Prevention of Sea Pollution from Ships - The Latest Updates of Standing Regulations

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Abstract

The paper contains a general outline of world ocean progressing degradation in a global scale, and presents latest works and publications by GESAMP and MEPC regarding prevention of this trend. Marpol 73/78 Convention with Annexes is also briefly outlined, with emphasis given to a new annex focusing on threats posed by ballast water transport and release. The updates and verification of other MARPOL regulations are also discussed. The legislative aspect of ship pollution prevention in Poland is shown basing on "Ustawa o zapobieganiu zanieczyszczeniom morza przez statki" (a standing national act concerning ship-caused pollution of the sea).

1 Introduction

Pollution and resulting degradation of the seas continues on a global scale in spite of progress achieved in the last three decades in some areas of this problem.

A series of incidents, which took place a few decades ago, brought the subject of marine pollution to the attention of global public. After a crippling and sometimes fatal disease in Japan was traced to industrial mercury discharges, it was discovered that even the fish caught in open sea could contain high levels of mercury. Another well-known case is a deterioration of some seabird populations, which was found to be caused by widespread pesticide pollution. Oil spills from tanker groundings raised a public outcry about the problem of oil pollution, which is now a most publicised example of a marine pollution disaster. The recent spills from "Braer" in the Shetlands and "Sea Empress" in Milford Haven, together with a number of lesser accidents, have
proved that a tanker disaster continues to be a likely threat to the marine environment, despite many efforts made to prevent this nightmare from happening again.

Pollution control initiatives have focused on regulating the pollution sources, banning the use of many chemicals, such as detergents, cancerigenic substances like 3,4-benzopyrene, PCB's, heavy metals and many others.

Some clear successes have been achieved up so far, including a decisive reduction of operational discharges of oil from ships effected by enforcement of international maritime regulations (MARPOL 73/78 Annex I in this particular case). There is a number of international bodies co-operating actively in the area of marine pollution, with GESAMP (joint Group of Experts on the Scientific Aspects of Marine Environmental Protection) and IMO MEPC (Marine Environment Protection Committee) among the most influential ones.

Many serious problems continue to linger, however. Despite gains in some areas sewage discharges continue to be a major global problem, especially in the developing countries, where these are often a most dangerous source of sea pollution. New chemicals are introduced to the market faster than their environmental impact can be assessed. Some of them are known to disrupt animal hormone systems, and are likely to cause long-term effects that are as yet poorly understood. Ballast water discharges have brought foreign organisms to very sensitive ecosystems, which has had irreversible and often detrimental effects on their balance and safety to humans.

In order to avert the ongoing risks, there is a continuing global effort being made in updating standing legal regulations and introducing the new ones, aimed at threats not addressed before.

2 Marpol 73/78 - the latest problems, corrections and updates

International Convention for the Prevention of Pollution from Ships - MARPOL 73/78 was created with the objective of preventing the pollution of the marine environment by the discharge of harmful substances, which were defined by GESAMP as (IMO News):

"Any substance which, if introduced into the sea, is liable to create hazards to human health, to harm living resources and marine life, to damage amenities or to interfere with other legitimate uses of the sea, and includes any substance subject to control by the present Convention"

MARPOL addressed not only pollution by oil, but also pollution by chemicals, dangerous cargo, sewage and garbage. MARPOL Annexes were developed covering various categories of harmful substances and most recently, in 1997, a new Annex on air pollution was added.

The Convention consists of Annexes with regulations concerning oil - Annex I, noxious liquid substances (chemicals) carried in bulk - Annex II,

Dates of entering into force all of Annexes are presented in table 1

<table>
<thead>
<tr>
<th>Annex</th>
<th>Dates of entering into force</th>
</tr>
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<tbody>
<tr>
<td>I - oil</td>
<td>2nd October 1983</td>
</tr>
<tr>
<td>II- noxious liquid substances carried in bulk (chemicals)</td>
<td>6th April 1987</td>
</tr>
<tr>
<td>III- harmful substances carried in packaged form and in containers</td>
<td>1st July 1992</td>
</tr>
<tr>
<td>IV- sewage</td>
<td>not yet in force</td>
</tr>
<tr>
<td>V - garbage</td>
<td>31st December 1988</td>
</tr>
<tr>
<td>VI - air pollution</td>
<td>Added in 1997 - not yet in force.</td>
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</tbody>
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Though adopted in 1973, Annex IV has not yet entered into force because a considerable number of Member Governments have indicated that they have no intention of ratifying it in its current form, mainly due to the difficulties in providing reception facilities for sewage from ships. The MEPC is attempting to ascertain the necessary amendments that would enable Annex IV to become sufficiently acceptable to allow it to enter into force whilst remaining an effective mechanism for combating marine pollution from ship-based sewage (Crayford*).

Recent developments concerning the pollution categorisation of products under Annex II indicates that it is necessary for IMO to reconsider the criteria used to assign both pollution category and ship type. The most important of these are:

1. improvements in ship technology;
2. a greater appreciation of the relationship between the properties of chemicals and their impact on the marine environment;

One of the most important features of Annex II to MARPOL was the introduction of efficient stripping systems, which ensured that only relatively small amounts of cargoes could be discharged into the sea with tank washings (Crayford*).

However, in the past ten years there have been advances in technology, which allow efficient stripping levels as low as 10 to 20 litres (of products left in the cargo tank) to be achieved. Clearly, as the quantity of product that is expected to enter the marine environment is reduced, so the type of product deemed to be acceptable to be put into the environment may be reconsidered.

The MARPOL Convention was the first global legislation designed to protect marine environment and, with hindsight, took a simplistic view on the definition of marine pollutants.
Annex II introduced a degree of differentiation using a few simple biological properties, with the greatest influence being placed on acute aquatic toxicity, tainting of fish and bioaccumulation with associated harmful effects.

Since then there has been recognition of the fact that other properties may have been over-emphasised. This conclusion has been reached independently within IMO’s BLG Sub-Committee, GESAMP’s EHS working Group and the OECD discussions on global harmonisation resulting from the UNCED Rio Conference.

UNCED Rio Conference adopted programme for the Harmonisation of hazard classification and labelling of chemicals. At present, the classification and labelling of chemicals is not harmonised worldwide, and this has implications for shippers. For example, a product is defined as being toxic to mammals under the IMO IMDG Code if the oral LD₅₀ is less than or equal to 500 mg/kg; while EU Dangerous Substances legislation defines a product as being toxic if the oral LD₅₀ is less than or equal to 2000 mg/kg.

Similarly, EU legislation defines a substance as flammable if it has a flashpoint of less than 55°C, whilst under the IMDG Code, a product is classified as flammable if the flash point is less than or equal to 61°C (Crayford²).

There is a clear need for harmonisation of classification at a global level.

3 Addition of Annex VI to MARPOL 73/78

The new Annex VI to MARPOL, adopted by a conference of all MARPOL parties, held in September 1997 in London and convened by IMO comprises regulations for the prevention of air pollution from ships. Annex VI should be entered into force in 2004. Nine following articles outlining all the issues connected with Annex VI adoption have been agreed (MARPOL 73/78*):

Art. 1 - Instrument to be amended,
Art. 2 - Addition of Annex VI to the Convention,
Art. 3 - General Obligations,
Art. 4 - Amendment procedure
Art. 5 - Signature, ratification, acceptance, approval and accession
Art. 6 - Entry into force,
Art. 7 - Denunciation,
Art. 8 - Depository,
Art. 9 - Languages

The regulations introduced in Annex VI are laid out in three chapters with five appendices. Chapter I titled "General" includes regulations for applications, definitions, general exceptions and equivalents. Chapter II - includes regulations for surveying, certification and means of control, surveys and inspections, issue of International Air Pollution Prevention Certificate,
issue of a Certificate by another Government, form of certificate, duration and validity of certificate, Port State Control on Operational Requirements Detection of Violations and Enforcement. Chapter III - Requirements for control of emissions from ships:

- Ozone depleting Substances,
- Nitrogen Oxides (NOx),
- Sulphur Oxides (SOx),
- Volatile Organic Compounds,
- Shipboard Incineration,
- Reception Facilities,
- Fuel Oil Quality,
- Requirements for Platforms and Drilling Rigs.

An integral part of Annex VI are five following appendices:

Appendix I - Form of IAPP Certificate (International Air Pollution Prevention Certificate)
Appendix II - Test cycles and weighting factors
Appendix III - Criteria and procedures for designation of SOx emission control areas
Appendix IV - Type approval and operating limits for shipboard incinerators
Appendix V - Information to be included in the bunker delivery note

Furthermore, Annex VI contains a newly published "Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines", which was also adopted by the Conference. The contents the Code are as follows:

Chapter I - General (purpose, application and definitions);
Chapter II - Surveys and Certification
Chapter III - Nitrogen oxides emission standards
Chapter IV - Approval for serially manufactured engines: engine family and engine group concepts
Chapter V - Procedures for NOx emission measurements on a test bed
Chapter VI - Procedures for demonstrating compliance with NOx emission limits on board

Additionally there are seven appendices in "Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines" concerning problems of survey and certification of marine diesel engines, calibration of analytical instruments, test reports of samples and methods using for calculation of exhaust gas mass flow. Moreover, check list for an engine parameter check method is included.
The entry into force of Annex VI is only a few years away, but many owners of engines and electrical units, oil concerns, ship owners, shipyards, surveying services, training institutions and companies must all adapt to this new regulations and requirements which are included in the Annex VI.

The entering into force of Annex VI will cause significant changes in oil and fuel technological process, manufacturing of the main and auxiliary engines and machines and also their service.

The criteria for SOx and NOx included in Annex VI, in conjunction with the special areas defined, will bring about considerably different conditions of surveys and inspections of the marine power plants.

4 IMO MEPC and IACS works on Annex VII

For a few years IMO MEPC and IACS have been working on a problem of non-native fish and other aquatic organisms that could be transferred in ballast tanks. The purpose of these works is the protection of indigenous water environment from non-native aquatic organisms that can be harmful to the balance of nature that now exists. When a new organism is introduced to a balanced ecosystem, negative changes may result. Such countries as Australia (degradation of Coral Reef by organisms transferred from Bengal Gulf) and United States (Great Lakes) provided the alarming studies concerning this problem. As a result the new projects of regulations were proposed. 20th IMO Session has passed the relevant resolution, which is now only a recommendation. It is to be expected that in the near future this resolution will be passed as a new Annex VII to MARPOL.

This regulation has a working title “Ballast Water Management Code” and in the future it should include detailed guidelines for safe preparation and management of ballast water discharge. IACS documents enumerate in total 27 risks posed by discharging of ballast water. The most important of them are:

- worsening of stability parameters for ships with clean ballast and having ballast in cargo tanks
- non-acceptable bending moments and shearing forces in the ship structure
- damages of tanks and ship bottom structures
- loss of manoeuvrability

The Conclusions of the IACS investigations underline the necessity of standardising the regulations for ballast water discharge operation despite of lot of differences between ship types and constructions. These regulations must include instructions ensuring safe, easy to perform and fast water ballast discharging operation.
5 “Ustawa o zapobieganiu zanieczyszczeniom morza przez statki” (The Polish National Act on Prevention of Sea Pollution from Ships)

"The Act on Prevention of Sea Pollution from Ships" adopted on 16 March 1995 and based on resolutions of MARPOL 73/78, was published in "Dziennik Ustaw" (Polish Legal Acts Bulletin) no.9 issued on 9 May 1995.

The regulations of this act are binding for all ships sailing on Polish waters and all Polish flag ships sailing anywhere. The ship is defined as any waterborne craft used in sea environment, which includes hovercrafts, hydrofoils, submarines, and both floating and fixed drilling rigs. According to Act regulations a ship may be allowed to service under a condition that it fulfils either the requirements of MARPOL 73/78, or the Act itself.

The technical condition of any ship is to be verified as appropriate by inspections carried out by responsible authorities. The articles 7 and 8 state that "A ship is subject to inspections by maritime administration representatives. In case the result of such an inspection is proclaimed as positive, the inspected ship receives a certificate foreseen in MARPOL 73/78 Convention, which is valid for 5 years if positively confirmed by periodical (e.g. yearly) reviews to be carried out as required."

The Act imposes a number of duties on the master of any ship which it refers to, requiring him to man the ship with crew appropriately trained in prevention of sea pollution, and also to ensure that the ship is fit to fulfil the requirements in this field. Moreover, he has to inform the nearest shore station about any oil spill or an accident posing a threat of sea pollution observed. Failure to follow to requirements of the Act by the master or any crew member is to be penalised as foreseen by law.

References
3. “Further work on MARPOL revision”, IMO news No 3, pp. 3-4, 1998,