Pollution from ships as a factor affecting maritime transportation: universal and regional approaches to solving the problem

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Abstract. The study considers problematic issues related to identification and prevention of ship pollution as a factor negatively affecting the volume and quality of maritime transportation. It is shown that one of the most dangerous for the marine environment forms of pollution from ships is oil pollution, which is characteristic not only for oil tankers, but also for other types of marine vessels. International legal sources of protection of maritime spaces from pollution from ships, including universal and regional ones, related to the water area of a certain maritime region are defined. Formal-legal analysis of the MARPOL 73/78 convention allowed to identify the main types of pollution from ships, which is a complex, multifaceted process with a certain variety of practical ways. The system analysis of the impact of prevention of pollution from ships on the overall effectiveness of the implementation of the concept of sustainable development in the world ocean has been carried out. The role of states in overcoming the factors determining the reduction of maritime container transportation in terms of establishing unified environmental rules of navigation has been determined. Proposals on improvement of international legal mechanisms for prevention of pollution from ships, including "dumping" and discharge of bilge water, extremely harmful and dangerous not only for the marine environment, but also for human life and health, have been developed and formulated.

1 Introduction

Marine pollution is one of the key factors negatively affecting the realization of the concept of sustainable development, which today acts as the main paradigm determining the content of international legal norms in the field of merchant shipping.

On the other hand, the application of international legal restrictions and procedures related to the unified environmental norms has a huge direct impact on the possibilities of achieving the private legal interests of the subjects of maritime transportation, as it affects the very admission of the vessel to operate in a particular market of a certain maritime region or at the universal level of international legal regulation of the actions of the shipowner, parties to the supply contract and the crew of the vessel.

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The purpose of this study is to analyze the development of international legal regulation of prevention of marine pollution from ships, to develop proposals to improve the complex interaction of sovereign states, international organizations and subjects of commercial navigation, unification of environmental norms and principles of maritime transportation, taking into account the application of doctrinal and practical-applied approaches of various sciences, including legal, technical, managerial.

2 Research methods

The methodological basis of the study was a broad interdisciplinary approach, which allows to comprehensively establish both the forms of pollution from ships and international legal, organizational, managerial, technological mechanisms of their prevention and elimination in modern shipping. According to this methodological basis, specific methods of data collection were used in the research process: analysis of universal and regional international legal treaties - allowed to define international legal mechanisms of prevention of pollution from ships, as well as to establish the formal-legal content of the relevant concepts; monitoring of the maritime transportation market - allowed to draw conclusions about general trends in the development of merchant shipping, to establish the role and importance of certain types of maritime transportation in the context of the modern shipping industry. Directly in the research process, along with general scientific methods of analysis, synthesis, deduction, induction, abstraction, the comparative legal method was used, with the help of which regional international legal agreements on the subject under study were compared, the optimal model of legal impact on the decisions and actions of subjects of maritime activity was identified and recommended as a model.

3 Results

1. With the help of comparative-legal method the optimal international legal model of regulation of relations connected with pollution from ships, "polluter pays", which allows to influence effectively the participants of the maritime transportation market, is established.
2. Formal-legal analysis of international conventions on the protection of the marine environment from pollution has allowed us to identify the main ways of public-law influence on the observance of environmental norms in private maritime transportation.
3. System analysis of oil pollution as a special case of pollution from ships is carried out, its negative impact on marine environment, life and health of people is investigated, conceptual approaches to consideration of bilge water as one of the most dangerous and harmful objects of discharge from marine vessels are defined.

4 Discussion

Over the past decades, the volume of maritime transportation in the world has a steady tendency to increase, which is primarily due to the importance of maritime transport for the modern global economy. Such importance is explained by the diversity of the range of cargoes transported on the World Ocean, convenience and length of transport corridors, consumer demand from participants of foreign economic activity.

At the same time, there are objective factors, due to which the growth of the global maritime transportation market in 2022 was not as significant as in previous years. According to UNCTAD calculations, this indicator amounted to only 1.4% [1].
One of such factors are geopolitical decisions of certain states, which consist in the introduction of unilateral coercive measures unjustified from the economic and commercial point of view, quite often terminologically incorrectly labeled as "sanctions" (sanction, in our opinion, in international law can be called only a measure of legal responsibility for the offense committed in accordance with international legal principles and norms, and not a unilateral domestic act adopted in circumvention of the established ones) Such actions, undoubtedly, negatively affect the market of maritime transportation, being a deterrent lever and reducing both real and potential opportunities for the full realization of private legal interests of participants of merchant shipping [2, P. 60; 3, P. 2358].

The next important factor is the change of routes, increase in costs and adjustment of transportation logistics taking place in the world, including commercial contractors from China as one of the largest maritime market players as an exporting party, starting from 2020 due to the COVID-19 pandemic. An example of the consequences of this situation is the decrease in the freight rate of dry bulk carriers in November 2022 after long-term trends of constant increase [4].

Finally, the third major factor that has a direct impact on the volume and quality of the global shipping market is climate and environmental impacts on the marine environment, which this study aims to analyze from a factual and legal perspective.

In this context, it should be noted that environmental problems caused by ship operations have both universal and regional (and in some cases subregional) dimensions.

The acuteness of the designated problem for the preservation of natural (life) and operational capacity of marine spaces is emphasized by the terminology used to describe the impact of environmental problems by L.V. Speranskaya, who operates in her works with rather uncompromising concepts of "environmental security", "ecological warfare", "ecocide", "weather warfare", "marecide", etc. [5, р. 146-151].

As pointed out by S. Andresen, summarizing the reaction of international law to increasing environmental risks and impacts, the broader concept of sustainable development has replaced the narrower concept of environmental protection [6, p. 78], which seems to reflect the recognition by the world community of the conscious need to apply a systematic approach to solving marine environmental problems, consisting in the systematic, proactive creation of favorable conditions, rather than in reflexive actions that respond to certain negative trends that have already emerged In other words, we mean the development of an integrated approach capable of predicting and preventing adverse effects on the marine ecosystem before they occur by keeping them within the maximum permissible limits inevitable in the active implementation of maritime transportation by modern ships.

In other words, keeping environmental risks within acceptable limits should be taken into account in the conduct of merchant shipping by all its participants a priori, as stated in a number of key international documents for the organization of the world trade system. Thus, the preamble of the Marrakesh Agreement on the Establishment of the World Trade Organization (WTO) emphasizes that the economic relations of member states should contribute to "the growth of production and trade in goods and services with the most appropriate use of world resources in accordance with the objectives of sustainable development" [7]. At the same time, it is obvious that the sustainable development of the World Ocean in harmony with the satisfaction of economic interests of its users is precisely the goal, the end result of the adoption of the latest universal international legal mechanisms, which is initially laid in their conceptual foundation.

One of the key elements in really ensuring the sustainability and quality development of the marine ecosystem is the prevention of pollution from ships, including special maritime law institutions such as, for example, oil pollution or the dumping of cargo residues.

Speaking about the very problem of pollution from ships as a factor that negatively affects the state of the marine environment in which marine transportation is carried out, it should
be noted that the International Convention for the Prevention of Pollution from Ships (MARPOL) adopted on November 2, 1973, which is the main universal international treaty on this issue, defines such types of wastes discharged from ships at sea: oil; harmful liquid substances transported in bulk; substances transported by sea in packaging; sewage from ships; garbage [8].

Analyzing the problem of oil pollution of the World Ocean and the search for adequate international legal mechanisms of response, it is worth mentioning the fact that approximately 1/3 of the total annual volume of marine pollution by petroleum hydrocarbons falls on pollution from ships. Such a conclusion is based on the materials of the UNCTAD Maritime Transport Review for 2022. [9].

In 1980-1981, as a result of studies by a special IMO expert group, a classification of discharges from oil ships of hydrocarbons in the marine environment was established, which identified the following types of oil discharges: a) operational discharges of oil cargo from tankers; b) discharges from ships during docking; c) discharges at berths, including bunker operations; d) discharges with bilge water (i.e., e) discharges with oily ballast from fuel tanks; f) spills from tanker and non-tanker accidents [10, p. 9].

In his message for World Maritime Day 2007, IMO Secretary-General E. Mitropoulos noted that, according to shipping market analysts, although there has been an increase in global maritime trade in oil and petroleum products, and therefore the volume of transportation of these products has also increased in percentage terms, there has been a steady decline in the amount of oil spilled during this period from 1985 to 2006 by about 85%. The statistics show an annual improvement in the overall situation both in the number of oil spills and the volume of oil spilled [11].

Oil pollution from ships can be extremely dangerous not only for the marine environment, but also for human life and health. For example, as a result of unauthorized discharge of bilge water from the vessel Probo Koala in 2006 8 people died [12].

The problem of bilge water is, first of all, that it is difficult to be treated. Part of oil products is deposited on the set elements and remains there for a long time without decomposition. The main amount of oil up to 35 g/l is concentrated in the upper layer of oily waters, which is not more than 5 % of the total height. In other layers the content of oil products is much less (up to 1.0 g/l) [13].

In terms of existing international legal mechanisms, the MARPOL 73/78 convention already mentioned above allows discharge of oily bilge water treated to a standard of 15 mg/l. State requirements for prevention of pollution of water bodies by ship-generated waste are mainly determined by the relevant sanitary regulations, as well as regulations developed by various regulatory agencies. The requirements related to the discharge of ship-generated waste into water bodies set out in these documents differ from those defined by MARPOL. In inland water bodies it is prohibited to discharge oily water (OW) from ships if the concentration of oil products in it exceeds: 10 mg/l for self-propelled vessels and 5 mg/l for non-self-propelled specialized vessels.

Another special case of pollution from ships in modern shipping is the so-called "dumping", which is understood as waste disposal at sea, which accounts for almost 10% of all pollutants entering the World Ocean [14, p. 4]. At the same time, as G. Timagenis states in this context, waste dumping should not be considered in the strict sense only as pollution from ships, because dumping is a mixed form of pollution, as it actually starts from land, but gets its logical conclusion in the sea by direct discharge from ships. In this regard, it is possible to agree with the proposal of G. Timagenis to ensure effective control of waste disposal process it is necessary to take into account the dual nature of this type of pollution [15, p. 151].

At the same time, the effective and qualitative management of waste generated directly in connection with the process of operation of marine vessels should be recognized as a
significant measure to prevent and counteract "dumping". This process includes collection, transportation, storage, treatment and disposal of wastes, which in its synergetic aggregate should prevent and counteract marine pollution by dumping products. Undoubtedly, the mentioned process is complex, including technical, organizational, managerial, legal measures, which gives grounds from the scientific and methodological point of view to highlight the interdisciplinary nature of counteraction to dangerous and harmful forms of waste dumping from ships.

At the level of human impact, all crew members must be responsible for compliance with the ship's environmental requirements and environmental policy, which is also directly reflected in the underlying universal MARPOL convention. Under its provisions, everyone must be alert to practices that could lead to marine pollution. The designated environmental approach to ship operation includes waste collection and prevention of improper overboard discharge. It also includes ongoing efforts to minimize the quantity and risks associated with waste generated on board. Each ship should have an environmental officer in place using current plans, guidelines and instructions designed to prevent pollution incidents. Such person shall be responsible for the discharge of food waste and shall keep a record of the amount of garbage discharged, the approximate amount of waste discharged, the time and location of the vessel at the time of discharge in the Garbage Record Book. Before discharging, the Environmental Officer ensures that the MARPOL Convention 73/78 and other applicable legislation in this area is not violated. He is also personally responsible for the collection, labeling, treatment, storage and loading and unloading of hazardous waste, oversees all necessary documentation for this process, and is responsible for determining the correct classification of a particular waste and how it should be handled for disposal.

From the point of view of interstate cooperation of public character, it should be noted that the obligation of sovereign states to cooperate among themselves should be considered, as the International Tribunal for the Law of the Sea unambiguously stated in the Decision on Provisional Measures in the case "On the MOX Plant", 2001, as "a fundamental principle of prevention of pollution of the marine environment in accordance with Part XII of the UN Convention on the Law of the Sea and general international law" (para. 82) [16], which seems to be a quite reasonable and reasoned approach to solving the ecological problem of the Russian Federation.

The quoted position of the International Tribunal for the Law of the Sea is of crucial ontological and methodological importance for understanding the general vector of improvement of mechanisms for counteracting various forms of pollution from ships, achieved exclusively through the manifestation of the sovereign will of States parties to maritime activities, to the practical implementation of such agreements and instruments.

Other acts of the International Tribunal for the Law of the Sea have adopted a similar message. For example, the 1999 Order on Provisional Measures in the Southern Bluefin Tuna Case stated as a guiding principle that parties were obliged to "intensify their efforts to cooperate with other participants in the southern bluefin tuna fishery" to ensure its conservation as a species and to promote "the objective of optimum utilization of the stock" (para. 78) [17].

In the context of the analysis of universal mechanisms to improve the environmental safety of shipping, it is also necessary to draw attention to the fact that three new IMO guidelines aimed at reducing greenhouse gas emissions from maritime shipping and the environmental impact of ships came into force on January 1, 2023.

In addition to the universal international legal mechanisms for the protection of the marine environment from pollution from ships, a number of regional agreements and mechanisms aimed at achieving these objectives, both tactical and strategic, should be highlighted.

One of the regional examples of an attempt to solve environmental problems and prevent harmful impacts in a particular part of the World Ocean in a coordinated manner is the
ASEAN Agreement on the Conservation of Nature and Natural Resources 1985 [18, p. 19], which, among other aspects, covers ways of preserving natural diversity in the marine environment.

In the Baltic region, the main document that establishes the environmental basis of maritime transportation is the Helsinki Convention for the Protection of the Marine Environment of the Baltic Sea Region, 1992 [18, p. 20]. [18, p. 20], which defines as one of its tasks the protection and improvement of the marine environment, which, of course, among other measures, provides for proper control over the amount of pollution from ships. Clause 4 of Article 3 of this Convention fixes the most important practical principle showing its high efficiency in international shipping - "the polluter pays". In its turn, clause 6 of article 3 fixes another key principle of inadmissibility of transboundary pollution, i.e., in other words, if in one's own jurisdiction pollution is paid by appropriate compensations, then outside the limits of sovereign maritime spaces it is categorically prohibited in the absolute form of legal regulation.

In the Caspian region, the document defining the environmental basis for the exploitation of mineral resources and navigation is the Framework Convention for the Protection of the Marine Environment of the Caspian Sea, 2003. [18, p. 20].

In the Azov-Black Sea basin, the key document regulating issues related to pollution from ships is the Bucharest Convention on the Protection of the Black Sea against Pollution, 1992. [19].

Thus, the international legal system of countering marine pollution from ships consists of a whole complex of specialized sources of international maritime law, adopted both at the universal and regional levels, and being in mutual intersection and organized, systemic correlation with each other.

5 Conclusion

Pollution from ships in modern shipping is a serious factor significantly affecting the market of maritime transportation and opportunities of its participants, which is explained by a significant universal and regional international legal framework regulating the technical characteristics of ships and the rules of behavior of the crew, in case of non-compliance with which legal liability measures are established, including not allowing the ship in certain water areas.

Moreover, the extraction of living and non-living mineral resources of the world's oceans seems possible in sufficient quantities to meet existing consumer demand only with systematic adherence to environmental norms that conceptualize the sustainable development paradigm.

In turn, the preservation of marine ecosystems is the most important prerequisite for achieving sustainable development of the world ocean as a spatial sphere of maritime transportation, through which the private legal interests of subjects of maritime activity, as well as the public economic interests of sovereign States are realized.

Based on the results of the study, the author has developed and formulated the following proposals:

1. According to the model established in the Helsinki Convention for the Protection of the Marine Environment of the Baltic Sea, it is advisable to transfer the international legal mechanism "polluter pays" to other regions of the World Ocean as it has shown its effectiveness. This mechanism is able to effectively influence the behavior of subjects of maritime transportation, based on the presumption of the general effectiveness of economic measures of legal responsibility in private legal relations. At the same time, an important point is the adoption of an effective procedure for bringing the violator of
environmental norms to material responsibility, which should be ensured by the joint efforts of all States parties at both the law-making and law-enforcement levels.

2. Oil pollution is one of the most dangerous types of pollution from ships for the marine ecosystem, and the relevant statistics should include not only direct oil spills, but also discharges of bilge water, fuel waste, oily ballast, which occurs not only from oil tankers, but also from other technical types of marine vessels.

3. The process of formation of international legal regulation of counteraction to pollution from ships has not yet been completed, as there are still areas of the World Ocean where there are no special regional international legal mechanisms to control pollution from ships, as well as to prevent the increase of discharges to an unacceptable level (both quantitatively and qualitatively).

Thus, the objectives of the conducted study have been achieved.

Using a comparative legal approach, the peculiarities of international legal regulation of issues related to pollution from ships, characteristic of different regions of the World Ocean, have been identified.

The normative-legal analysis of international treaties regulating pollution from ships allowed to identify the main international legal mechanisms, including at the universal level of interstate interaction.

The system analysis of methods of pollution from ships, their influence on the development of merchant shipping and quality of life of the crew was carried out, and their role in the formation of a certain tendency to a slight decrease in the volume of world maritime, primarily container, transportation was established.

Proposals on improvement of international legal mechanisms of prevention of inadmissible pollution from ships in conditions of unification of international maritime law around the UN Convention on the Law of the Sea 1982 and MARPOL 73/78 convention are developed and formulated.

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