



**WORLD MARITIME THEME FOR 2023**  
**MARPOL AT 50 – OUR COMMITMENT GOES ON**

**Background paper**

**INTRODUCTION**

The Torrey Canyon oil spill in 1967, the largest oil spill disaster of its time, was one of the key milestones that led to the development of the MARPOL Convention. Against the backdrop of increased global awareness through the 1970s of the need to protect the marine environment from all sources of pollution, the MARPOL Convention and the 1978 MARPOL Protocol were adopted in 1973 and 1978, respectively. This combined instrument entered into force on 2 October 1983. In 1997, with greater awareness of air pollution concerns and the threat of global warming, MARPOL was further expanded through a Protocol addressing prevention of air pollution from ships (Annex VI) that was adopted and entered into force on 19 May 2005.

The MARPOL Convention, through its many iterations and refinements over the years, remains integral to the goal of IMO as a United Nations specialized agency to promote safe, secure, environmentally sound, efficient and sustainable shipping by providing a comprehensive framework for the protection of the marine environment.

MARPOL covers all forms of pollution of the sea from shipping, including pollution from oil, noxious liquid substances in bulk, harmful substances in packaged form, sewage and garbage from ships, as well as covering air pollution from ships, and improving energy efficiency. It also allows for the adoption of special areas with even stricter controls on operational discharges.

MARPOL has evolved through the years; some highlights include the phasing out of single hull tankers in 1992, the establishment of several special areas including the Antarctic area, the introduction of the mandatory IMO Member State Audit Scheme (IMSAS) in all MARPOL annexes, the introduction of the IMO 2020 global sulphur limit, and the adoption of technical and operational measures to enhance the energy efficiency of ships.

Additionally, the adoption of the Initial IMO Greenhouse Gas (GHG) Strategy in 2018 to decarbonize the sector as soon as possible before the end of this century has set the policy framework for the development and adoption of further measures within MARPOL to enhance energy efficiency of ships and the reduction of GHG emissions from ships.

The theme "**MARPOL at 50 – Our commitment goes on**" aims to promote further dialogue on the next phase of IMO's work to further enhance the sustainable use and protection of our planet and oceans in line with the UN 2030 Agenda for Sustainable Development and the 17 Sustainable Development Goals (SDGs). These include affordable and clean energy (SDG 7); industry, innovation and infrastructure (SDG 9); climate action and sustainable use of the oceans, seas and marine resources (SDGs 13 and 14); and the importance of partnerships and implementation to achieve these goals (SDG 17).

**MARPOL Annex I – Regulations for the Prevention of Pollution by Oil**

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Oil tankers transport some 2,900 million tonnes of crude oil and oil products every year around the world by sea. MARPOL Annex I, which entered into force 2 October 1983, has helped ensure that the oil tankers are safely built and operated and are constructed to reduce the amount of oil spilled in the event of an accident.

Annex I introduced a number of radical new concepts, such as a requirement for new oil tankers to be fitted with segregated ballast tanks, so as to obviate the need to carry ballast water in cargo tanks.

In 1991, amendments to Annex I, which entered into force in 1993, introduced a new chapter, requiring oil tankers and other ships to carry a shipboard oil pollution emergency plan detailing the procedure to be followed in reporting an oil pollution incident.

In 1992, further amendments to Annex I made it mandatory for new oil tankers to have double hulls and brought in a phase-in schedule for existing tankers to fit double hulls, which was subsequently revised in 2001 and 2003.

In 1994, MEPC adopted amendments to MARPOL Annex I aimed at improving implementation of the Convention, by making it possible for ships to be inspected when in the ports of Parties to the Convention, and to ensure that crews are able to carry out essential shipboard procedures relating to marine pollution prevention.

These amendments and others, along with subsequent revisions, have meant that the regulations in MARPOL Annex I, along with other safety-related regulations such as the introduction of mandatory traffic separation schemes and international standards for seafarer training, have been instrumental in the continuous decline of accidental oil pollution that has taken place over the last 50 years.

Statistics show a 90% reduction in the number of major oil spills and a hundred-fold reduction in the volume of oil spilt since the entry into force of MARPOL Annex I. This highlights the real, tangible benefit of government and industry working together to reduce oil spills over the decades.

Operational pollution, such as from routine tank cleaning operations, has also been cut through amendments to MARPOL Annex I. These amendments have introduced many innovations, such as those related to allowable discharges of bilge water through the oily water separator, oily waters from the cargo tanks, or oil discharge monitoring and control systems, which all have contributed greatly to a noticeable decrease in the pollution of the world's seas.

## **MARPOL Annex II – Regulations for the Control of Pollution by Noxious Liquid Substances in Bulk**

MARPOL Annex II, which details the discharge criteria and measures for the control of pollution by noxious liquid substances carried in bulk, entered into force on 2 October 1983.

Annex II requires chemical tankers built after 1 July 1986 to comply with the International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk (IBC Code), which prescribes the design and a construction standard of ships involved in the transport of bulk liquid chemicals and identifies the equipment to be carried to minimize the risks to the ship, its crew and to the environment, with regard to the nature of the products carried. The basic philosophy is one of ship types related to the hazards of the products covered by the IBC Code. Each of the products may have one or more hazard properties which include flammability, toxicity, corrosivity and reactivity.

The discharge of residues of a "noxious liquid substance" is allowed only to reception facilities (i.e. their discharge into the sea is prohibited), until certain concentrations and conditions that

vary with the category of substances are complied with. Most importantly, no discharge of residues containing noxious substances is permitted within 12 miles of the nearest land.

In October 2004, IMO adopted revised MARPOL Annex II Regulations for the control of pollution by noxious liquid substances in bulk. This incorporated a four-category categorization system for noxious and liquid substances, and it entered into force on 1 January 2007.

MARPOL Annex II continues to be updated to reflect the constantly changing array of chemicals with varying properties and hazards and to ensure that these cargoes can be carried in a safe manner.

### **MARPOL Annex III – Regulations for the Prevention of Pollution by Harmful Substances Carried by Sea in Packaged Form**

Annex III, which entered into force on 1 July 1992, contains general requirements for packing, marking, labelling, documentation, stowage, quantity limitations, exceptions and notifications with regard to Harmful Substances Carried by Sea in Packaged Form.

The objective behind the regulations contained in Annex III of MARPOL was to identify marine pollutants so that they could be packed and stowed on board ships in such a way as to minimize accidental pollution as well as to aid recovery by using clear marks to distinguish them from other less harmful cargoes.

For the purpose of the Annex, "harmful substances" are those substances which are identified as marine pollutants in the International Maritime Dangerous Goods Code (IMDG Code), or which meet the criteria in the Appendix of Annex III.

The IMDG Code has undergone many changes, both in structure and content, to keep pace with the ever-changing needs of industry.

### **MARPOL Annex IV – Regulations for the Prevention of Pollution by Sewage from Ships**

The discharge of raw sewage into the sea can create a health hazard. Sewage can also lead to oxygen depletion and can be an obvious visual pollution in coastal areas – a major problem for countries with tourist industries.

Annex IV of MARPOL contains a set of regulations regarding the discharge of sewage into the sea from ships, including regulations regarding the ships' equipment and systems for the control of sewage discharge, the provision of port reception facilities for sewage, and requirements for survey and certification. The Annex entered into force on 27 September 2003. A revised Annex IV was adopted on 1 April 2004 and entered into force on 1 August 2005.

The discharge of sewage into the sea is prohibited, except when the ship has in operation an approved sewage treatment plant or when the ship is discharging comminuted and disinfected sewage using an approved system at a distance of more than three nautical miles from the nearest land.

MARPOL Annex IV and associated guidelines are currently being reviewed, with a view to introducing provisions for record-keeping and measures to confirm the lifetime performance of sewage treatment plants; and further, on new ships, a prohibition of fitting comminuting and disinfecting systems.

### **MARPOL Annex V – Regulations for the Prevention of Pollution by Garbage from Ships**

Through MARPOL Annex V, a general prohibition applies to the discharge of all types of garbage, including all plastics, into the sea from ships and fixed or floating platforms except in the cases explicitly permitted under the Annex.

MARPOL Annex V entered into force on 31 December 1988 and includes requirements concerning, inter alia, the provision of adequate port reception facilities; the designation of special areas; port State control; and placards, garbage record-keeping and garbage management plans.

Recent developments in relation to MARPOL Annex V have been prompted by the damaging build-up of plastic litter in the oceans. Harrowing images of marine wildlife having been trapped by plastic litter, or having ingested it, have become tragically familiar.

In 2018, in recognition of the importance of continued action to manage this global issue, IMO adopted the Action Plan to Address Marine Plastic Litter from Ships to contribute to the global solution for preventing marine plastic litter entering the oceans through ship-based activities. The Action Plan builds on existing policy and regulatory frameworks and identifies opportunities to enhance them and introduce new supporting measures to address the issue of marine plastic litter from ships.

In 2021, MEPC adopted an accompanying Strategy to guide the implementation of the Action Plan by the establishment of a timeline for the actions and identification of appropriate modalities. Some of the outcomes of the Action Plan that are identified in the Strategy as key goals are: the reduction of marine plastic litter generated from fishing vessels; the reduction of shipping's contribution to marine plastic litter; and the improvement the effectiveness of port reception facilities in reducing marine plastic litter.

In this context, draft amendments to MARPOL Annex V and associated guidelines are currently being developed to make the marking of fishing gear mandatory, using a goal-based approach, and to enhance the requirement to report fishing gear losses.

### **MARPOL Annex VI – Regulations for the Prevention of Air Pollution from Ships**

The issue of controlling air pollution from ships – in particular, noxious gases from ships' exhausts – had been discussed in the lead up to the adoption of the 1973 MARPOL Convention. However, it was decided at the time not to include air pollution.

MARPOL Annex VI was finally adopted in 1997, through adding a Protocol to the Convention, which included the new Annex. It limits the main air pollutants contained in ships exhaust gas, including sulphur oxides (SO<sub>x</sub>) and nitrous oxides (NO<sub>x</sub>), and prohibits deliberate emissions of ozone depleting substances (ODS). MARPOL Annex VI also regulates shipboard incineration, and the emissions of volatile organic compounds (VOC) from tankers.

Although air pollution from ships does not have the direct cause and effect associated with, for example, an oil spill incident, it causes a cumulative effect that contributes to the overall air quality problems encountered by populations in many areas. According to the World Health Organization (WHO), each year air pollution is responsible for nearly seven million deaths around the globe. Also, when SO<sub>x</sub> and NO<sub>x</sub> are exposed to the atmosphere they react with water to form sulfuric acid and nitric acid, components of acid deposition, also known as acid rain.

Annex VI entered into force on 19 May 2005 and a revised Annex VI with significantly tightened emissions limits was adopted in October 2008, which entered into force on 1 July 2010.

### **IMO 2020**

The success stories of MARPOL Annex VI continued with the implementation of a global limit of 0.50% m/m (mass by mass) – a significant reduction from the previous limit of 3.5%, on the sulphur content in the fuel oil used on board ships from 1 January 2020.

An immense amount of preparatory work was undertaken by IMO and industry stakeholders to ensure the changeover went smoothly. IMO issued a series of guidelines to help the shipping sector and its Member States to prepare, including ship implementation planning guidelines (addressing issues such as risk assessment for new fuels and tank cleaning) and port State control guidelines.

There was some trepidation in the lead up to IMO 2020 entering into force with predictions of huge disruptions and impacts to shippers, customers and producers of diesel fuel. However, the final implementation of IMO 2020 resulted in very few fuel-oil non availability reports (FONARs) and even fewer non-compliance cases reported. This shows that, with extensive planning and preparation, major change can occur which has significant benefit to the world without distorting the global trade.

## **GHG emissions**

Linked to the protection of the atmospheric environment is the ongoing effort of IMO to address the impact of emissions of greenhouse gases, the single biggest challenge the world is facing.

### *Mandatory EEDI and SEEMP requirements*

In 2011 IMO added in a new chapter 4 of MARPOL Annex VI entitled "Regulations on energy efficiency for ships" which comprised two main measures, the Energy Efficiency Design Index (EEDI) and Ship Energy Efficiency Management Plan (SEEMP). This represented the first set of mandatory energy efficiency measures for any transport sector and the first legally binding climate change treaty to be adopted since the Kyoto Protocol.

The EEDI for new ships is a technical measure which aims at promoting the use of more energy efficient equipment and engines. The EEDI requires a minimum energy efficiency level per capacity mile (e.g. tonne mile) for different ship type and size segments.

The level is tightened incrementally every five years, and so the EEDI stimulates continued innovation and technical development of all the components influencing the fuel efficiency of a ship from its design phase.

The Ship Energy Efficiency Management Plan (SEEMP) is an operational measure that establishes a mechanism to improve the energy efficiency of a ship in a cost-effective manner.

In order to accurately assess ships' energy efficiency, it is vital to have accurate data on fuel consumption. In October 2016, IMO adopted mandatory MARPOL Annex VI requirements for ships to record and report their fuel oil consumption. Under the amendments, starting from 1 January 2019, ships of 5,000 GT and above (representing approximately 85% of the total CO<sub>2</sub> emissions from international shipping) are required to collect consumption data for each type of fuel oil they use, as well as, additionally, other specified data, including proxies for "transport work".

### *Initial IMO GHG Strategy*

One of the most important achievements of IMO's work is the adoption of the Initial Strategy on the reduction of greenhouse gas emissions from ships in April 2018. For the first time, there is a clear commitment to a complete phase-out of GHG emissions from ships, a specific linkage to the Paris Agreement and a series of clear significant levels of ambition including at least a 50% cut in emissions from the sector by 2050.

The Initial Strategy is a landmark agreement, representing as it does a framework for Member States, setting out the future vision for international shipping, the levels of ambition to reduce GHG emissions and guiding principles; and includes candidate short-, mid- and long-term

further measures with possible timelines and their impacts on States. The strategy also identifies barriers and supportive measures, including capacity-building, technical cooperation, and research and development (R&D).

Since the adoption of the Initial Strategy, IMO has been actively working on transposing the commitments into mandatory requirements in MARPOL that apply to individual ships from all flags to ensure that the levels of ambition are effectively achieved in line with the agreed timelines. As such, IMO's commitments do not just remain aspirational targets but lay down a binding regulatory framework that applies to the world fleet and is enforced globally, both the ship's flag State as well as any port State the ship visits.

One of the most important building blocks for future GHG reduction measures is the short-term goal-based carbon intensity reduction measure. Amendments were adopted to MARPOL Annex VI setting out technical and operational energy efficiency measures for ships with the aim of achieving at least 40% reduction of carbon intensity by 2030, as agreed by the Initial GHG Strategy. This was accompanied with the approval of a comprehensive impact assessment.

The new measures will require all ships to calculate their Energy Efficiency Existing Ship Index (EEXI) following technical means to improve their energy efficiency and to establish their annual operational carbon intensity indicator (CII) and CII rating. Ships will get a rating of their energy efficiency A-E. Multiple guidelines have been developed to support the implementation of the short-term measure.

The IMO carbon intensity rating system is expected to enhance the private sector's involvement in promoting low-carbon shipping. It will allow the financial sector, for example, banks and insurance companies, but also charterers and cargo owners, to use the mandatory ratings of these ships in a way to steer investment and equity to the most efficient ships.

Following COP 26 and the Glasgow Climate Pact, IMO Member States are actively engaged in the process of revising the Initial IMO Strategy on Reduction of GHG Emissions from Ships and in developing a basket of candidate mid-term measures, including technical and economic elements, which will set global shipping on a more ambitious path to phasing out GHG emissions.

It is clear that technological innovation and the global introduction of alternative fuels and/or energy sources for international shipping will be integral to achieve the necessary GHG reduction.

Regulation drives technological innovation and there are an increasing number of R&D projects and trials in energy efficiency ship design technology and alternative (renewable) marine fuels in different parts of the world. MARPOL, as a regulatory platform, will play its increasing vital role in pursuing shipping's decarbonization pathway.

### **The concept of "special areas" and the Polar Code**

While always advocating a global approach, IMO nevertheless recognizes that some areas need additional protection and the MARPOL Convention, in its Annexes I, IV and V, defines certain sea areas as "Special Areas" in which the adoption of enhanced special mandatory measures for the prevention of pollution is required. Annex VI establishes certain SO<sub>x</sub> Emission Control Areas with more stringent controls on sulphur emissions and NO<sub>x</sub> Emission Control Areas for Tier III NO<sub>x</sub> emission standards.

Recognizing the need for enhanced protection of the pristine environments around the poles, and building up many relevant requirements, provisions and recommendations have been developed over the years, IMO adopted the Polar Code which entered into force on 1 January 2017 and was seen as a historic milestone in the Organization's work.

The Polar Code covers the full range of shipping-related matters relevant to navigation in waters surrounding the two poles – ship design, construction and equipment; operational and training concerns; search and rescue; and, equally important, the protection of the unique environment and eco-systems of the polar regions. In general, the Polar Code goes over and above all the other global, safety and environmental regulations that apply to international shipping and builds on global measures to provide an additional layer of protection for the Polar regions.

## **CONCLUSION**

The adoption of the MARPOL Convention in 1973 was an important step in focusing the shipping industry's attention on the environment. It was no longer enough just to ensure goods and people were transported safely – consideration for the environment was on the agenda. In part, this reflected greater awareness worldwide of the impact of an increasingly industrialized world on the environment – and it is clear that the Convention was also in a sense a global political response to incidents such as the Torrey Canyon disaster. After the 1978 Conference on Tanker Safety and Pollution Prevention, which both strengthened provisions for tanker safety and removed the obstacles that were preventing the entry into force of the Convention, the twin aims of "Safer shipping and cleaner oceans" became the dual objective of IMO's work.

Today, MARPOL is recognized as the most important set of international regulations for the prevention of marine pollution by ships. Over the years, MARPOL has extended its scope in order to address new challenges that have emerged from shipping and in response to the changing expectations of global society – such as the demands for clean air and the reduction of GHG emissions.

MARPOL has been regulating the environmental impact of shipping for decades. But, in the modern context, its environmental work has never seemed so relevant. And, in the years to come, it will take on an even greater importance as sustainable development grows into not just what we at IMO would like to achieve, but a necessity on which the world's future will depend. Changing environmental expectations are both a challenge and an opportunity for the shipping industry.

The ships of the future must provide a continuous response to the needs of society, industry and global trade and must be operated within a framework that encourages a culture to promote green technology that goes beyond mere compliance with statutory requirements. Undoubtedly, MARPOL will be a driver and catalyst for a whole new generation of more efficient ships.

The 2023 World Maritime theme provides a good opportunity for the IMO Secretariat, Member States and observer organizations to celebrate the 50-year legacy of MARPOL, while also underscoring our dedication to build on the existing foundations as we move towards a brighter future together. The theme allows for a coordinated outreach and communications campaign by all stakeholders to highlight the stories of success about MARPOL making shipping greener. It also allows for activities to delve into specific topics related to the promotion of the implementation of MARPOL requirements; how the future regulations can ensure a better response to the challenges of atmospheric pollution and climate change as well as ever emerging environmental issues. Additionally, through key international events, IMO will have the opportunity to contribute and to showcase the maritime industry's efforts in creating a culture to promote green technology driven by the MARPOL regulations. Throughout the year, IMO will provide targeted input into the global conversation on how to move towards a sustainable maritime transport future, in light of the 50-year legacy of MARPOL.

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