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## Safety Management in Polish Seaports: Identification and Analysis of Threats

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Submitted 02/09/23, 1st revision 20/10/23, 2nd revision 16/11/23, accepted 30/11/23

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**Abstract:**

**Purpose:** The main objective of this article is to present the economic and military importance of Polish seaports as complex economic systems and intermodal transport hubs and to identify contemporary threats to their functioning, indicating directions for counteracting the negative impact of external and internal factors on an international and national scale. One specific goal is to shape the maritime awareness of Polish society, one determinant of the safe and effective use of Poland's coastal location.

**Design/Methodology/Approach:** The author has adopted and verified the following research thesis: The efficient and safe operation of seaports has a significant impact on the security of the transport system, the functional stability of supply chains and the development of the national economy. Seaports should become the subject of a permanent, systemic study aimed at building, expanding and modernising critical infrastructure with systems of its protection. In the research, systemic analysis methods, induction and deduction methods, and quantitative methods were employed.

**Findings:** Maritime ports should become subjects of systematic and ongoing research, resulting in the development of simulation models for the strategic and operational management of each Polish port under crisis conditions, taking into account their geographic, infrastructural, and technological specificities. Integrated crisis management modules should be incorporated into the strategic and operational management systems of ports. It is imperative to influence public awareness regarding the contemporary role of maritime ports within the national security framework, given the lurking threats to maritime and land-based critical infrastructure, through interdisciplinary research, publications, and the dissemination of knowledge pertaining to maritime issues.

**Practical Implications:** Seaports should become the subject of a permanent, systemic study aimed at building, expanding and modernising critical infrastructure with systems of its protection. The article is cognitive, organisational, methodological and prescriptive. It can be used by researchers, students and managers in the maritime sector as well as maritime and local government decision-makers interested in the theory and practice of safety management in seaports.

**Originality/Value:** The publication exhibits signs of originality due to its systemic approach; wherein maritime ports are regarded as complex economic systems and intermodal links within the logistics and transportation system of Poland in global land-maritime supply chains. It addresses a relatively underexplored topic, possesses a limited body of relevant

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*scientific literature, and addresses the timeliness and significance of the security issues concerning Polish maritime ports in light of emerging military threats.*

**Keywords:** *Importance of seaports, port critical infrastructure, risks characteristics, crisis management, security scenarios, maritime awareness.*

**JEL codes:** *M14, L15.*

**Paper type:** *Research article.*

## **1. Introduction**

The exploration of maritime port security is justified by existing and potential military, political, economic, social, informational, and environmental threats generated by external and internal factors affecting ports and maritime transport.

This issue possesses a multifaceted dimension with both national and international significance. Given the current geopolitical situation, it is essential to adequately prepare maritime ports to achieve optimal cargo flow capacity for Polish foreign trade and transit in land-maritime relations and the broader context of national security.

The primary objective of this article is to elucidate the economic and military importance of Polish maritime ports as complex economic systems and intermodal transportation hubs. It seeks to identify contemporary threats to their functioning while also highlighting strategies to counteract the adverse effects of external and internal factors within the context of crisis management. A secondary goal is to foster maritime awareness within Polish society, which is instrumental in ensuring the safe and efficient utilisation of Poland's coastal location.

The article presents research conducted by the author on the subject of maritime port organisation, management, and operation, as well as state maritime policy, expanded to include security management issues.

The publication exhibits signs of originality due to its systemic approach; wherein maritime ports are regarded as complex economic systems and intermodal links within the logistics and transportation system of Poland in global land-maritime supply chains. It addresses a relatively underexplored topic, possesses a limited body of relevant scientific literature, and highlights the timeliness and significance of security issues concerning Polish maritime ports in the context of emerging military threats.

The research in the article focuses on the broad concept of maritime port security and its impact on shaping the security of the national transportation system.

The scope of the research encompasses specialised scientific literature, factors influencing maritime port and transportation security, crisis management in ports, legal documents from the International Maritime Organization (IMO), Polish maritime laws, and selected research projects related to port and maritime transportation security. Systemic analysis methods, induction and deduction methods, as well as quantitative methods were employed in the research.

The research is guided by the following research hypothesis: Efficient and secure functioning of maritime ports significantly impacts the security of the entire transportation system and the development of the national economy.

The article serves a cognitive, organisational, methodological, and prescriptive purpose. It can be utilised by scholars, students, and practitioners in the maritime sector, as well as by decision-makers in maritime and local government administration who are interested in the theory and practice of managing security in maritime ports.

## **2. The Economic and Defensive Significance of Maritime Ports**

Approximately 85% of the goods involved in foreign trade among EU countries are handled in ports and transported by sea. In maritime ports, over 40% of the volume of goods traded in the domestic trade between EU countries is transhipped. European ports handle more than 3.5 billion tons of goods annually and serve around 350 million passengers.

On average, over 350,000 people work in ports and in related port services. Maritime ports and water transport (both maritime and inland) are the vital components of the logistics chain in international trade.

The European Union would not be considered a global economic powerhouse without its maritime ports. The European internal market would not exist without ports (Green Paper, 2006).

Maritime ports constitute an area (both aquatic and terrestrial) where capital, technical potential (port infrastructure and superstructure), knowledge, information, innovation, skilled personnel, and companies from the Transport, Freight Forwarding, and Logistics (TSL) sector are concentrated, often interconnected in clusters. They provide comprehensive services to individuals, means of transport, and goods involved in national foreign trade and transit (Christowa, 2021a).

In scientific research, the concept of a port as an intermodal transport hub is well-established. According to the contemporary approach, a maritime port represents a logistical and economic hub in the global transportation system, characterised by a strong maritime dimension. It is the focal point for a variety of activities, directly or

indirectly related to logistics chains, of which land-maritime transport chains are a part.

The strategic importance of ports in international trade and transportation primarily arises from the fact that they serve as the starting and ending points for maritime transport, a crucial element in land-maritime transportation chains capable of handling a substantial volume of cargo simultaneously. Maritime ports, as intermodal transport hubs, also function as the starting and ending points for rail, road, and river transportation.

Due to the significance of ports for society, many governments worldwide consider ports as strategic assets for their economies. Treating ports as public goods has a tangible impact on all aspects of their operations, including management, administration, operation, service provision, production, and finance.

Polish maritime ports, treated as public utility organisations, are of particular interest to the state (the public factor), mainly for the following reasons (Christowa, 2021b):

1. Locations on the border of the State;
2. Economic and social significance;
3. Statutory organisation of the managerial and administrative sphere of the ports;
4. General availability of the port infrastructure and areas;
5. The need to implement EU transport and maritime policies, including state engagement in the financing of access roads to ports and the construction, expansion and modernisation of port infrastructure components;
6. The need to control the proper use of publicly accessible facilities;
7. The obligation to provide public services of a supervisory nature;
8. The need to control environmental and social safety conditions and standards in port areas and waters, including border protection, customs, fire safety, counterterrorism, sanitary-epidemiological oversight, ship traffic monitoring, and the technical efficiency of port facilities and structures;
9. Applicable legal regulations in ports encompassing a body of norms and legal-administrative regulations within a given state, including port customs and international regulations, such as conventions of the International Maritime Organization, as well as recommendations from other international organisations and port associations;
10. The necessity of spatial planning and development of port areas and waters;
11. Implementation of integrated coastal area management strategies.

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Polish maritime ports play a significant role in trade exchange within the Baltic Sea region. The observed dynamic growth in the volume of global trade provides a stable foundation for the development of ports and maritime transportation.

Maritime ports serve as poles of growth and primary economic entities for coastal cities and regions. They are convenient locations for various economic activities, including industrial endeavours, necessitating the concentration of goods within their territories. Ports also function as information hubs about cargoes, means of transportation, port transshipment potential, and the possibilities for transporting goods to and from the port. Consequently, the development of port functions is a determinant of the growth of coastal cities and regions.

From a technical and economic perspective, ports are intermodal transport nodes serving as connectors between maritime and land transport. Simultaneously, they are complex economic entities that, beyond their primary transportation function associated with cargo handling activities, perform commercial, industrial, logistical-distribution, city-building, and region-building functions.

The fundamental task of maritime ports is to provide comprehensive cargo and transportation service for goods and various means of transportation that pass through these ports as transport hubs, facilitating the transfer of cargo from senders to recipients (Economics of Maritime Ports, 2003).

Maritime ports are situated at the intersection of land and sea, encompassing expansive spatially organised transport-production complexes, which are technically and organizationally adapted to facilitate the movement of cargoes and passengers in the context of land-sea relationships. They also provide comprehensive services for maritime and land transportation means commencing or concluding their production cycles there (Grzelakowski, 2012).

The logistical-distribution function of maritime ports is developing dynamically in tandem with the growth of the global economy and maritime foreign trade. Specialised, modern port logistics centres are the primary sites for executing this logistical function.

The location of industry within maritime port boundaries and in their vicinity is economically and socially beneficial due to low maritime transportation costs for raw materials, materials, and semi-finished products (imports), as well as for finished products (exports).

It also involves the utilisation of renewable energy sources (marine wind power) and the extraction of minerals from the seabed. The maritime industry impacts cargo handling growth and the equitable distribution of cargo flows in time and space. It is situated within port boundaries, port cities, and the port's surroundings, influencing the city-building and region-building functions of ports.

The COVID-19 pandemic caused significant disruptions in global supply chains at the outset of 2020. Weaknesses in the global economy and its failure to adapt to turbulent environmental changes were exposed. Entire sectors of the economy collapsed, leading to global supply chain disruptions, including those affecting Polish ports. In comparison to other sectors of the economy, the maritime service sector suffered less. Over recent years, maritime ports have been one of the fastest-growing sectors of the Polish economy.

The scale of this growth is best illustrated by numbers. In 2012, Polish ports collectively transhipped 63,900,000 tons, and in 2022, this figure reached 133,200,000 tons.

The results of individual ports are also impressive. In 2012, the Port of Gdansk handled 26,900,000 tons, which increased to 68,200,000 tons in 2022. The throughput of the Port of Gdynia rose from 15,800,000 tons in 2012 to 28,200,000 tons in 2022. The Szczecin and Świnoujście port complex transhipped 21,300,000 tons in 2012 and 36,800,000 tons a decade later.

In 2022, Polish maritime ports saw growth in various cargo categories. The import of oil increased due to the replacement of pipeline oil with imported oil from Norway, Saudi Arabia, the United Kingdom, and the USA. The amount of coal imported to Poland from Russia decreased from 8,200,000 tons in 2022 to 2,600,000 tons in the first quarter of 2023. To meet the existing demands, 18,000,000 tons of coal were transhipped in maritime ports in 2022. LNG imports also rose. The LNG terminal in Świnoujście recorded a 54.6% increase (Łopian, 2023).

Over the past few years, Poland has become a leader in container transshipment in the Baltic Sea, and the Port of Gdansk has become the largest container port in the Baltic and a regional hub with crucial oceanic connections.

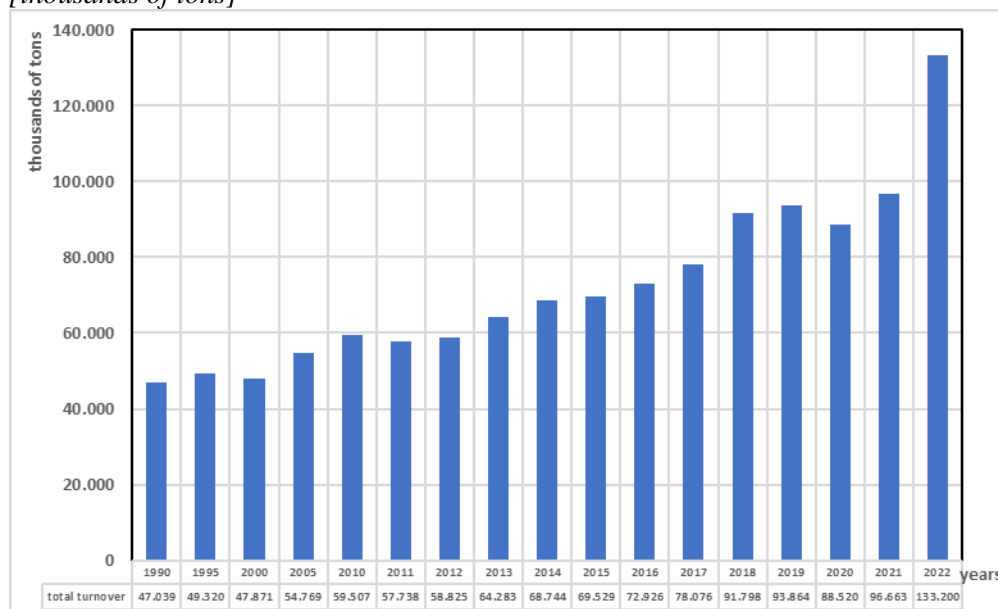
The dynamic growth in the importance and role of Polish ports is not solely defined by numbers. Over the past decade, Poland's energy system has become increasingly reliant on maritime ports. Currently, the majority of energy resources are delivered to Poland via maritime routes.

This is evidenced by record fuel transshipments at Gdansk's NAFTOPORT and the fuel terminal in the Port of Gdynia, as well as investments in PERN's fuel base in the Port of Northern Gdansk and Dębogórz near Gdynia.

The expansion of the LNG terminal in Świnoujście continues, along with the construction of the Baltic Pipe pipeline, an FSRU terminal in the Gulf of Gdansk, a small-scale LNG transshipment terminal at the Gdansk Refinery complex, and the decision to establish an offshore wind installation terminal and a container terminal in Świnoujście. These substantial port investment decisions are justified.

The growth dynamics of cargo transshipment in Polish maritime ports from 1990 to 2022 are illustrated in Figure 1.

**Figure 1.** Cargo transshipment volume in maritime ports in the years 1990-2022 [thousands of tons]



**Source:** Own elaboration based on data from the Central Statistical Office (GUS).

In the context of the war and Poland's disconnection from energy resources supplied by Russia, several port terminals had to quickly adapt to new needs, particularly the increased import of coal. Furthermore, such cargoes occasionally appeared even in smaller ports, traditionally focused on fishing and tourism.

To maintain competitiveness, similar to European ports, Polish ports should adjust their transshipment capacity to accommodate changing types of cargo in the port service market. This includes preparing installations for future fuel bunkering, such as ammonia, methanol, and hydrogen.

The development of ports would not have been possible without a series of key investments made in recent years by Maritime Offices, Port Authorities, as well as port, railway, and road companies. Multi-billion investments in ports have ensured Poland's security of supply during critical moments related to increased demand for energy resources and other goods in Polish foreign trade and transit.

Port basins and waterways are systematically deepened to allow larger ships to enter. New quays and terminals have been built, and existing ones have been modernised to accommodate increasingly larger vessels. Modern transshipment equipment operates on quaysides. The surroundings of maritime ports are also developing.

Warehouse areas are expanding, warehouses and manoeuvre-transshipment yards, parking lots, and logistics valleys are being constructed.

The development of ports is accompanied by the expansion and enhancement of the capabilities to transport cargoes to and from the quaysides. The construction of railway infrastructure at the hinterland of ports is carried out by PKP Polskie Linie Kolejowe. Thanks to these investments, more goods can now be transported to and from ships by trains. Further investments are needed to develop intermodal transport.

Crucial road investments have also begun, which could completely transform the functioning of port cities. Design work is underway for the so-called "Droga Czerwona" (Red Road) in Gdynia, which is meant to be the primary route for heavy truck traffic to the port.

Local authorities and the state are also implementing additional projects in Gdansk, Szczecin, and Świnoujście to provide ports with the capacity to handle as many goods transported by road as possible without congesting the passage through port cities. Smaller ports along the Polish coast are also developing, and offshore wind energy may become a significant factor for them.

Service bases for Polish wind farms will be located in Łeba and Ustka. Other ports also plan to service vessels involved in the construction and operation of wind farms in the Baltic Sea.

In order to ensure environmental safety and sustainable national development, a swift transition is urgently needed in the structure of the Polish transportation system toward rail and water transport.

The strategic goal should be to achieve the following proportion of the transport modes for Polish maritime ports by 2030, with a perspective until 2050: rail transport approximately 70%, water transport 20%, and road transport 10%, with a decreasing trend in favour of rail and water transport.

It is estimated that due to the activities of Polish maritime ports, budget revenues from taxes, fees, and duties amount to approximately 40-50 billion PLN annually. Ports provide employment opportunities and benefits to port service and manufacturing companies. As intermodal transport hubs, they play a central role in global supply chains.

During the ongoing conflict between Russia and Ukraine, maritime ports have become critical links in global supply chains for food, strategic energy resources, and military logistics. The efficient operation of ports has become a national economic priority, given the broad concept of national security (military, political, economic, social, informational, and environmental).



### 3. Security in Maritime Ports

In the realm of academic discourse, maritime ports, as substantial spatial and technological economic complexes, characterised by a multifaceted and diversified industrial and economic structure, fall within the domains necessitating distinct protection measures. They also serve as pivotal subjects and objects of crisis management across multiple levels of economic, national, regional, local, and international administration (Tubielewicz, 2010; Zampeta and Chondrokoukis, 2022; 2023; Zampeta, 2015).

Within the literature addressing security concerns, there exist classifications of threats that cannot be fully applicable when considering maritime ports (Kaczmarczyk, 2014). Consequently, it becomes imperative to examine a broader spectrum of undesirable phenomena within the context of a maritime port, thereby necessitating alternative threat classifications. This distinctiveness primarily arises from:

- 1) the locations of ports on the land-sea border of a state,
- 2) the active role of the state factor,
- 3) the extensive land and water areas located within the administrative boundaries of ports, utilised for performing various economic functions by the port (transport, commercial, logistical, industrial, urban development, and regional development),
- 4) connections with the regional, national, and international environment.

One can consider an appropriate classification encompassing the following threats (Zawadzki, 2019):

1. Threats arising from natural forces;
2. Terrorist threats;
3. Cyberterrorism;
4. Theft and break-ins, smuggling of goods and people, economic and political sabotage;
5. Fires and leaks of harmful substances;
6. Ecological disasters;
7. Drone attacks;
8. Human trafficking, cargo, and hazardous substance smuggling;
9. Contamination of transported foodstuffs;
10. Threats compromising port security.

The threats arising from natural forces encompass phenomena resulting from natural occurrences, the frequency of which has significantly increased in recent years. The escalating dynamics of climate change translates into greater intensity of atmospheric events causing damage to technical infrastructure and superstructure within ports, endangering the continuity of operational and service processes.

Natural threats include winds, hurricanes, storms, floods, snowstorms, thunderstorms, icing of port waters, and others.

In the context of a maritime port, terrorist threats can be divided based on the target of the attack, its area, and the means employed. The objects of attack comprise ships calling at the port, port infrastructure, warehouses, storage yards, stored cargo, and hazardous substances.

The destruction or damage to a floating unit in port waters is synonymous with disruptions in the port's operational and service activities, potentially leading to its temporary exclusion. Furthermore, there may be a leakage of hazardous substances from the vessel, such as oil-derived products. Considerable financial losses may also result from ship operators discontinuing cooperation.

Cruise ships could be an attractive target for terrorists as they can host up to four thousand passengers, potentially resulting in a high number of casualties and injuries in the event of an attack. Critical port infrastructure, typically destruction of which would yield palpable consequences, may also be targeted, examples being facilities for transferring liquid fuels.

The damage or destruction of such facilities may lead to chemical contamination and environmental degradation, alongside large-scale fires. Targets of terrorist attacks that pose threats not only to maritime ports but also to undersea energy and gas connections, as well as critical transport and port infrastructure, are now emerging.

The term "critical port infrastructure" encompasses both land-based and maritime (including navigational) technical infrastructure that forms part of the maritime-land transportation and communication system, as well as communication systems, handling, storage of hazardous materials and substances, teleinformatics networks, and rescue systems (Forkiewicz, 2010).

The concept of critical infrastructure threats in ports encompasses a broad spectrum of accidents, damages, and incidents affecting systems and machinery within the port area.

The objective of cyberterrorism is to paralyze systems vital for the port's operation and to steal confidential data. This phenomenon is particularly dangerous because significant damage and losses can be inflicted with relatively minimal investments (Oleksiewicz, 2018).

The cybersecurity challenges that have emerged during times of warfare present new challenges in the implementation of digital security measures within the maritime industry, especially in ports. Maritime ports can become attractive targets for cyberattacks as they represent key intermodal transportation nodes in the logistics supply chain.

In 2022, three cyberattacks on wind farms occurred across Europe, where computer systems managing, monitoring, automating, and controlling industrial systems were vulnerable to exploitation and takeover. In 2023, at a maritime wind farm in the North Sea, a ship's crew attempted to gather information about the wind farm.

An example of a terrorist act related to political and economic sabotage was the explosion of the Nord Stream pipeline, which highlighted problems in monitoring objects and identifying potential threats and acts of sabotage at sea (<https://defence24.pl/polityka-obronna/polskie-firmy-wzmacniają-morskie-zdolności-obronne-wschodniej-flanki-nato>).

According to NATO intelligence structures, the focus is not only on securing pipelines and power lines, but also on protecting systems like undersea cables, which make up 95% of Internet communication and handle financial transactions estimated at \$10 trillion every day (<https://www.money.pl/gospodarka/podmorskie-kable-potencjalnym-celem-rosja-mapuje-krytyczna-infrastruktura-ue-i-usa-6894336230361888a.html>). Maritime ports are also part of this system.

A potential security threat in maritime areas is the construction project of Maritime Wind Farms (MWF) as a group of critical maritime infrastructure objects (artificial islands) that could alter the political, economic, and military dynamics in the Baltic Sea areas. In accordance with current legal regulations, the obligation to ensure adequate protection of hydrotechnical objects in the surface, underwater, and airspace lies with MWF operators in cooperation with the Ministry responsible for defence and state security.

Maritime security and navigation protection primarily concern the safety of people, vessels, transported goods, and the maritime environment. This also includes safeguarding floating units and port facilities against terrorism, piracy, and acts of sabotage. A specific, threatening category of terrorist threats comprises hijacking and seizure of ships at sea by so-called maritime pirates.

In maritime ports, leaks or spills of hazardous substances (chemicals, flammable and explosive materials) can occur. Such leaks can happen during transport, cargo handling, and storage. In direct contact, many of these chemicals are dangerous to human health and life. Contamination of soil and water in aquatic environments may also occur, leading to environmental degradation and ultimately resulting in the exclusion of the contaminated port areas from operation (Chmieliński, 2019).

Terrorists employ both conventional explosives and firearms, as well as hazardous substances to carry out attacks with the goal of contaminating water intakes located and used within the port area. A bioterrorist attack, despite minimal costs, can have devastating effects. Thus far, this type of threat has been downplayed and rarely encountered in any classification.

A particularly troublesome new threat to maritime ports is drones, remotely piloted aircraft or autonomous flyers. The term "drone" is quite broad and includes machinery used in the armed forces, as well as small multi-rotor aircraft used for commercial purposes. In the case of a port, the analysis should focus exclusively on the threat posed by unmanned aerial vehicles, or drones.

One example of the use of such devices is their utilization as carriers of explosives for terrorist attacks. Drones are ideal tools for such endeavours as they are fast, small, and challenging to detect. Moreover, they can carry a payload sufficient to destroy a railway tank with hazardous substances or damage a liquid fuel transshipment station.

Even when used for legitimate purposes, drones can pose a danger in situations where there is a loss of control or operator error leading to the device's crash. It is worth noting that even a drone weighing just a few kilograms can be lethal if it falls from a significant height.

#### **4. Crisis Management Systems in Maritime Ports**

The agencies responsible for security in the port primarily include the Navy, Border Guard, Maritime Office, State Fire Service, Port Security, security companies, and the Maritime Port Authorities.

In existing conditions, the protection of the maritime port includes, in particular:

1. Individuals (ship crews, barge and car personnel, passengers, dockworkers, crane and mechanised equipment operators, other individuals involved in management and operations, and those present within the port area).
2. Approach tracks and channels to port facilities.
3. Roads and railway tracks within the administrative boundaries of the ports.
4. Ships entering, exiting the port, and undergoing transshipment.
5. Maritime floating units.
6. Railcars, trucks, barges handled in the port.
7. Port terminals, transshipment and storage quays.
8. Hydrotechnical structures.
9. Maritime logistics centres.
10. Warehouses and storage facilities.
11. Administrative buildings.
12. Power, water, and sewage networks.
13. Access points to information bases and documentation.
14. Passive and active protection systems for maritime facilities and infrastructure.
15. Land and water areas bordering the port areas.

16. Maritime wind farms.
17. Areas that may be used for unauthorised observation of port facilities.
18. Critical asset components (critical infrastructure) in the adjacent port area, which, if destroyed, can pose a threat to the port's operation.
19. Asset components located in the adjacent area to the port facility, which, if damaged, can cause harm to the port facility or be used to inflict damage on the port facility.

Potential security threats in ports evolve under the influence of the international environment, the globalisation of individual country economies, European integration, and globalising processes.

Scenarios of threats to port facilities are developed in several variants with a focus on preventive procedures and measures to minimise the consequences. The following scenarios of threats and events can be anticipated, including:

1. Infiltration or seizure of control over a target located within the port facility.
2. Internal attack on the port facility.
3. External attack on the port facility.
4. Utilisation of the port facility for smuggling purposes.
5. Electronic manipulation.
6. Cargo manipulation, sabotage.
7. Utilisation of unconventional means of attack.

The foundation for developing a crisis management concept in the maritime port areas entails assessing the security status of port facilities and constructing scenarios of their threats. When formulating threat scenarios and events that breach security, it is imperative to consider the level of danger and the appropriate state of physical and operational protection measures. These encompass forces and resources defined in the applicable legal regulations (Tubielewicz, 2010).

In the context of a broad spectrum of fundamental threats, it becomes necessary to devise coherent procedures ensuring close cooperation among the various services responsible for port security, with the goal of a rapid response to threats and the minimization of adverse event consequences. This also aims to prevent the emergence of competency disputes in practice.

Such an assumption should appear self-evident; however, as research suggests, security procedures in ports are far from ideal, and the absence of adequate crisis management infrastructure significantly hampers effective coordination and command of rescue operations.

The legal basis for security in maritime ports is outlined in the document titled "International Ship and Port Facility Security Code (ISPS Code)," which is a

comprehensive set of measures and recommendations with international scope, intended to enhance the security of ships and port facilities.

In the case of maritime port areas, the ISPS Code delineates the overarching responsibilities and principles for establishing:

1. Security plans for the port facility.
2. Guidelines for ascertaining the risk level (referred to as "security level" in English).
3. Appointment of Port Security Officers.
4. Special security provisioning devices.
5. For maritime vessels, the ISPS Code delineates obligations and principles regarding:
  - Ship Security Plans;
  - Guidelines for determining the risk level (termed as "security level" in English);
  - Nomination of Ship Security Officers;
  - Nomination of Company Security Officers;
  - Special security provisioning devices.

Common requirements related to ships and port areas encompass duties and principles for establishing a monitoring and access control system, monitoring the activities of individuals and cargo, and creating communication rule systems.

It is crucial to emphasise that the ISPS Code mandates the establishment of security officer positions, specifying the rules for their training, recruitment, and the required competencies. Another pivotal element is the obligation to create security plans.

A European Union document directly addressing port and fleet protection issues was the Directive of 2004, aimed at enhancing port and fleet security. Its content is directly derived from the provisions of the ISPS Code. Subsequently, in 2008, a special regulation defining principles for updated maritime safety inspection procedures came into effect. Further legislative packages of the European Union are known as Erika I, Erika II, and Erika III.

The level of maritime security is determined by the ability to identify threats and the development of integrated countermeasure systems by the international community, which will establish new maritime transport security standards in the coming years (Miler, 2015).

The management of maritime transport and port security is implemented at three levels: the International Maritime Organization (IMO), the European Maritime

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Safety Agency (EMSA), and the coastal state's maritime administration at various levels (Miler, 2015).

Instrumentally, matters related to maritime security management are addressed through legal regulations and information technology systems for the acquisition, storage, processing, and transmission of information.

## **5. Summary**

The management of maritime port security holds significant importance within a nation's transportation system, as modern maritime ports serve as intermodal land-water transport hubs of international significance and logistical platforms connecting various transportation branches.

Maritime ports are characterized by complex technical and organizational structures, carrying out crucial economic and social tasks for the national economy. By participating in the process of moving goods from production centres to consumption locations, maritime ports become integral components of the commodity circulation phase.

Factors influencing security in ports, as specific intermodal transport hubs located at the interface of land and sea, dynamically change the scope and strength of their impact. Prevention and the maintenance of safety in maritime ports are contingent upon the ability to identify threats and the determination of international communities in creating integrated threat countermeasure systems throughout all links in the supply chain logistics. This remains a substantial challenge for both crisis management theory and practice.

In the context of political and economic changes in Europe and globally, a government document in the form of an act, "Maritime Policy of the Republic of Poland by 2030 with a perspective to 2050," as well as a new strategy and development program for Polish ports, should be established. These should take into account the contemporary roles and significance of maritime ports within the national security system, threats to critical maritime infrastructure, port tasks related to energy security, cyber security, and security threats to ports and sea routes.

The new national maritime policy should include actions aimed at enhancing the maritime defence of the country, building, expanding, and modernizing coastal and maritime critical infrastructure along with its protection systems. The document would outline the development prospects of Polish ports in the context of political and economic changes in Europe and the world, considering evolving global maritime supply chains.

The country's transportation policy should be correlated with maritime policy, including port policy, and the development program of maritime ports.

Maritime ports should become the subject of systematic and ongoing research, resulting in simulation models for the strategic and operational management of each Polish port under crisis conditions, taking into account their geographic, infrastructural, and technological specifics. Integrated crisis management modules should be incorporated into the strategic and operational management systems in ports.

Efforts should be made to raise public awareness regarding the contemporary role of maritime ports in the national security system, in light of threats to maritime and land-based critical infrastructure, through interdisciplinary research, publications, and the promotion of knowledge in maritime-related topics.

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