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Analysis of International Measures to Reduce the Environmental Pollution caused by Oil Tankers

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ABSTRACT

Due to the high use of the sea and the diversity and speed of discharge of pollutants into the sea nowadays, the self-purification capacity of marine ecosystems is reduced, and the effects of the entry of these substances can hardly be neutralized. Various human activities through maritime transport have led to the entrance of oil pollutants through current ship operations and maritime accidents. This paved the way for the emergence of a global mindset on the need to protect the marine environment from oil pollution and take actions to prevent, cooperate and deal with pollution, and, ultimately, to compensate the victims of these accidents. The purpose of this study is to research the impact of international actions taken to reduce the environmental pollution from oil tankers. This article has been carried out using a descriptive-analytical method. Based on studies conducted, the authors conclude that international rules and regulations have defined the limits of the rights and obligations of governments and international organizations in reducing environmental pollution from oil tankers. What needs to be done is to find universal support for these rules and regulations and their implementation. The perfect implementation of International Conventions for the proper transportation, collection, recycling, treatment, processing, and disposal of these materials will have a significant effect on the reduction of marine pollution caused by maritime transport.

Keywords: Oil tankers, Environmental pollution,maritime law, International treaties.

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Análisis de Medidas Internacionales para Reducir la Contaminación Ambiental causada por Petroleros

RESUMEN

Hoy en día debido al alto aprovechamiento del mar y la diversidad y velocidad de vertido de contaminantes al mar, la capacidad de autodepuración de los ecosistemas marinos se ve reducida, y los efectos de la entrada de dichas sustancias difícilmente pueden ser neutralizados. Diversas actividades humanas a través del transporte marítimo han dado lugar a la entrada de contaminantes derivados del petróleo a través de las operaciones actuales de los buques y los accidentes marítimos. Esto allanó el camino para el surgimiento de una mentalidad global sobre la necesidad de proteger el medio ambiente marino de la contaminación por petróleo y tomar medidas para prevenir la contaminación, cooperar y lidiar con la contaminación y, en última instancia, indemnizar a las víctimas de estos accidentes. El propósito de este estudio es investigar el impacto de las medidas internacionales tomadas para reducir la contaminación ambiental de los petroleros. Este artículo se ha realizado utilizando un método descriptivo-analítico. Con base en los estudios realizados, los autores concluyen que las normas y reglamentos internacionales han definido los límites de los derechos y obligaciones de los gobiernos y organismos internacionales en la reducción de la contaminación ambiental de los buques petroleros. lo que se necesita hacer es un apoyo universal para estas reglas y regulaciones y su implementación. Es perfecto La implementación de convenciones internacionales para el transporte, recolección, reciclaje, tratamiento, procesamiento y eliminación adecuados de estos materiales tendrá un efecto significativo en la reducción de la contaminación marina causada por el transporte marítimo.

Palabras clave: Buques petroleros, Contaminación ambiental, Derecho marítimo, Tratados internacionales.

Introduction

The importance of the seas and oceans for transportation, energy supply, vast mineral resources, and their contribution to environmental balance is evident to everyone. However, this sector, like other sectors of the environment, has been a victim to human exploitation. Due to rapid population growth and industrialization of communities, exploitation of sea water is often carried out independently of the capacity and power of this part of the environment. For a long time, effective and appropriate actions to protect it were not even considered. The geographical extent of water (relative to land areas) and the global lack of power to sustain this ecosystem have been important factors in the degradation of the marine environment by human use (Anyanova, 2012). In addition, the geographical diversity of different maritime regions of the world and the numerous and varied sources of marine pollutants have complicated the problem and negatively affected the efforts to use the waters of the seas and oceans in a regular and adequate manner (Ruban & Yashalova, 2022).

Therefore, due to the growing dependence and expansion of the daily needs of human societies on food and energy resources, the importance of maritime transport for the widespread exchange of these resources around the world and the intensification of oil pollution from shipping activities, the world witnessed many maritime accidents that left significant oil pollution[1] (Mensah, 1976). Accidents such as the sinking of the Torrey Canyon off the coast of the Lands, resulted in the entry of more than 100,000 tons of petroleum products into sea water and the extinction of large numbers of birds and other aquatic animals in 1967. The recurrence of similar events such as the sinking of the Erica ship in proximity to the coast of France and the fall of the Prestige off the coast of Spain led to the leakage of more than hundreds of thousands of tons of petroleum products in the sea water and the occurrence of similar damage as that produced by the Canyon (Nanda, 1967).These events have drawn the attention of the international community to the need to protect and preserve the marine environment (Utton, 1967). By holding numerous meetings and ratifying Conventions, the International Maritime Organization provided in its General Assembly the basis for reducing the likelihood of similar accidents as well as ways to prevent and compensate for maritime damages(Gaskell, 2003).

The purpose of this study is to find a way to solve the environmental problems caused by oil tankers, given the widespread methods of oil pollution of sea water. If there

[1] The most famous of these events are:
1. The American tanker Torrey Canyon (with the flag of Liberia), 1967 caused a leak of one thousand tons of oil off the coasts of Britain and France.
2. The tanker Amoco Cadiz, which sank off the coast of France in 1978, shipped 220,000 tons of crude oil to the French coast.
3. The Exxon Valdes tanker, sank off the coast of Alaska in 1989 and caused damage. This is the second - largest oil incident in the United States.
4. The ship Erica, sank off the coast of France in 1999 and brought 20,000 tons of oil to the shores, and its cleansing up continued until 2000.

is a global consensus and international cooperation of all countries in the world, profound and fundamental actions can be taken in this field, and the problems can be largely solved (Ringbom, 1999). In this sense, the international Convention on Oil Pollution Preparedness, Response, and Cooperation (OPRC) was ratified by the International Maritime Organization in 1995. The main objective of this Convention is to take rapid and effective action in the event of an oil pollution accident, avoiding irreparable damage to ships, offshore installations, ports, equipment, and oil loading and unloading. It also provides the basis for international cooperation in dealing with oil pollution incidents (Dzidzornu & Tsamenyi, 1990; Gauci, 1999; Mason, 2003; Ülker & Baltaoğlu, 2018).

1. Concepts

1.1. **Definition of pollution**

The broadest definition of pollution of the seas and oceans from the perspective of international law that was established by to the International Oceanography Commission of UNESCO and the United Nations Ad Hoc Group of Experts[2] on the Scientific Aspects of Marine Pollution, includes the direct or indirect introduction of substances or energy into the marine environment which have harmful effects on living resources and pose a danger to human health thus interfering with marine activities, including fishing, and damaging the quality of sea water with regard to its use (Churchill, 2011)

Pollution can also be defined as an adverse change in the physical, chemical, and biological properties of air, water, or land that endangers the health of humans and other living organisms (Mohammadi Golrang, 2021). According to this definition, pollution does not necessarily include physical harm but also the interruption of human use is considered self-pollution (Hosseini & Kalbassi, 2003). On the other hand, the International Convention for the Prevention of Pollution from Ships, known as the MARPOL[3], as defined by Article 2 (2) of the International Maritime Organization, defines harmful substances as any substance entering the sea that is likely to endanger human health, damage living resources, and the marine environment, harm amenities, and disturb other legitimate marine resources and/or any article controlled by this Convention[4] (Nordquist, 2011).

[2] UN Groups of experts on the scientific aspects of Marine pollution (GESAMP)

[3] International Convention For The Prevention Of Pollution From Ships 1973 (MARPOL)

[4] Harmful Substance Means Any Substance that, if introduced into the sea, is liable to create a hazard to human health, harm living resources, and marine life, damage amenities or interfere with other legitimate uses of the sea. And includes any substance subject to control by the present convention.

1.2. Marine oil pollution

Marine oil pollution is sometimes caused by oil spills from offshore structures during exploration and exploitation, from oil spills by cargo or ship at sea, from release of offshore structures, and frominvasive species due to marine sediments. Therefore, according to the International Convention on Civil Liability for the Compensation of Oil Pollution, oil pollution is the result of spillage of any hydrocarbon oil used to steer or propel a ship into the territorial sea of a country, and as a result of any event causing pollution damage or serious and imminent threat of such damage. In other words, oil pollution means the contamination of the environment with petroleum products resulting from events or accidents that threaten the marine environment or coastlines, or the interests of a country (Sengul *et al.,* 2010). Of course, oil pollution is not only caused by the spilling of fuel oil from a ship into the territorial sea of a country, and much of it can also occur outside the territorial sea. Oil pollution is not caused by the heating oil on ships, but because of exploration and exploitation, oil leakage from the oil cargo of the ships, etc.

2. International regulations to prevent, deal with, and compensate for oil pollution

1. International preventive regulations.
2. International regulations related to cooperation and combating oil pollution.
3. International Liability Regulations to Compensate for Ship Fuel Oil pollution.

2.1. International preventive regulations

Pollution of aquatic environments by hidrocarbons is an unavoidable problem that occurs due to leaks at docks, explosions of oil tankers and oil wells and deep waters drilling. Pollution resulting from oil exploration and extraction through pipelines from the seabed, the traffic of oil tankers, accidents and incidents related to oil platforms, movement of ships, and land-based sources and industries are among the factors affecting the ecology of the sea. The destruction of marine systems and surface waters has caused irreparable damage to the environment. Today due to the high use of the sea and the variety and speed of discharge of pollutants into the sea, the self-purification capacity of marine ecosystems is reduced and can hardly neutralize the effects of the entry of such materials (Vanem *et al*., 2008). Flowing waters and industries that have developed along the coasts create a massive part of marine pollution. Other factors that can lead to pollution of marine ecosystems are well drilling, maritime transport (shipping), natural oil spills, direct contact of the water surface with the surrounding air, and deliberate dumping of material into the sea. Maritime transport, including commercial ports, oil terminals, ship repair

shops, fishing docks and ships generates waste that could be a potential source of marine pollution. The collection, recycling, cleaning, processing, and disposal of these materials significantly reduce marine debris resulting from maritime transport (Burrows *et al*., 1974; Eide *et al*., 2007; Mensah, 2007).

Since shipping is an international industry, it must be regulated internationally. As a result, since its founding in 1958, Emo has sought to strike a balance between the various interests involved, based on its guiding principle of "safer ships and cleaner seas". The basis of this principle is the undeniable fact that maritime transport is an essential part of international trade and carries certain risks in the transport of goods by sea. This is especially so when transporting polluting cargo such as oil and petroleum products and hazardous and potentially harmful substances that are potentially harmful to the marine environment. As a result, due to the increasing level of global environmental awareness, the environmental risk factor has become almost as important for the maritime industry and its central global agency (Gold, 1998). An international industry, with transnational trade links, needed a uniform international system rather than a unilateral national regulatory system. If there was any doubt about this fact, it ended with the conclusion of the 1982 United Nations Convention on the Law of the Sea[5]. The International Maritme Organization (IMO)[6] will also have the authority to develop these rules. As a result, it has drafted about 50 International Conventions, protocols, and agreements associated to safer ships and cleaner seas. These treaties have been carefully drafted, negotiated, and widely accepted (Gold, 1991).

The shipping and oil industries play a very important role in the problem of marine pollution given the nature of their activities. However, in recent years, these industries have taken significant preventive measures to reduce pollution. The shipping industry has taken important steps to reduce marine pollution through the implementation of international laws and standards in the field of ship waste and pollution management, developing new technologies to control pollution, and training ship crews in pollution management techniques. The oil industry has also sought to reduce the environmental risks of its activities by employing advanced technologies in the exploration, extraction, transportation and refining of oil and gas, as well as by implementing educational and safety programs for their employees. These measures help to significantly reduce current and future marine environmental pollution.

On the one hand, it is important to recognize that international law is not always the solution, but sometimes it can be part of the problem. For instance, the "flag state" concept in the shipping industry can have undesirable distributional consequences in terms of accountability and risk management. The "flag state" concept allows ships to fly the flag of a country with more lax regulations in order to avoid the stricter requirements of other nations. This may lead some shipping companies to

[5] United Nations Convention on the Law, 1982, Parts VII and XII

[6] International maritime organization

choose a more permissive flag state, thereby reducing their own liability for potential incidents and pollution. These companies may also abuse weaker regulations to disproportionately transfer operational and environmental risks. This can result in higher compensation and cleanup costs for other stakeholders, such as governments and local communities. Therefore, the "flag state" concept should be used with greater caution and oversight to prevent potential abuse.

2.1.1. International Convention for the Prevention of Pollution of the Sea by Oil, 1954

The first conference on oil pollution prevention was the 1954 International Convention for the Prevention of Pollution by Oil. This Convention was ratified when customary international law had few provisions on marine pollution (Churchill, 2012). For this reason, the provisions of this Convention, while not very effective in preventing oil pollution, are an effective step in international law to standardize pollution prevention rules. The result of this action is Article 2 of the Offshore Convention, which establishes that "States shall exercise their freedom on the high seas in such a way as to reasonably take into account the interests of other States on the high seas". Eventually, these materials and the Corfu and Smalter Strait cases led to the acceptance of a general rule of customary international law that governments should not allow their citizens to introduce harmful substances into the sea (Healy, 1969; Van Hanswyk, 1988; Van Reenen, 1981). The rules and Regulations, and standards set by this Convention to prevent oil spills into sea water are:

1. Prohibition of discharge of petroleum products within a 50-mile radius of the tanker and determination of the penalty for non-compliance with this prohibition[7].

2. The need for tankers to have a n event log.

3. Acceptance of the flag rule.

4. Designation of specific marine areas (North Sea, Black Sea, and Baltic Sea) in which any discharge of petroleum products is prohibited.

Under the 1962 amendment, in addition to increasing the radius of the exclusion zone from 50 miles to 100 miles, the amount of oil that a tanker may discharge while in motion was also changed so that it must not exceed 60 liters per mile. The need to equip the coasts and ports of the Contracting States to receive sewage and petroleum products from ships is another requirement created by the 1962 Amendment to the Convention. The failure of Convention 1954 and its amendment to prevent the discharge of sewage from ships into the sea led to the creation of a system called "loading on the remains of the previous cargo". The scheme was

[7] Under the 1962 amendment, which entered into force in 1967, the distance was increased to 100 miles.

invented by the oil industry and shipowners, and it consisted of asking tankers to remove water from the ship after emptying and washing the tanks and to store the remainig waste in the tanks for later loading (Zhu, 2007).

This method, while having significant advantages in reducing oil pollution, has three significant disadvantages:

1. Cannot be used for short voyages.
2. If the next shipment cannot be mixed with the previous cargo, this method cannot be used.
3. Many ports were not equipped with equipment and facilities for receiving oil waste.
4. The Convention entered into force in 1958, and since then an international body should oversee compliance with these provisions. After the establishment of the International Maritime Consulting Organization (IMCO), the organization assumed liability for monitoring the implementation of the Convention in 1995[8] (Kiss & Shelton, 2007).

The weaknesses of this Convention can be listed as follows:

1. Ease to discover violations of the rules contained in the Convention.
2. Reluctance of flag States to pursue shipowners of their national fleets which indicates the high cost of complying with the requirements of the Convention and the reduction of competition of national fleets with commercial competitors.
3. The allocation of authority to establish facilities to receive waste and oil residues is the responsibility of port owners, and the guarantee of compliance with these requirements is not determined.

2.1.2. International Convention for the Prevention of Marine Pollution from Ships, 1973

The main objective of this Convention was to prevent intentional pollution of the marine environment by oil and other substances, as well as to reduce the accidental discharge of toxic substances into the seas. The convention was amended in 1978 and before it entered into force at the International Conference on Tanker Safety and Pollution Prevention 1978, it has since become known as the Marpol Convention of 73/78. This convention has 20 articles and four annexes, the first of which concerns

[8] In 1982, the organization was renamed the International Maritime Organization (IMO).

the rules on the prevention of oil pollution by hydrocarbons, which was repealed by the International Convention for the Prevention of Pollution by Hydrocarbons adopted in 1954 and its amendments of 1962 and 1969. This Convention regulates the methods of water pollution from ships other than waste disposal. On the other hand, this Convention, by virtue of paragraph 1, Article 1, cannot in any way cover warships and other ships owned or operated by a State that have been used by the government for non-commercial purposes at the time in question. Likewise, the emphasis of the Convention on the non-impact of its provisions on the rights of member states to explore and exploit the natural resources of the seabed and subsoil near their coasts is another significant case (Ng & Song, 2010).

The above cases are examples of the notable features of this Convention that have played an important role in reducing water pollution by setting the necessary technical standards. Intentional or operational oil pollution was reduced by 30% during the 1990s and 1980s due to a 17% increase in oil transportation by sea (Arslan *et al*., 2018; Fleischer, 1971).

2.2. International measures related to cooperation and combating oil pollution

With the increasing public environmental awareness and the need for effective and accurate international action in protecting the marine environment, along with the Canyon tanker accident that brought over 100,000 tons of crude oil into the English Channel, oil spills and extensive damage to the coasts of France and the United Kingdom led to further regional and global marine pollution problems. Immediately after the catastrophe, the UN General Assembly adopted Resolution 2414 on International Co-operation on questions related to the oceans and called on member states and international organizations to improve the process of adopting international agreements on the prevention and control of marine pollution. (Kiss & Shelton, 2007).

On December 21 of that year, the General Assembly requested the Secretary-General to study the marine pollution resulting from the widespread use of the seabed. Two years later, the General Assembly would make a recommendation on hazardous substances affecting the oceans and the activities of member states and international agencies for the prevention and control of marine pollution. It would also seek the views of member states on the feasibility and ratification of an international treaty on this issue. During this period, global efforts were focused on finding a solution to the problems caused by marine pollution. As a result, the International Maritime Organization drafted the next two Conventions in 1969 (Kiss & Shelton, 2007).

2.2.1. International Convention Relating to Intervention in the High Seas in Cases of Oil Pollution, 1969

After the sinking of the Canyon in 1967 and the shelling of the vessel by the British government to reduce the damage caused by the accident, the need for timely action by governments to cooperate and deal with these incidents and prevent the development of their harmful effects became apparent. The sinking of the ship and the damage to the fishing, agricultural, and tourist industries led to several lawsuits to compensate for the damage caused (Chen *et al*., 2019). The British government, therefore, requested the International Maritime Organization to consider and decide the course of the conference in the face of numerous complaints on the matter, because, before that, customary international law and the rules governing the legality or illegality of the bombing of this oil tanker on the high seas are unrestricted. International law had not yet grown sufficiently to convince the world of the legality of the British rigmarole, and most governments believed that if an incident occurred across the sea of a state territory, the country would have the right to either intervene or not intervene, even if the coast of that country is threatened by this event (Gurumo & Han, 2012; Schmitt, 1997).

Despite these circumstances, the International Maritime Organization met in Brussels in 1969 and the result of this meeting was the ratification of a convention entitled "Intervention in the high seas in the event of accidents caused by oil pollution" which enables national governments to adopt measures to prevent or reduce pollution from maritime accidents (Erkebay, 2018; O'Connell, 1970).

The convention allows the coastal state to intervene, if necessary, against the owner or cargo of a vessel to prevent, reduce or eliminate the imminent danger on the high seas where the coastline or benefits associated to pollution are threatened (Scheffer, 1971).

Under Article 1 of the Convention, Contracting States are authorized to take measures necessary to protect their environment on the high seas, that prevent the reduction or elimination of serious or imminent danger of oil pollution. Two main points have been considered in drafting this Convention: first, governments must maintain the proportionality and moderation of their actions (Seyfang & Jordan, 2013), and second, the right of States to complain about extremist actions by other States must be recognized as a fundamental principle. This convention has been ratified in relation to the activities of States on the high seas, and if for example, pollution occurs in a monopolist economy zone, the government will not have the right to intervene to prevent or reduce pollution. It may seem that the coastal State cannot exercise its power in a monopolist economy zone. But since there is no other Convention for intervention in the monopolist economy zone, if the above powers are limited to the high seas, in practice, the coastal government will have more authority to intervene in the high seas than in the monopolist economy zones (Mendelsohn, 1971).

Simultaneously, at the time of drafting the Intervention Convention and its protocol, the concept of a monopolist economy zone had not yet been formed, and it seems that the meaning of the high seas in the the Convention document is logically a region beyond the territorial sea (Higgins, 1978).

2.2.2. International Convention on oil pollution preparedness, response, and co-operation, 1990

The Convention was ratified by the International Maritime Organization in 1990 following the sinking of the Exxon Valdes off the coast of Alaska and entered into force in 1995. The Convention emphasizes the need to act promptly and effectively in the event of an oil pollution accident to prevent irreparable damage to ships, marine facilities, ports, oil spills, and cargo equipment and also provides the basis for international cooperation in dealing with oil pollution incidents (Meyer *et al*., 1997).

The main objective of this Convention is to provide prompt and effective measures to prevent or reduce the harmful effects of oil related maritime accidents, thereby preventing environmental damage by providing international co-operation to prevent or treat irreparable damage and ensure maritime safety or reduce related losses. Prevention can be very effective in combating pollution, but this is only one aspect of the oil pollution problem because, despite the advances in this field, the occurrence of oil pollution is inevitable (Lansakara, 2011).

2.3. International Convention on Civil Liability for Bunjer Oil Pollution Damage

While emphasizing the principle of co-operation of States in the further development of international law, this Convention provides that, in the first place Governments must take all necessary measures to prevent, reduce and control marine environmental pollution. Secondly, they should pay all damages caused by marine ecological pollution to ensure adequate and immediate compensation. While emphasizing the precautionary principle against liability and compensation for marine environmental pollution, the aforementioned Convention provides for fair, prompt, and effective payment and considers it necessary. Interestingly, this Convention guarantees sufficient, prompt, and effective compensation payment (Ivshina *et al*., 2015) which is also considered necessary. It could be argued that this guarantee later became the Environmental Compensation Fund. On the other hand, the scope of the Convention extends precautionary measures to prevent or reduce such damages, holding the shipowner liable for any damage caused by pollution brought about by any type of fuel for ships, and in the case of multiple owners, specifically expressing their responsibility. The cases of exemption of the liability of the owners referred to in paragraph 3 of Article (3), that include issues such as war, insurrection, the act of a third party or the intention of causing damage, among others, indicate the acceptance of risk theory as the base of liability according

to this Convention (Teal & Howarth, 1984). Although the primary objective of international law is to prevent pollution, its secondary objective is to facilitate the response to the claims of those who have suffered pollution since, despite such a process, the need to compensate the victims of the contamination is evident, and it is expected that international standards and requirements be implemented by ship operators, ship owners and transport officials (Mityagina & Lavrova, 2016).
On the other hand, for almost three decades, a reasonable international liability and compensation system has been implemented for damage caused by oil pollution. Insurers cover the ship protection and compensation for approximately 30 different risks related to ship operations up to an unlimited theoretical roof. The system is backed by a complex reinsurance arrangement through an international group[9] with access to more than $ 2 billion in reserves.

An exception to the indefinite coverage is oil pollution, with a limit of $ 500 million, which in certain circumstances can be increased to $ 700 million (Poland & Rooth, 1996). It is part of a system of mutual accountability that has been very good at spreading the risk evenly across the global fleet for over a century, and all shipowners are benefiting. In addition, the coverage provided seems to be sufficient for all less catastrophic events. However, this coverage has certain limitations to claim damage due to oil pollution because unlimited coverage is not insurable for catastrophic events. In a system of accountability, the Congress may inadvertently endanger its main purpose in its rush to pass liability legislation. All marine risks are subject to the unique principle of maritime law on the limitation of liability, allowing the owner of the ship to assess the total risk in relation to the tonnage of the ship. This restriction will not be allowed only if the event that leads to litigation has been committed by the owner of the ship with real and confidential failures[10], intentionally and recklessly knowing that the damage will ocur.[11]

2.3.1. International Convention on civil liability for oil pollution damage 1969 and the 1992 amendment protocol

The Convention ratified by the International Maritime Organization (IMO) in 1969, was a measure to help possible victims of oil spills compensate for the lack of international regulation, which became evident when the Canyon sank. With this description, the Convention defines a ship in paragraph 1 of Article 1 interpreting it as a means for ocean-going vessels and any submarine built or modified to transport bulk oil as a commodity (Nigar, 2018).

However, first, the ship must be a cruise or an ocean liner, and second, it must be used to transport bulk oil. Third, the oil should be carried as a commodity and still

[9] P & I Clubs

[10] Under the 1957 Limitation Convention.

[11] Under the 1976 LLMC Convention.

have the above characteristics on the same voyage or after shipment. The accident will result in contamination subject to the Convention. The only exception to this definition is when the ship, after carrying the cargo of oil, does not retain any sediment of the oil carried during the voyage (Purwendah *et al*., 2019). In paragraph 3, Article 1 of the Convention, the criterion for determining the ownership of a ship is the registration of the person as the owner. Otherwise (no-registration), the discovery of who owns the ship would create a relationship of ownership. According to paragraph (1) of Article 1, oil means any stable mineral hydrocarbon such as crude oil, black oil, etc., whether carried as a commodity on a ship or present in the fuel tanks of the ship. The first point to note in this Convention is the acceptance of the absolute liability of the shipowner as the person responsible for damages (Kaluza *et al.,* 2010).

2.3.2. International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage 1971 and the 1992 Amendment Protocol

Since the 1969 conference led to the conclusion of the two Conventions on oil civil liability for oil pollution and the Convention on intervention on the high seas, there has been a need to find another mechanism for compensating pollution accidents covered by the 1969 Civil Liability Convention, which was explicitly agreed upon at the conference. A few months after the ratification of the Civil Liability Convention, the initial draft of this Convention was prepared. In 1971, at the Brussels Conference, the outcome of the negotiations led to the ratification of the International Convention on Oil Pollution Damage. The Fund Convention was finally ratified in 1995 with improved conditions. The Protocol is also similar to the amendment to the Convention, which extends civil liability of the territory covered by the Convention to the exclusive economic zone of the contracting states (Article 4) and modifies the amount of compensation payable by the Fund. The 1971 Fund Convention, like the Civil Liability Convention, will not ptovide for liability for civil pollution or oil damage from warships or government-operated vessels which were solely in the commercial service of the State at the time of the accident. The Fund Convention in 1976, 1984, and 1992 was amended in three stages by protocols but the 1984 Protocol did not enter into force due to severe conditions. Therefore, the Convention was referred to the IMO Legal Committee at the request of the Contracting States and was finally ratified in 1992 with more favorable terms. This Protocol, like the 1992 Amendment to the Civil Liability Convention, replaces crude oil with various types of crude oil (Article 2) and extends the area covered by the Convention to the limit of the exclusive economic zone of the Contracting States (Article 4). It has also adjusted the amount of compensation payable by the fund (Faure & Hui, 2003).

2.3.3. International Convention on Liability and Compensation for Damage in Connection with the Carriage of Hazardous and Noxious Substances by Sea (HNS, 1996 with the 2010 Protocol)

In 1996, an international conference adopted the HNS Convention which covers oil pollution damage caused by tanker accidents. In the event of maritime accidents, this Convention establishes a two-tier compensation system which covers not only pollution damage, but also fire and explosion risks, including loss of life or personal injury, as well as loss of or damage to property. Compensation will generally be paid from the HNS Fund when the owner of the ship liability for compensation is insufficient or non-existent. Under this Convention, the right to membership in the second tier of the HNS Fund will be imposed on those who receive a specified minimum amount of HNS cargo from the Contracting States over the course of a year. The unit of account used in this Convention is the Special Drawing Right (SDR).

Overall, this legal framework seeks to provide comprehensive and effective compensation for a wide range of damages resulting from the maritime transport of hazardous and noxious substances, protecting both the marine environment and people and communities affected.

From an international law perspective, this Convention serves as an important multilateral legal instrument to foster international harmonization and cooperation in the field of transportation of hazardous and noxious substances. At the same time, the accession of more countries to this Convention and its effective implementation by the Member States, as well as the continuous monitoring and review of this Convention to align it to developments in the maritime transportation industry, are crucial. This can help to update and improve its effectiveness in protecting the environment and coastal communities from risks of hazardous and noxious substances. Overall, this international Convention, as a significant achievement in the field of international environmental law and maritime transport, can potentially play a vital role in strengthening global cooperation in this area.

3. International treaties in response to environmental challenges

Given the spread of environmental hazards in the world and the ineffectiveness of international environmental law in preventing environmental damage, one of the main concerns for compensating environmental damage is the development of indicators of environmental damage. Despite this, transboundary environmental damage occurs continuously and raises issues of liability and treaties. According to Article 38 of the Statute of the International Court of Justice, international treaties are one of the most important sources of international law. Considering that the ratification of more than one thousand bilateral or multilateral treaties and

agreements in international environmental law, international treaties have played an important role in the substantive development of this field of law. Therefore, the implementation of these resolutions is not easy because the international community has neither the executive or the administrative policy, nor the right to executive judgment. For this reason, tools such as persuasion of governments, taking advantage of public opinion pressure, taking advantage of financial aid and incentives such as tax exemption incentives, and removing barriers to domestic law are used (Taghizadeh Ansari, 2020).

In this regard, legal experts recommend the following three Conventions:

1. International Marpol Convention
2. Ship Ballast Water Management convention (BWM)
3. Pattern on harmful antifouling systems
4. Global Environmental Pact

3.1. International Convention for the Prevention of Pollution from Ships – Marpol

The importance of preventing and controlling marine pollution was felt in the first half of the twentieth century, and several countries enacted national laws to control the amount of oil spilled into waters under their control. In 1954, the British government hosted a conference on oil pollution, which gave rise to the International Convention on Oil Pollution of 1954, which was subsequently ratified in 1958 by the IMO. This Convention, one of the most important International Conventions on the prevention of marine pollution is the Marine Pollution Prevention Convention (MARPOL) which was ratified by the IMO at the International Conference on Marine Pollution in 1973 and subsequently amended by the 1978 Protocol. These regulations cover various sources of pollution from ships, and their main objective is to eliminate the deliberate corruption of the marine environment by oil and other harmful chemicals and reduce the discharge of such substances intentionally or unintentionally by applying laws and regulations on ships and ports (Aydin *et al*., 2021; Čampara *et al*., 2018). Annexes 5 and 6 of the Marpol Convention were revised in 2011. This Convention applies to ships that are entitled to fly the flag of a Member State and also to ships that are not but operate under its supervision. Any violation of the requirements of the Convention is prohibited and penalties will be imposed in accordance with the rules of the executive body of the offending ship. Furthermore, infringements within the jurisdiction of each Member State are also prohibited and penalties will be imposed in accordance with the regulations of that Member State (Akten, 2006). In the event of a discharge or contamination, each State Party will provide evidence to the Maritime Organization of the flag State

indicating the discharge of harmful substances or a flow of substances containing such harmful substances in violation of the provisions of the Convention. And when a Member State receives a report of a pollution accident, it will immediately notify the maritime authorities of the polluting vessel of the accident. If an accident has a significant adverse effect on the environment, Member States should investigate the incident and bring the perpetrators to justice, and penalties should be sufficiently severe to prevent a recurrence (Mitchell, 1994).

3.1 International Convention on the Control and Management of Ship Ballast

The issue of the transfer of no-native harmful aquatic species due to the discharge of ship ballast into the sea has now become a global problem, so the solution to this problem goes beyond national plans and requires uniform co-operation at a global and regional levels. In 1995, the Convention on the Law of the Sea urged Member Sates to take all necessary measures to prevent and reduce marine pollution caused by the application of technical knowledge within their jurisdiction, which could cause significant and harmful changes in the environment. As the consequences of introducing marine species into new ecosystems intensified during the International Conference on Environment and Development (Rio) in the same year, the International Maritime Organization was responsible for reviewing and approving regulations for discharging water into the sea to prevent the release of non-native species. In 1995, the Convention on Biological Diversity urged States Parties to appropriately introduce non-native species that threaten ecosystems and habitats of other species, with the aim of conserving biodiversity, sustainable use of species and equitably sharing of the benefits from the use of genetic resources. Immediately after the issuance of the Declaration of the Rio Conference in 1995 and subsequently, while the above-mentioned guidelines were being amended, steps were taken to prepare and ratify the legal instrument necessary for international implementation in the form of the International Convention for the Control and Management of Fish Species. After numerous meetings and lengthy debates and expert opinions, the document was approved by the Member States of the International Maritime Organization on February 13, 2004, following a diplomatic conference. The Convention requires States Parties to oblige ships covered by the Convention and ships entitled to fly their flag to comply with the provisions and requirements contained therein. Each State Party will, in accordance with its conditions and capabilities, develop and implement national policies, strategies or programs for the management of water in its ports and waters under its jurisdiction and competence in order to achieve the objectives of the Convention. As of 2005, eight countries have joined the International Convention on the Control and Management of Water Ballast. The convention will enter into force 12 months after the accession of 30 countries with 35% of the commercial shipping capacity (Karachle *et al.*, 2017).

3.2 International Convention on the Control of Harmful Anti-fouling Systems for Ships

An anti-fouling system is a coating, paint, or similar element used to control or prevent unwanted organisms from adhering to the hull. The presence of such creatures has a negative effect on the movement and operation of ship systems. To prevent such creatures from adhering, coatings or paints known as anti-moss system are used on the hull. But the use of such systems due to the use of tin compounds creates problems for the environment, aquatic animals, and even humans. In fact, the implementation of this Convention reduces pollution caused by tin compounds used in anti-moss systems, protects the marine environment and human health from the adverse effects of tin compounds, prevents the accumulation of living organisms on the hull and prevents the spread of marine organisms and harmful organisms. This Convention helps to produce paints in accordance with international standards in industrial companies.

3.4. Global Environmental Pact[12]

According to the information provided, it appears that, in 2018, the UN General Assembly adopted Resolution 72/277 entitled "Towards a Global Pact for the Environment", requesting the Secretary-General of the United Nations to submit a report on gaps and shortcomings in international environmental law at the 73rd session of the UN General Assembly.

The passage highlights the urgent need for a comprehensive and binding international instrument that can consolidate the dispersed environmental rights and principles, as proposed by the French Association of Environmental Law Jurists and the President of France. Given the significant challenges posed by the implementation of environmental rights at both the national and international levels, the passage suggests that institutional reforms could play an important role in improving this situation.

4. Review of the Convention for the prevention of pollution of the sea by oil[13]

Each State Party will, by designating and declaring ports, take appropriate measures to facilitate the implementation of these Regulations, such as facilities for the reception of waste products and petroleum compounds from ships at ports without delay, facilities for the reception of oil tankers and their combinations at the oil terminal for oil tankers, and facilities for the reception of fuel tanks and other petroleum compounds at ports repairs (Wolok *et al*., 2020). Ships covered by this Convention or any oil tanker will have access to a fuel or oil cargo logbook in accordance with the

[12] A/RES/72/277, General Assembly, Towards a Global Pact for the Environment, 10May2018.

[13] Convention for the Prevention of the Pollution of the Sea by Oil (OILPOL 1954).

Annex to this Convention (Ivanov & Zatyagalova, 2008). Any change in the amount of oil loaded or energy in the ship must be recorded in this logbook immediately, and each page must be signed by one of the officers of the ship. The government where potential violations occur in its territory has to notify the flag government of these violations. However, none of the provisions of this Convention will deprive states of the powers they have under their laws to deal with pollution (Atabule, 2020).

Conclusions

The International Maritime Organization (IMO) has played a significant role in the development of rules and regulations related to maritime safety for more than half a century of its international history. The inclusion of the mandatory provision of equipment for the treatment and collection of contaminated material on ships and ports, the creation of requirements for the installation of navigation aids, etc., brought about a dramatic change in international maritime regulations. These measures were implemeneted through the adoption of methods and rules for compensating victims of pollution accidents and the adoption of regulations under the title of the Convention and related Amending Protocols for the effective implementation of these requirements promised, by the International Maritime Organization (IMO).

Despite the increase in the volume of maritime transport, the amount of pollution caused by ships has been reduced both in terms of operational pollution and accidents. However, in spite of all the efforts made by the international community, the prevention of water pollution has not yet reached a credible point, and it must be said that today there is an international collective policy to protect the marine environment and prevent the occurrence of water pollution, and to take joint measures among all countries of the world, even countries that have not adhered to the relevant Conventions, which is an inevitable necessity.

Otherwise, due to the undeniable impact of water pollution in all countries of the world (even countries that have no role in producing or spreading of this pollution), the fate of some nations will depend on the behavior of other nations. But today, the polluting country can no longer exempt itself from the obligations and duties of international law by invoking the principle of the jurisdiction of the flag-state on the high seas, but in any case, due to different structures of countries in terms of technology and exploitation of marine resources, regulations are costly. The subject of Conventions does not apply equally to the international community, and developing countries believe that developed countries will play a more significant role in marine pollution and that by implementing these regulations, their national fleets will be less competitive. Their refusal to fully comply with international requirements, along with other factors has played a major role in reducing the effectiveness of international regulations in the occurrence of oil pollution from ships and has led to the fact that, despite all the commendable efforts of the World Maritime Organization, oil

pollution still continues to be seen in the waters. Finally, within the framework of international law and the international community, the struggle to ensure the safety, security, and protection of the marine environment as the common heritage of humanity, is necessary to prevent and combat any pollution that occurs in any corner of the world which can affect the farthest corners of the planet. The sources of water pollution need comprehensive and public thinking, and with such a review, the goals of domestic and international legislators have a common goal and all human beings can help achieve this goal by establishing this reflection.

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