

STUDY APPLICATION OF MARPOL 73/78 CONVENTION IN WORLD SHIPPING

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Abstract: MARPOL 73/78 Convention is the International Convention for the Prevention of Pollution from Ships and is one of the most important international maritime conventions on environmental protection. Its application in world shipping is mandatory and imperative. This study is related to the implementation of MARPOL 73/78 Convention globally.

This paper examines the synchronization of international, European and national directives and regulations to protect the environment from pollution with the provisions of the Convention. Keeping a clean marine environment create conditions for better development of marine tourism and fisheries. Implementation and compliance with legal directives and regulations create conditions for the preservation of ecologically clean environment.

As a result of this study establish that prescribed in the Convention to protect the environment and the marine environment from pollution are applied and observed by all Member States under the Convention.

Key words: MARPOL 73/78 Convention, marine pollution, air pollution, pollution of coastal areas, oil pollution

I. INTRODUCTION

Marine environmental pollution is considered as a worldwide problem with an ever growing significance whose solving involves immediate measures related to minimizing and finally eliminating pollution from ships. The adoption of International Convention for the Prevention of Pollution from Ships, known universally as MARPOL 73/78, is seen as a major success in this field. It aims at bringing pollution caused by ships to levels that do not exceed the natural assimilative capacities of the environment and does not hinder the ability to restore its qualities. In order for this to be achieved, MARPOL 73/78 introduces a number of requirements related to ships and their operation.

II. RESEARCH

MARPOL 73/78 is the International Convention for Prevention of Pollution from Ships, adopted on 17th February 1973 by the International Maritime Organization (IMO) in attempt to decrease pollution of seas and oceans by oil, as well as prevention of air pollution from ships. The current convention includes the regulations adopted in 1973 and the amending protocols of 1978 and 1979 which came into existence due to a number of incidents involving tankers in the period of 1976-77. The Convention finally enters in force on 2nd October 1983.

A major part of the Convention is the Annexes, which introduce regulations on prevention of maritime pollution by the cargoes carried onboard. The MARPOL has six Annexes and each of them introduces regulations on prevention of maritime pollution caused by a certain kind of pollutant as follows:

- *Annex I. Regulations for the Prevention of Pollution by Oil*. Annex I entered into force on 2 October 1983 and, as between the Parties to MARPOL 73/78, supersedes the International Convention for the Prevention of Pollution of the Sea by Oil, 1954.
- *Annex II. Regulations for the Control of Pollution by Noxious Liquid Substances in*

Bulk. Belonging to the category of Noxious Liquid Substances in Bulk are 250 substances distributed in the following categories X, Y, Z, and OS and included in a list as part of the Convention. Discharges of residues are only allowed in reception facilities up to certain concentration levels and under certain conditions, depending upon the substance category.

- **Annex III.** *Regulations for the Prevention of Pollution by Harmful Substances Carried by Sea in Packaged Form.* The Annex contains general requirements on standards related to packing, marking, labelling, documentation, stowage and quantity limitations, as well as exceptions and notifications. The Annex entered into force on 1st July 1992.
- **Annex IV.** *Regulations for the Prevention of Pollution by Sewage from Ships.* The Annex contains requirements on controlling pollution by sewage from ships and entered into force on 27th September 2003. Discharges of sewage overboard is prohibited, unless the ship in operation and in open seas. The ship discharges only comminuted and disinfected sewage at a distance of more than 3 nautical miles from the nearest land. Sewage which is not comminuted or disinfected should be discharged at a distance of more than 12 nautical miles from the nearest land.
- **Annex V.** *Regulations for the Prevention of Pollution by Garbage from Ships* The Annex deals with the various kinds of garbage and determines the distances from land as well as ways of discharging. The Annex entered into force on 31st December 1988 and its most important contribution is the total prohibition of plastic disposal.
- **Annex VI.** *Regulations for the Prevention of Air Pollution from Ships.* The Protocol adopted in 1997 and included in the new Annex VI of MARPOL, sets limits on sulphur oxide and nitrogen oxide emissions from ship exhausts and prohibits deliberate emissions of ozone depleting substances. On 21st September 2001 there were still some aspects under discussion, but finally Annex VI entered into force on 19th May 2005. Annex VI contains provisions allowing for special SO_x Emission Control Areas (SECAs) to be established with more stringent controls on sulphur emissions, which have been enlarged due to the increased seaborne trade. It is set that by 2020 all of the Republic of Ireland's international waters will be also included in the enlarged area, resulting in all of Western Europe's subjection to the MARPOL directive. [2]

MARPOL application in the world shipping is necessary and obligatory. The Regulations on environmental and marine prevention of pollution included in the Annexes should be complied with by all the countries signatories to MARPOL. For each of these countries Annexes I, II and VI are mandatory. The rest of the Annexes can be applied with certain variations and usually serve as a basis for local laws and regulations.

Canada and the USA are leaders both in exporting and importing goods by sea and also countries signatories to MARPOL meeting strictly its requirements. Adopting Annex VI, both countries contribute to decreasing and eliminating noxious emissions by vessels berthing and transiting the territorial, continental and international waters in proximity to their territories. Canada and the USA imply severe sanctions for ships which do not comply with Emission Control Area – ECA regulations. (fig.1).



Fig. 1. ECA areas in North America and Europe

Depending on the convention and the type of the emissions controlled, the year of its adopting is as follows: Baltic Sea SO_x emissions – 1997/2005; The North Sea SO_x emissions – 2005/2006; North America including the coastline of the USA and Canada NO_x and SO_x emissions – 2010/2012; the Caribbeans, including Puerto Rico and the US Virgin Islands NO_x and SO_x emissions 2011/2014. [1]

Currently the USA and Canada have come to very good results in terms of NO_x and SO_x, emissions by strictly observing the norms set by the Convention and enlarging the ECA in proximity to their territorial waters.

India is another country signatory to MARPOL whose petrol related economy has led to a recent growth in exportation of goods by sea. The branches in petrol and gas industry which include extraction, processing and supply of petrol and gas products form 15 % of India GDP. In 2009 the production of petroleum goods increased by 3 %. Indian export of petroleum end-products on the international market has proved to be prosperous and constantly increasing, which has consequently led to a raise in seaborne trade. As a result, Indian port authorities strictly observe the norms and regulations set by MARPOL Annexes I and II. Based on the latter, the Indian administration has developed the Shipboard Oil Pollution Emergency Plan both in cases of operational or accidental oil spillage. In such cases, the plan provides an overall centralized coordination involving local groups, controlled by the largest port authorities, namely Mumbai, Goa, Mangalore and others. [6]

Industrialization along with seaborne trade growth has negative impact on maritime environment, not only in the Indian, the Pacific and the Atlantic Oceans but also in the intercontinental sea waters. Floating garbage and oil slicks are the most visible form of pollution in the Mediterranean and the Black Sea region. A main source of pollution is the ships transiting the region and the ballast waters, solid garbage and accidental pollution by tankers having noxious substances onboard.

As most of the Mediterranean coastline mostly belongs to Turkey, the country pays a large contribution to the fight against pollution of its coastal and territorial waters. Politics of prevention of accidental and deliberate pollution of seas has been held by Turkey, it actively participates in IMO researches and being a country signatory to MARPOL 73/78 since 1990, it strictly meets the Convention requirements. Since 26th December 2010, a Waste Control Regulation has been adopted whose aim is to introduce procedures and establish operational

principles concerning ship waste reception, its storage and transfer to disposal facilities, in order to avoid discharging overboard. The Regulation concerns all kinds of vessels and reception facilities. Port Management is held responsible for the reception of solid and liquid waste, e.g. sewage, contaminated ballast waters, and oils, which includes petrol and petroleum products resulting from the vessel's operation as stated in Annex I, noxious liquid substances as stated in Annex II, sewage as stated in Annex IV and solid waste as stated in Annex V.

Apart from the prescribed ECA areas, the Convention states additional Special Areas, in which garbage and sewage disposal has to be done solely in specialized reception port facilities, and the Mediterranean region belongs exactly to this group. (fig.2) [8]

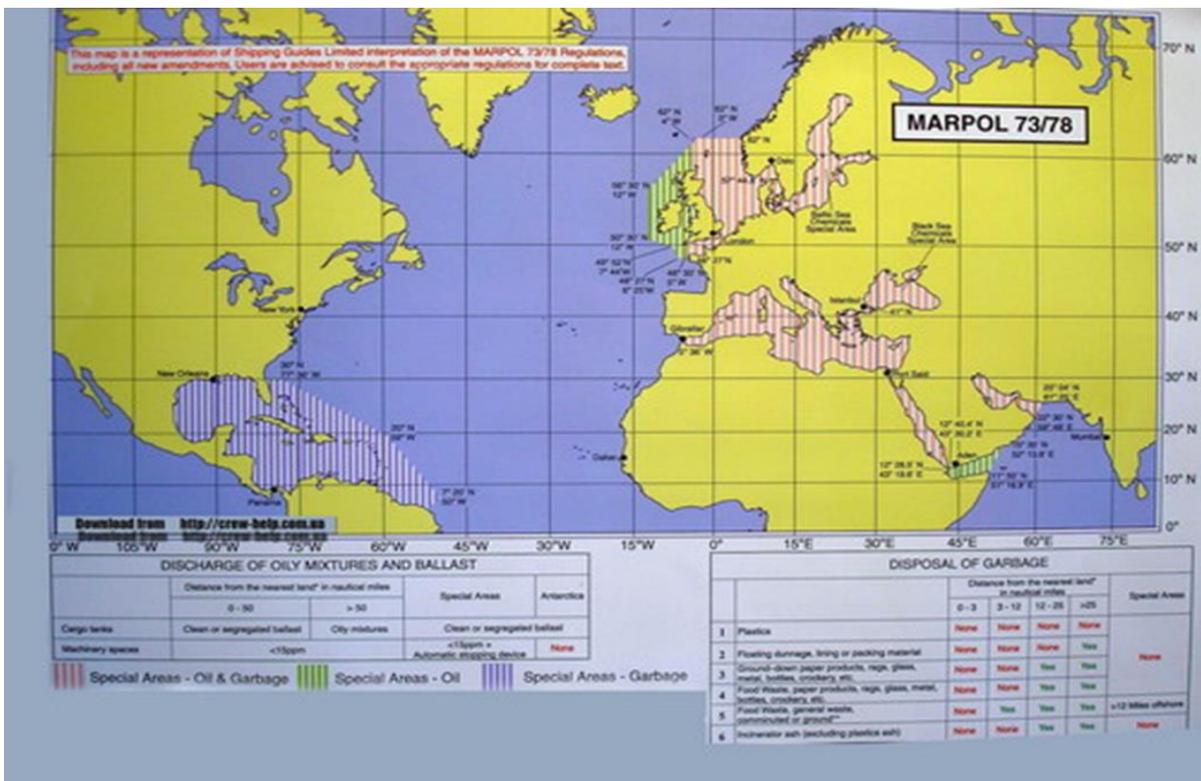


Fig. 2. Special Areas MARPOL

As these Special Areas also include the Greek Mediterranean continental waters, Greece sets up sustainable development and marine environment protection strategy which aims at decreasing polluting operations as well as effectively managing marine environment.

The Greek Ministry of Merchant Marine is the major authority, responsible for the prevention of marine pollution and adopting the international conventions concerning the marine environment. The Greek Ministry of Merchant Marine's politics complies with the Convention regulations and its goals are as follows:

- Constant and continuous monitoring of the coastline and the major water routes;
- Prevention of pollution of the marine environment, its rehabilitation, monitoring and coordination;
- Applying the international and national regulations, related to prevention of pollution;
- Requesting and providing assistance in case of serious incidents;
- Raising public awareness and encouraging active participation in marine environment

protection;

- Profound research of every marine incident involving pollution caused by ships or land based sources;
- Emergency drills, testing the personnel competence in terms of readiness to respond to potential incidents, as well as clean-up equipment and facilities testing;
- Developing and implementing local Emergency Plan in every port and establishing authorities to coordinate the clean-up operations in the given region;
- Building up and exploitation of ship waste reception facilities in every port in order to improve their accessibility;
- Constant and continuous updating of the existing pollution preventing equipment;
- Sanctions against violations;

Achieving the above-stated goals, Greece gets ahead in marine environment protection, in cases of accidental pollution and is ready to adequately and immediately take part in the prevention of a potential ecological catastrophe.

Italy is another European Mediterranean country signatory to MARPOL which applies and observes the Annexes. The country has ratified the MARPOL 73/78 Convention with the following regulations: 462/80 and 438/82, which include the Annexes. Italian territorial waters also belong to the Special Areas and the ECA areas and are consequently subject to the requirements in MARPOL 73/78, Annexes II, IV, V and VI.

The Mediterranean region is considered of key importance as it connects two continents and the African and European countries (Turkey, Greece, Italy etc.) have to largely cooperate in the mission of preserving its marine environment. This can only be achieved if the Convention Annexes are strictly observed and the regulations followed as well as if the national legislation is correspondingly synchronized.

The Black Sea proves to be another European region of major importance since it is intercontinental and preserving its marine environment entirely depends on the countries whose territorial waters belong to it. Bulgaria is one of these countries and also a member of the European Union.

Bulgaria not only implements and observes the European Parliament legislation, but also, being a country member of IMO and signatory to MARPOL 73/78, it has since 2007 synchronized its laws with those of the Union, which in turn are correspondent to the international conventions and regulations. (Table1)

Table 1. Synchronization of the national marine environment protection and preservation legislation with the European one. Black Sea region

European Union Legislation	Legislation of the Republic of Bulgaria	Measures
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Science & Technologies

Directive on the environmental impact assessment (2003/35/EU)	Environmental Protection Act (SG 91 / 2002 , New, SG. 77 / 2005) Environmental Impact Assessment Act (SG, 25 / 2003) Practical Implementation of EIA of Plans and Programmes (SG, 57/ 2004)	Investment plans, programs and projects, which require EIA(according to the Environmental Protection Act) as well as protected areas environmental compatibility assessment (according to the Biological Diversity Act) are approved only after being voted by the authorities and after the assessment prescriptions have been taken into consideration.
Directive on port reception facilities for shipgenerated waste and cargo residues (2000/59/EO)	Act № 15 on Port Reception Facilities for Ship-generated Waste and Cargo Residues (SG, 94 / 2004, New SG 28 / 2009)	<u>Main</u> 1. Special offshore dredged material disposal sites – Black Sea. <u>Additional</u> 1. Beneficial use of dredged materials in port construction. 2. Petroleum waste reception and transfer control 3. Sewage reception and transfer control 4. Ship generated domestic and operational waste control 5. Oil or oily mixture pollution control 6. Liquid bulk cargo ship pollution control 7. Control of pollution by harmful substances carried by sea in packaged form 8. Waste processing and disposal good practices implementation, including ship – generated waste
Directive 1999/32/EO on sulphur content in certain liquid fuels and further decrease in noxious emissions by seagoing ships	Currently being developed	Maritime transport pollution is regulated by Annex VI of the International Convention for the Prevention of Pollution from Ships (MARPOL 73/78), governed by IMO. Prior to 2008 the Convention allowed for fuels with up to 4.5 % sulphur in all maritime areas, except for SECA, where the maximum sulphur content allowed was 1.5 %.

In order to practically apply the changes, the Government of Bulgaria has developed and implemented new regulations based on the Convention annexes. Based on MARPOL 73/78 Annex V Bulgarian ships have been provided with a new form of Garbage Management Logbook and Garbage Management Plan as well as the crew members, shipowners and Maritime Administration duties have been defined in accordance with the Bulgarian Merchant Shipping Code, paragraph 362. Executive Agency “Maritime Administration” of Bulgaria has also issued Ordinance 117, which entered in force on 2nd January 2013 and concerns:

- all ships under Bulgarian flag, operational or not , all kinds of offshore oil platforms;
- all Bulgarian flag ship-owners
- all crew members onboard ships under Bulgarian flag;
- all employees in “Inspection, certification and registration of ships and shipowners” department – Varna and Burgas

- all employees authorized to state port control and state ecological control in Executive Agency “Maritime Administration”;
- all ships under foreign flag, when in Bulgarian territorial waters or the ports of Republic of Bulgaria

Duties related to Ordinance 117:

1. Discharge overboard is prohibited for all sorts of plastics, synthetic ropes, fishing nets, the cinder after these being incinerated as well as cooking oils.
2. Discharge overboard in the territorial waters of Bulgaria is prohibited for the garbage defined in Annex V MARPOL 73/78.

If regulation [3] is observed (Annex VI MARPOL 73/78) garbage is allowed to be discharged in the territorial waters of Bulgaria.

In case of accidental discharge of garbage defined by Annex V, the master of the ship must immediately inform the designated person on duty in the Marine Rescue Coordination Centre.

Last but not the least important are the noxious emissions by ships. After the problem being raised on international ground the IMO member states reconsider the issue and in the end of 2008 come to a revision of Annex VI of MARPOL. This includes a gradual decrease to 0.5 % of sulphur content in marine fuels in all seas, starting from 2020, and to 0.10 % in SECA, from January 2015. The regulations are neutral in technological aspect and can be fulfilled applying alternative methods for noxious emission reduction, such as exhaust gas cleaning systems or liquefied natural gas.

The new regulations, approved in 2008, are to be considered as a great advancement on the way to reducing the noxious emissions in the fast growing sector of shipping. As a result, the SO₂ emissions are expected to decrease with more than 90 % in SECA and more than 75 % in the other marine areas, bordering with Bulgaria and the EU. Furthermore, it is expected for the fine dust particles to drop with more than 60 % in SECA and with 75 % in the other marine areas. The related benefits, deriving from the 2008 MARPOL agreement, are evaluated at least as much as 15 – 34 billion EUR in 2020. [4]

The 62nd Marine Environment Protection Committee Session – IMO, whose end in July 2011 imposed the new CO₂ requirements, discussed the development and implementation of a Ship Energy Efficiency Management Plan, which was first published in August 2009. The Plan is to be applied for both the ships in operation and those to be built after January 2016, irrespective to the national flag they operate under. The new requirements were implemented after 1st January 2013 and controlled during the initial inspection or during any other inspection following.

The Ship Energy Efficiency Management Plan gives opportunity for the ship's efficiency to be monitored throughout their whole service life. What is more, the shipowners are encouraged at every stage to implement new technologies and practices, aiming ship operation optimization as well as air pollution reduction. [7]

The 66th Marine Environment Protection Committee Session – IMO in Brussels discusses amendments to MARPOL Annex VI, regulation 13, which bring the NO_x emission standards implementation delay to an end.

Directive 2008/50/EO, concerning the quality of air in Europe, determines target values for the fine dust particles, ozone and NO_x which give ground for developing further directives concerning NO_x emissions. [5]

III. CONCLUSION

Implementing and synchronizing the international regulations under MARPOL 73/78 with the national directives concerning environmental pollution prevention will help preserve the marine ecological balance.

The research proves that all Convention state members apply and observe the prescribed in the Annexes requirements.

Compliance with all the Convention Annexes and their amendments, along with standardization of national norms and regulations in all countries will eventually lead to the implementation of uniform legislation policy for all ships in the world oceans and seas.

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