to the occurrence of such a risk, they differentiate to:

✓anthropogenic - defined by actions of the subject. They are divided into internal and external:

- caused by insiders, which are divided into:
 - unintended - errors, omissions, negligence and others.
 - intentional - sabotage, vandalism, racketeering and others.
- caused by outsiders, who are divided into:

- unintended - back errors, omissions, negligence, inadequate response to emerging critical situation - like „the wrong person in the wrong place at the wrong time“, etc.

- intentional - theft, robbery, racketeering, terrorism, piracy, organized crime and others.

The unintentional are most often associated with recurrence frequency, while their research is needed to look for their cause (knowledge gaps in negligence actions performed emergency operations).

Deliberate caused by outsiders, usually performed using insider. For their implementation need to be prepared, insider information and enough time to prepare.

✓technogenic (statistics data show that they have the highest conversion rate) - are determined by technical means. Share on:

- physical:

- internal - insufficient piloted lifecycle (random nature of manifestation - technical defects leading to breakdowns and interruptions in the functioning unaccounted feedbacks, etc.).

- external - unaccounted external to the system relationships and dependencies.

- transitional - in their realization are the conveyance of negative effects from the place of occurrence of the hazard to the site of impact (the subject of sea infrastructure) or by sea infrastructure to the environment.

Prefault situations and cases with relatively low effects occur often, but are not reported and accounted, as arisen consequences are removed with the powers and resources of the crew. Indirectly for their frequency conclusions are drawn on the reports of the systematic deviations in the normal parameters adopted for the marine environment.

Cases and situations with medium-heavy effects occur relatively rarely. Typical are occasional short sharp deterioration of the accepted normal parameters of the marine environment.

Cases and situations with severe and catastrophic consequences are rarely observed. Give rise to environmental disasters marine biosphere and the coastal zone of a lasting nature.

The direct detection of such cases and situations and preventing of their conversion into systematic violations is the only possible systematic control of the state of the marine environment.

- information:

- closed systems.

- systems with „open access“.

Environmental hazards (environmental degradation) - processes caused by human behavior and activities (sometimes combined with natural hazards) that irreversibly damaging natural resources or adversely alter the natural processes or ecosystems. Potential effects are varied and may contribute to increase vulnerability, and also the frequency and intensity of natural hazards. The results of the implementation of environmental hazards are: loss of biodiversity, pollution of soil, water and air, climate change, sea level rise, ozone depletion and others.

✓environmental pollution from port activities:

- air pollution.

- water contamination from spills (fuels, oils, liquid cargo loading / unloading, unauthorized disposal of bilge and ballast water, acceptance and disposal of ballast).

- waste production.

- pollution from industrial activities.

- increasing background noise.

✓environmental pollution as a result of emergency and catastrophic events related to the activities of the Sea:

- water contamination from spills caused after collision / impact (between ships, between ships and other surface objects).
- fire, explosion or unauthorized release of hazardous substances.
- breaches in the integrity of pipelines (lying on the seabed).
- other unknown reasons.

It is necessary to pattern the conditions of environmental degradation and to create activities that restrict reaching levels of irreversible damage to the environment. Conditions of occurrence must be so limited that it does not reach such levels. Activities at sea is necessary to take measures for planning organizational events, performing periodic inspection and lessons learned from practice, as well as their realization in future activities.

Each situation response is based on behaviors that "work" in such situations. It reaches idea system to take advantage of the possibility of obtaining data from situational games in a virtual environment to analyze the data collected to establish the origin of indicators for recognizing a particular situation, and to offer management solution. The recommendation that is given is that the simulators must provide an opportunity for „case management“, by modeling specific situations, acquisition and analysis of data and suggesting particular course of action. [5]

Determination of threats - they relate to human activity aimed at getting some kind of benefit, but leading to negative impacts on developing maritime activity.

Traditional challenges, risks and threats to the territorial, ethnic, political, economic and social problems and conflicts between countries in the region. They adversely affect in defending national interests of our country in its marine areas and generate danger to its security.

New challenges, risks and threats related to the sea or resulting therefrom relate to: the resurgence of transnational organized crime; piracy; enhancing the risk of various types of terrorist acts; resurgence of smuggling and drug trafficking; uncontrolled proliferation of weapons and military technology, including WMD components; prime poaching and plundering of marine resources; refugee problems; threats to information security; the deepening of environmental concerns. Most of them are transboundary in nature and are strongly influenced not only by the national but also by the international security. We can summarize them in the following groups: [6]

Piracy - in recent years, piracy is formed as a serious threat to impair the global business at sea. According to a report on the Alliance [1], the number of pirate attacks on commercial shipping continues to decline. Around the world in 2014, 245 attacks were registered, down by 7% compared to 2013 (264 attacks in 2013) Actual figures concerning accidents in pirate activity, belittled by shipping companies due to fears of an increase in insurance premiums and lengthy investigations which could lead to loss of reputation. Piracy may have various forms of embodiment, as most often involves:

- ✓ attacking ships at sea
- ✓ attacking ships at berth or at anchor.
- ✓ kidnapping and seizure of the ship or persons onboard
- ✓ unauthorized access to cargo, essential ship equipment, systems or stocks.

Such activities do not occur in the waters in question seas in the Black Sea.

Trafficking of human beings and illegal immigration by sea

- according to a report⁴ published on the website of Frontex⁵, the

number of illegal crossing of the external borders of the EU by sea, for the second quarter of 2014 increased by 311% (61 243 emigrants) compared to the first quarter of 2014 (14,883 immigrants), with about 50% of immigrants were nationals of Eritrea and Syria. Up to date, the most injured member state of the EU in terms of immigrants by sea is Italy. Interruption of traffic and immigration by sea is particularly important due to the fact that members of terrorist organizations may use similar pathways in order to cross the border or use a dirty bomb in order to carry out terrorist attacks in seaports. This threat is expressed most often in the form of:

- ✓ illegally boarding on civilian vessel.
- ✓ withdrawal of the vessel to carry out illegal transport on sea.
- ✓ illegal shipping after payment of shipowners and others.

Such activities in the sea waters of the Black Sea are of very low intensity, due to the direction of immigration flows and the opportunities for easy crossing of land borders.

Drug trafficking and smuggling of goods and weapons and military technology, including WMD components

- performed by carrying smuggled goods in containers (with or without the knowledge of the crew members) or congestion of small boats in neutral waters and dumping of goods shore without performing regulated customs inspection. These activities are related to:

- ✓ violation of national laws and requirements of the international instruments to which Bulgaria is a party.
- ✓ violation of the customs regime of the country and discredit the country to EU partners.
- ✓ endangering public health.
- ✓ funding for organized crime and terrorist organizations, and others.

Such activities in the Black Sea are with low intensity because of the limited water area of the Black Sea and the comfortable crossing of the land borders.

Terrorism - the threat of terrorism in the maritime area may take different forms. For example, weapons or explosives can be hidden in containers or vessels and may be used as weapons to destroy a critical infrastructure. The terrorists have a wide range of opportunities through which they might commit a terrorist act, besides the coast, the terrorist organizations have long act in international waters, as there is virtually no protection for merchant shipping against this threat. On the other hand, the effects of maritime terrorism are not immune even warships, as well as significant is the case of the attack on the US destroyer Cole in 2000. Today the passage of terrorists across borders is relatively easy, as they come with refugee flows, then continue their way to the aim. It is expected, that terrorism at sea will continue to be a threat unless radical measures which are taken to promote the coordination of sharing intelligence information and the actions against this threat of interstate level. Increased ability to respond to any terrorist activity can be very valuable, which in turn requires cross-border cooperation. Terrorism at sea can have different manifestations, as the most common include the following additional threats:

- ✓ damage or destruction of the vessel (s).
- ✓ use of controlled ship as a weapon platform for damaging or destruction.
- ✓ nuclear, chemical, biological attack.
- ✓ damage or destruction of the port facility.
- ✓ blockage of port entrances, locks, approaches.
- ✓ use of the ship to carry persons intending to cause an accident and others.

⁴ Frontex Risk Analysis Network Quarterly – April-June 2014

⁵ European Agency for the Management of Operational Cooperation at the External Borders of the Member States of the European Union

Armed attack aimed at violating the sovereignty and territorial integrity of the country, associated with national maritime spaces - Black Sea region appears surrounded by potential conventional sources of instability and crises. This type of threat can be considered for failed settlement through diplomatic measures delimitation of maritime borders and the right of exploitation of marine natural resources in the exclusive economic area. Composite threats which can generate any adversary may have various forms of embodiment, as most often associated with:

- ✓ conducting reconnaissance forces and facilities in the coastal region.
- ✓ raid forces and objects from the sea, hitting the various military components.
- ✓ blocking deployment of the Navy.
- ✓ breach (break) of marine communications in the country and others.

Similar probability of occurrence of this type of negative impact on the security of the Republic of Bulgaria by another Black Sea or Mediterranean country is assessed as minimal.

Cyber threats - or even seen as threats to information security, possible hazards (potentially or actually existing) to perform an action directed against the object of protection (information resources), causing damage to the owner or user in terms of hazards distortion or loss of information. They are connected to the so called information intrusion, which may include:

- ✓ unsanctioned obtain data on the movement of attractive cargo, passengers and vessels.
- ✓ malicious re-routing of traffic at attractive cargo, passengers and vessels.
- ✓ deliberate disruption of the normal activities of the GPS systems and the means of control and traffic management of civil ships of input channels and fairways to the ports.
- ✓ unauthorized remote control systems.

Conclusion

The disclosure of the nature of the hazards and threats posed by maritime areas arises from the need to know how to prevent the conditions that cause the realization of the hazards and threats.

Prevent the occurrence of conditions, which create prerequisites for the commencement, development and escalation of risks / threats resulting on reaching particularly serious consequences.

Action can be considered generally in three areas as follows on:

- conditions of a threat or hazard.
- terms of development (realization and escalation) of hazard or threat.
- limit the consequences of the implementation of a hazard or threat

The ratio of costs for prevention to those for eliminating the effects are in the range of 1/3 to 1/5, i.e., economically feasible is to remove the conditions of occurrence than to eradicate consequences.

The actual determination of the hazards and threats allows to study the conditions for the occurrence, development and possible consequences. From this we can see that most effectively is to fight to limit the conditions for the commencement, in which case the second and third stages of realization of the hazards / threats will not be realized.

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✓ security hole in secure facilities with access control and more.

Poaching and plundering of marine resources - to this threat are assigned:

- ✓ illegal use of organic and mineral resources in the national maritime areas.
- ✓ plundering of bio-resources influenced their population.
- ✓ conducting unauthorized research on organic and mineral resources in the sea areas and others.

Such activities in the sea areas are with medium and high intensity, leading to direct losses of resources and funds for the state.

Pollution of the sea areas - as a maritime nation, the Republic of Bulgaria has adopted to implement the norms of the International Convention for the Prevention of Pollution from Ships (MARPOL 73/78) and its Protocol of 1997 and the Convention for the Prevention of Pollution the marine environment by dumping of wastes and other materials 1972 also for the sea areas of the Black Sea, RB perform regulations and other existing intergovernmental arrangements. This threat can be assigned, intentional and unintentional contamination as follows:

- ✓ deliberate marine pollution.
- ✓ marine pollution as a result of accidents on ships.
- marine pollution as a result of natural disasters and major industrial accidents and others.

Such a scenario with negative impact on the sea area is small or medium likelihood of realization. In realization of this type of threat, however, the negative impact on security would be high.

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