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Oleksiy MELNYK¹, Svitlana ONYSHCHENKO², Kostyantyn KORYAKIN³

NATURE AND ORIGIN OF MAJOR SECURITY CONCERNS AND POTENTIAL THREATS TO THE SHIPPING INDUSTRY

Summary. During the last decades, maritime security has always stood as a separate critical problem for both shipowners and crews of sea-going ships, characterized by alternating periods of relative stability and periods of occurrence and growth of new threats, which proceeded from times of sailing fleet to an epoch of iron steam shipbuilding. Certainly, it is difficult to overestimate the significant role of the scientific community, which has been researching this problem for a long time, studying its scientific and practical sides. The professional experience of seafarers in sufficient measure, served as a basis of interest to this question, has led to the development of strategies and complex measures, which until now provided safety for ships and their crewmembers. Without recent advances in maritime security, shipping as an industry would not be able to reach the current level of reliability in shipping processes. Each generation of humanity has prioritized maritime security, contributing to improving its standards and stressing the importance of continuous development of the theoretical base. At least 23 million tons of cargo and 55,000 passengers move daily by water transport, so

¹ Department of Navigation and Maritime Security, Odesa National Maritime University, Mechnikov 34 Street, 65029 Odesa, Ukraine. Email: m.onmu@ukr.net. ORCID: <https://orcid.org/0000-0001-9228-8459>

² Department of Fleet Operation and Maritime Transportation Technology, Odesa National Maritime University, Mechnikov 34 Street, 65029 Odesa, Ukraine. Email: onyshchenko@gmail.com. ORCID: <https://orcid.org/0000-0002-7528-4939>

³ Department of Navigation and Maritime Security, Odesa National Maritime University, Mechnikov 34 Street, 65029 Odesa, Ukraine. Email: voloshin61@gmail.com. ORCID: <https://orcid.org/0000-0003-2388-645X>

the concept of maritime safety applies not only to the safety of life at sea, ship and cargo security but also to the prevention of maritime accidents and pollution. The increasing share of sea and river transport in the international cargo and passenger turnover leads to the need to increase demands on maritime safety and security.

Keywords: maritime security, shipping safety, potential threats

1. INTRODUCTION

Transportation safety is a top priority, particularly in the area of merchant shipping. Ensuring safety navigation has always been among topical issues commanding increased attention. Over the past centuries, designers and shipbuilders of sea-going ships have made enormous progress. Ships have grown in size, speed and tonnage. Accordingly, this has affected the safety of these ships in terms of navigational factors, that is, seaworthiness, cargo characteristics and the influence of the human factor, which occupies a special place among the causes of fleet accidents and directly affects the statistics of accidents and shipwrecks. Operation of a sea-going ship as an object of navigation safety is influenced by more frequent cases of maritime terrorism, pirate attacks, illegal trade and transportation of narcotic substances. During this research, the basic factors, which threatens a ship's safety, their components are revealed, the main normative documents and literature, principles of their realization for maintenance of monitoring of the safety of a vessel were analyzed.

Research of the shipping safety concept leads to the conclusion that ensures that the coastal industry workers and the ship's crew consider the safety of navigation as a joint decision of this task. The scientific community and international maritime organizations have always noted the issues of increasing safety on water transport, ensuring the safety of ship operation. Thus, works [1, 3, 4] are devoted to statistical data analysis and review of losses and incidents at sea. Papers [2, 5, 7, 12] describe the issues of passengers' perceptions of safety and security, ensuring principles and categories of safety assistance and maritime policy and the safety of the European Union. Illegal maritime drug trafficking is considered in [6]. Study of factors providing sufficient opportunities for the emergence and development of piracy, their impact on the level of security, and the negative effect on profitability in the shipping industry were reviewed in [8-10, 14]. Maritime security problems and ways to solve them were examined in [11, 15, 16]. Thus, the review of works on the chosen topic of research shows the need to identify the main threats to maritime navigation, study the classification of these factors and analyze the degree of their impact on the system of shipping safety.

2. MATERIALS AND METHODS

Since the worldwide shipping industry is involved in transporting up to 90% of global merchandise, the safety of its ships is critical. However, during the pandemic 2020 year, the number of total reported ship losses greater than 100 GRT fell to 41, the lowest this century and a nearly 70% decline in 10 years. On the other hand, technological advances in improvements of ship design and shipping technology, stricter regulations in risk management, and the implementation of more robust safety management systems and procedures on ships are among the factors for long-term improvement in losses in the global fleet.

In 2018 alone, the number of ship losses dropped by nearly a quarter from the previous year to 53, although the 2019-2020 ship loss data was not increased and were 48 and 49, respectively. Bad weather conditions were reportedly the primary cause of one in five episodes. Loss year 2019 represents a significant improvement over the rolling decade and an average of 95 cases – a decrease of more than 50% [1].

According to Casualty Statistics and the Lloyds Casualty Week Publication, in one single decade between 1994 and 2004, 6,693 people died and 2,225 medium and large ships were lost because of accidents in the world fleet. In the 10-year period from 2009 to 2019, the world fleet lost only 48 bulk carriers of more than 10,000 tons deadweight to accidental causes alongside 188 seafarers. The most common causes of vessel loss, 19 of the 48, were groundings. In nine cases, bulk carriers were lost due to cargo spillage and 101 seafarers lost their lives. Ratio of causes of maritime accidents in the world fleet as a whole is represented in the following list: dangerous roll, weather phenomena, damage, landings, technical reasons, destructions, hull leakage, fires, explosions, capsizing, collisions, shipwrecks, and others (Figure 1).

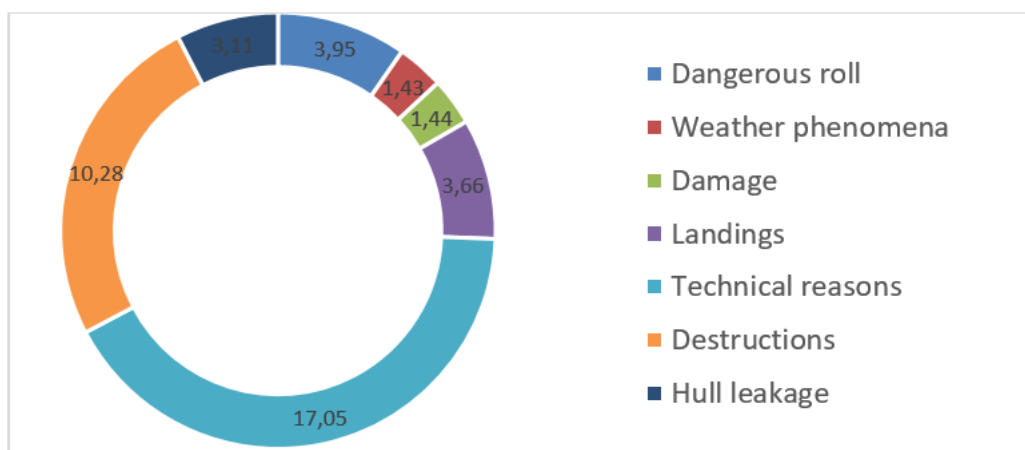


Fig. 1. The ratio of maritime accident causes in the global shipping year 2020

The main share of accidents is always damage to the ship's hull and destruction of its structural integrity. The next largest share of accidents is failure and malfunction of the ship's technical facilities and mechanisms. Further in descending order: blockage, loss of stability, water tightness failure, fires, explosions, etc. Figure 1 shows the same diagram as a percentage of the total number of accidents. The main contribution to the accidents is the violation of the procedures of the ship's technical operation and its equipment and ship handling errors in the context of breaching the COLREG (International Regulations for Preventing Collisions at Sea). Few accidents are related to the loss of stability. Mainly accidents not related to the human factor account for 28%. Therefore, the other 72% is caused by the violation of operation rules and the human factor errors of the ship crew. Around 72-80% of accidents around the world are caused by the human factor; hence, it is not peculiar to shipping [2].

Recent years reported 23,073 marine casualties and incidents from 2011 to 2018, the total number of ships involved was 25,614; however, a total of 3,174 maritime casualties and incidents was reported in 2019 according to [3]. General cargo ships were the main category involved in marine casualties or incidents (43.8%), followed by passenger ships (23.7%).

Since 2018 and subsequent years, the number of ships involved in marine casualties or incidents has either stabilized or slightly decreased in all ship categories, except other ships (Figure 2). The number of other ships involved increased almost by 63.7% when compared with 2017 [4].

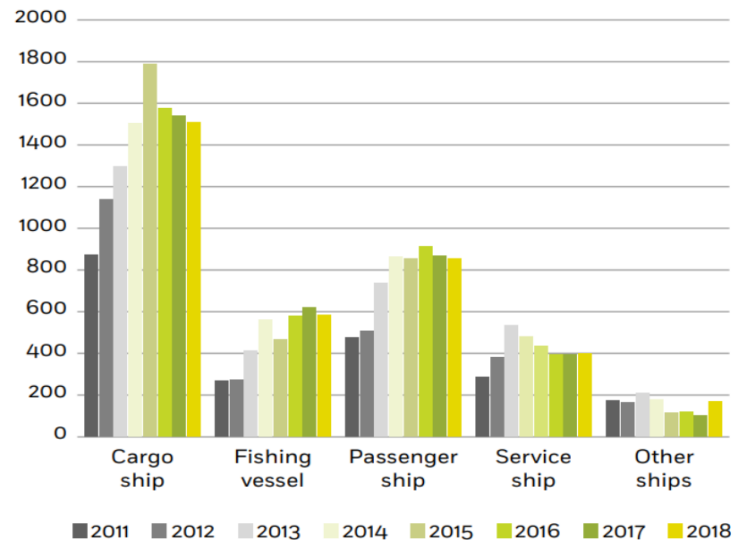


Fig. 2. Number of ships by type involved in accidents

Statistics show a steady growth trend in the number of accidents, with ship collisions in the first place among all types of accidents (20.5%). The human factor is the dominant cause of accidents in shipping. Thus, investigations have shown that 75% of accidents at sea are caused by human errors, irrespective of the cause of the accident (Figure 3). Only about 10% of accidents result from force majeure, while about 15% result from technical defects of ships and unexpected failure of shipboard equipment. Most frequent accidents resulted from navigational reasons, such as grounding and collisions. There is a reason to believe that this trend will continue in the near future. At the same time, indicators for technical types of emergencies are now reduced; for fires and explosions, they are practically stable. The accident investigation reports show that the navigator's work on the ships is not properly organized. The reasons for ship collisions are often lack of good maritime practice, insufficient professional training of ship crews, wrong actions of traffic control services, poor quality of ship's maintenance and repair. The reasons for the growing number of accidents in the shipping industry lie in the economic, technical, informational aspects, as well as in the human factor [5].

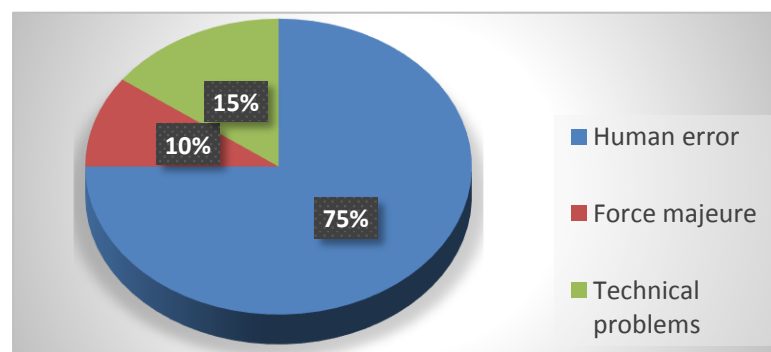


Fig. 3. The main reasons influencing accidents

3. RESULTS AND DISCUSSION

To identify contemporary threats to shipping and better understand their origin, it is necessary to consider the historical factor by way of solving the problems of maritime safety. Remarkably, the sinking of the Titanic in 1912 forced the major shipowners of that time, under public pressure, to negotiate and adopt the first, although not the final version of the international SOLAS Convention, which had already been approved two years after the subject disaster that claimed the lives of over 1500 passengers and crew. Thereafter, it was successively revised and supplemented; however, other ships sunk for different reasons with a significant number of victims [12, 13]. In particular, the first steps were aimed at establishing uniform safety standards for merchant ships and regulation of the total number of lifeboats onboard, as well as other emergency equipment necessary for the safety of passengers and crew. However, like any regulatory instrument, the convention has undergone long periods of updating by way of successive forms and periodic amendments, which have been adapted to the pace of technological progress and development of the shipping industry as an individual industry. In practice, the procedure for implementing the various amendments has proceeded at an unsatisfactory pace, leading to the realization that the adoption and entry into force of the necessary amendments within the required period would not be possible. Subsequently, during the meeting on November 1, 1974, the International Conference for the Safety of Life at Sea finally approved the new text of the SOLAS Convention, which in one form or another, has survived to the present day.

Further improvement of the Convention and new challenges to international maritime safety and security led to the development and adoption of a new chapter XI-2 of the Convention (SOLAS74) and with it the International Ship and Port Facility Security Code (ISPS Code). These documents have established and unified the minimum safety standards, which are obligatory for the participating countries in the international maritime traffic and transportation of cargoes and passengers. It served as an important step to the world community on the way to creating a global system of maritime safety and security. According to this code, the organization classified the main threats to international maritime security as follows: terrorism, piracy, theft of cargo and ship's property, drug and weapon smuggling, transportation of illegal migrants, cybercrimes (Figure 4).

In the context of consideration of threats of the main problems of security and potential threats to the shipping industry, it is necessary to stop the most prominent of them, directly influencing the international maritime security where it is possible to allocate with confidence the most significant, which today are:

- transnational organized crime, including illicit trafficking in drugs, arms, weapons and people;
- terrorism;
- piracy and armed robbery at sea (Figure 5).

Illicit trafficking of drugs and psychotropic substances by sea poses a serious threat to maritime security. Approximately 70% of all seized drugs are either seized in time or after they have been transported by sea. Maritime transport has some advantages over other modes of transport in this respect, namely: the relative ease of concealing drugs in packages and cargo containers and ship rooms, the significant number of contacts ship crewmembers have with foreigners in the ports of entry and the difficulties of identifying criminal connections among them. Maritime transport accounts for 37.6% of the total amount of drugs seized. In comparison, land transport accounts for 25.4%, air transport 5.4%, post 0.7% and other methods of drug

smuggling 30.9%. However, the volume of illicit drug trafficking by merchant ships continues to increase [6].

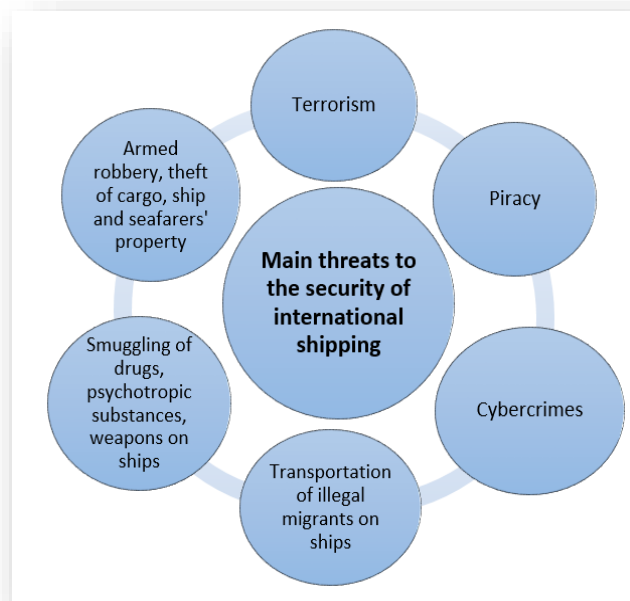


Fig. 4. Main threats to international shipping

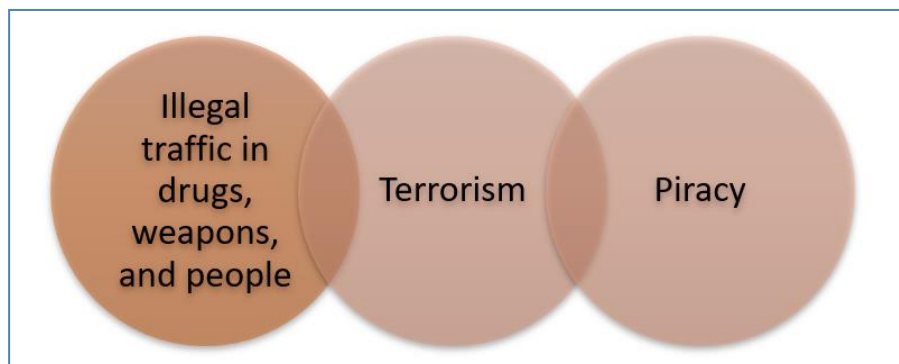


Fig. 5. Major threats to maritime security

The industry of the slave trade dates back to ancient Egypt. This type of activity largely determined the economies of the nations of that time. The African continent was the center of invasive raids by Arab traders who transported local people as slaves to Greece, Rome, and Turkey. However, black people were not the only prey of the invaders. Eventually, European merchant ships were seized by pirates who enslaved the Europeans onboard. Today, the problem of slavery and human trafficking is not a rare phenomenon and ranks third in the world after drug trade and illicit arms trafficking on the black market. The socio-economic backwardness of developing countries is a dangerous phenomenon both locally and internationally. Smuggling and human trafficking by sea increase the number of people who enter countries illegally; these people are smuggled migrants and victims of human trafficking. Among the reasons for clandestine migration, we should mention human rights violations, economic deprivation, natural disasters, and depletion of natural resources [7].

Maritime terrorism poses a serious threat to maritime security, undercuts the universally recognized principle of freedom of the seas and often poses a threat to peace. Like piracy, it is a crime of an international nature. In their methods and means of implementation, maritime terrorism and piracy are very similar. The only difference is in the objectives pursued by the perpetrators: for pirates, the main thing is enrichment and profiteering, while the goal of terrorists is to intimidate the authorities to meet their, as a rule, political demands [10]. From our point of view, as applied to the problems of maritime security, the concept of "terrorism" mainly refers to violent actions of social actors against passengers and crew of ships, against moving or coastal objects, committed at a time when the society does not offer resistance.

An analysis of terrorist actions that have occurred in various countries around the world reveals a trend of increasing scale and the use of new threats using maritime means of transport. Seaports, ships, including those with nuclear power units, and carriers of passengers and dangerous goods are the most vulnerable to escalating terrorist threats. Many modern ocean-going vessels are highly automated and can be operated by a crew of 20. It is not too difficult to train a terrorist group of this size and the likelihood of terrorist attacks is quite high.

The first mentions of acts of piracy refer to the inception of merchant shipping and as an armed robbery at sea has been known since time immemorial. Some sources [9] give information dating back to VI B.C. There is also a statement that with the departure of the first merchant ship, a pirate ship followed it. The reasons for the emergence of piracy are related to the fact that, primarily, poor people joined the pirates. In addition, the desire for easy profits forced more captains to become pirates. In summary, piracy is one of the oldest threats not only to maritime navigation but also to the political interests of the maritime powers, which are a potential threat nowadays primarily to the rights and freedoms of every person to life, liberty and security of person. As we know, pirates are not a global force; their attacks are severely limited by location. First, it is the Gulf of Aden and the waters to the east and southeast. The second region with high risks of pirate attacks is the Strait of Malacca. The pirates in different locations, understandably, are different. The third hot spot is the Gulf of Guinea and others that are less tense.

Piracy emerged, evolved, and changed along with seafaring (Figure 6). The role and attitude toward piracy have changed. It can be argued that piracy existed with varying intensity in all coastal countries. Piracy has not disappeared and currently exists largely due to the lack of state and political structure or low level of social and economic development of some coastal countries. In this case, the problem of piracy can be solved only through the active participation of various international organizations and the development of a set of appropriate international legal measures [15, 16].

Threats to maritime security, while predictable, nevertheless, by definition, have an element of unexpectedness. Accordingly, to confront the challenges, it is necessary, on the one hand, to regulate the actions of people, and on the other hand - a creative approach to the assessment of threats and ways of their neutralization [11].

4. CONCLUSION

The growth rate of world trade and the intensity of international shipping principally determines the increase of the accident rate of the world fleet. However, in parallel, there are also threats to maritime security, as evidenced by the analysis of accidents in the world fleet in recent decades and the analysis of statistical data on the types of accidents on ships. The main causes of shipwrecks and the ratio of the main causes of maritime accidents in the world

shipping to the total number of accidents were studied and revealed. All aforesaid points to the fact that the inability to solve the problems of shipping security using traditional methods, such as ship management by ship's crew, is a reason to create and implement new and more effective systems of maritime security, which is actual and among the priority tasks.

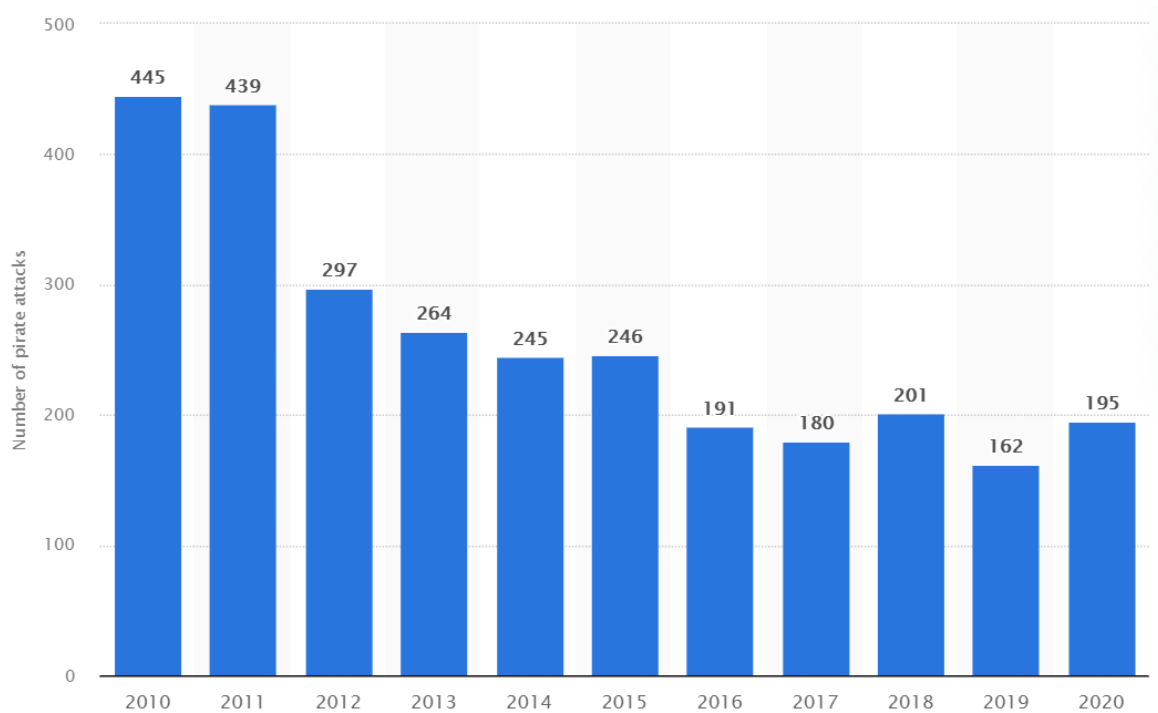


Fig. 6. Number of pirate attacks worldwide 2010-2020 by Statista 2021

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