

# **IMO MARINE ENVIRONMENT POLICY**

## **Background paper**

### ***MARINE ENVIRONMENT DIVISION INTERNATIONAL MARITIME ORGANIZATION***

#### **General introduction**

This paper will look in detail at some of the environmental issues that confront international shipping today and what steps the shipping community, in particular through its global regulator, the International Maritime Organization (IMO), is taking to address them.

Of necessity, shipping takes place in a particularly precious and vulnerable setting. Not only are the seas and oceans of the world worthy of protection for their own sake, they are also key components in the sustainability of the entire planet and the cornerstone of our future preservation.

#### **Shipping’s environmental record**

In the last quarter of a century, shipping’s environmental credentials have come under sharper scrutiny than ever before and this is something that is set to continue and increase. A thorough examination of the statistics reveals that shipping is the least environmentally-damaging form of commercial transport and, set against land-based industry, is a comparatively minor contributor, overall, to marine pollution from human activities.

Estimates by GESAMP (the Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection) suggest that land-based discharges – such as sewage, industrial effluent and urban/river run off, together with atmospheric inputs from land industry sources – accounted, in 1990, for some 77 per cent of marine pollution generated from human activities, while maritime transport was estimated to be responsible for some 12 per cent of the total.

When drawing on a more recent estimate, in 2002, by UNEP’s Global Programme of Action for the Protection of the Marine Environment from Land-Based Activities, some 80 per cent of the pollution in the world’s oceans originates from land-based activities, with the maritime sector representing just 10 per cent of human sources of marine pollution – a two per cent decrease from the aforementioned 1990 figure, which is not as negligible as it might appear when considered against the increase in shipping operations during the intervening years.

Indeed, despite a massive increase in world seaborne trade, there has been a substantial reduction in marine pollution over the last 20 years, especially with regard to the amount of oil spilled into the sea. According to shipping market analyst, Fearnleys, world seaborne trade rose from around 13,856 billion tonne-miles to an estimated 30,686 billion tonne-miles between 1986 and 2006, an increase of around 121 per cent. The figure is expected to grow to almost 33,000 billion tonne-miles, by 2008.

The carriage of oil and petroleum products accounted for a significant part of this increase, rising by some 106 per cent, from 5,905 billion tonne-miles to an estimated 12,151 billion tonne-miles

during the same 20-year period. In pure tonnage terms, the amount of oil transported by sea increased from 1.3 billion tonnes in 1986 to an estimated 2.3 billion tonnes in 2006.

In sharp contrast, estimates of the quantity of oil spilled during the same period show a steady reduction. Figures from ITOPF, the Independent Tanker Owners' Pollution Federation, reveal that, despite the rare major accident which can cause a spike in the annual statistics, the overall trend shows a continuing improvement, both in the number of oil spills and the quantity of oil spilled each year.

The average number of oil spills over 700 tonnes has shrunk from over 25 in the 1970s to just 3.7 in the 2000s. It is interesting to note, in this context, that the biggest single "decade-to-decade" reduction was from the 1970s to the 1980s, coinciding with the adoption and entry into force of the MARPOL Convention (see below), which is rightly credited with having had a substantial positive impact in decreasing the amount of oil that enters the sea from maritime transportation activities – both as a result of accidents or from the operation of ships.

There is a similar story to tell with regard to atmospheric pollution, too. The shipping industry is a small contributor to the total volume of atmospheric emissions, compared to road vehicles, aviation and public utilities such as power stations, and atmospheric pollution from new marine diesel engines has been reduced in the last decade. Scientific evidence that the environment is increasingly damaged by greenhouse gas emissions is causing growing concern globally and the conclusion of recent research, that a significant share of ship emissions, occurring along coastlines, travels inland over much longer distances than previously realized, is serving to galvanize the maritime community into prompt action.

Disconcerting as the research findings are, it has to be acknowledged that there have already been significant improvements in engine and propulsion system efficiency, while improved hull design and the use of ships with larger cargo-carrying capacities have led to a reduction in emissions and an increase in fuel efficiency. While further research in this field is to be encouraged, data from the United Kingdom's Department for Transport shows that energy consumption of road transport by truck lies in the range 0.7 to 1.2 Mj/tonne-km. By comparison, the consumption of a 3,000 dwt coastal tanker at 14 knots is about 0.3 Mj/tonne-km and a medium size container ship (1,226 TEU) at 18.5 knots, about 0.12 Mj/tonne-km.

On the other hand, authoritative organizations, such as the World Meteorological Organization and the US National Oceanic and Atmospheric Administration, are warning that the level of gases in the atmosphere associated with climate change are reaching record highs.

Whether we like it or not, there is no avoiding the fact that the modern world is utterly dependent on motorized transport systems that run largely on fossil fuels. Moreover, it is also a fact of life that the use of fossil fuels carries an environmental burden. An engine burning fossil fuel will emit a quantity of greenhouse gases (GHGs), principally CO<sub>2</sub>, and these emissions are now widely accepted as being significant contributory factors towards global warming and climate change.

Shipping, aviation, rail and road transport all perform different functions. Apart from some minor areas of crossover, one cannot do the job of the others. The primary function of shipping is to transport huge volumes of cargo, unitized or in bulk, across the vast distances of the world's oceans. It is no more feasible to imagine, say, aircraft taking over this role than it is to imagine ships becoming the prime means of moving people, at speed, between the world's capital cities.

It may seem invidious, therefore, to enter into a debate about the relative environmental merits of one form of transport over another, given that all contribute to the problem and that it is

incumbent on all to do whatever is possible to mitigate their harmful effects. Nevertheless, it is important to make sure that the true facts are known and, equally important, that their context is properly understood.

If a comparison must be made between the environmental credentials of different forms of transport, it is important also to take into account the complete picture. The Swedish Network for Transport and the Environment, for example, compared the CO<sub>2</sub> emissions for different forms of transport by amount carried and distance – CO<sub>2</sub> emissions per tonne/km. The figures revealed that, at one end of the scale, airfreight (specifically a Boeing 747-400 on a 1,200 km flight) produces 540 grams of CO<sub>2</sub> per tonne/km, whereas, at the other, a cargo ship of more than 8,000 deadweight tonnage produces just 15 grams of CO<sub>2</sub> per tonne/km.

There is no doubt that shipping is a clean, green, environmentally-friendly and very energy-efficient mode of transport. Overall, it is only a small contributor to the total volume of atmospheric emissions. Nevertheless, significant reductions in harmful emissions from ships and increases in fuel efficiency per tonne-mile have been achieved over the past decades through enhancements in the efficiency of engine and propulsion systems and improved hull design. Larger ships and a more rational utilization of individual vessels have also contributed significantly to reducing the amount of energy needed to transport a given unit of cargo.

What is often overlooked in any discussion about overall levels of GHG emissions from shipping is that the total amount of shipping activity is not governed by shipping itself, but by global demand for shipborne trade. And not only is this high, but it continues to grow. The international shipping industry is responsible for the carriage of more than 90 per cent of world trade and is the life blood of the global economy. Without shipping, it would simply not be possible to conduct intercontinental trade, the bulk transport of raw materials or the import and export of affordable food and manufactured goods.

Over the last four decades, estimates suggest that total seaborne trade has more than quintupled, from less than 6,000 billion tonne-miles in 1965 to over 30,000 billion tonne-miles in 2006. Today, world trade continues to grow and the international shipping industry has responded to the demand for its services.

As marine and atmospheric pollution from land-based sources is reportedly reduced, so shipping, like every conspicuous user of energy and every conspicuous contributor to climate change and global warming, is under pressure, as never before, to adopt greener practices and to do even more to clean up its act. However, while there is no doubt that shipping, and IMO, still have more to do in this respect, one can also, equally, point to an impressive record of continued environmental awareness, concern, action, response and other relevant successes scored by the Organization, the maritime community and the shipping industry, over many years.

## **IMO MEASURES**

### **MARPOL**

The wide-ranging MARPOL Convention, with its six Annexes, has been the bedrock of the world's regulatory framework for the prevention of pollution from ships for decades. It is the most important international Convention on preventing the pollution of the marine environment and the atmosphere by ships, whether from operational or accidental causes.

MARPOL is a combination of two treaties adopted in 1973 and 1978, respectively, and updated by amendments through the years.

The International Convention for the Prevention of Pollution from Ships was adopted in November 1973 at IMO and covered pollution by oil, chemicals, harmful substances in packaged form, the discharge of sewage and the dumping of garbage. The Protocol of 1978 relating to the 1973 Convention was adopted at a Conference on Tanker Safety and Pollution Prevention in February 1978, held in response to a spate of tanker accidents between 1976 and 1977.

As the 1973 Convention had not yet entered into force, the 1978 Protocol absorbed the parent Convention. The combined instrument is referred to as the “International Convention for the Prevention of Marine Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto”. It is known universally as MARPOL 73/78, and its first Annexes (I and II) entered into force on 2 October 1983. MARPOL currently includes six technical Annexes. States Parties must accept Annexes I and II, but the other Annexes are voluntary.

### *Annex I*

Annex I, dealing with the prevention of pollution by oil, incorporated many of the provisions of previous international agreements on oil pollution, notably the 1954 Oil Pollution Convention (OILPOL) and its 1969 amendments. Over the years, it has been substantially amended and updated and a brand-new version of the Annex entered into force at the beginning of 2007.

Annex I is a substantial and comprehensive document, dealing in great detail with such topics as the design and construction of oil tankers, onboard equipment, piping and pumping arrangements, the operational discharge of oil from all ships, shore reception facilities, tank cleaning, shipboard emergency plans and the way an oil tanker should respond in case of damage. It is the ultimate authority for anyone dealing with the design, construction or operation of ships carrying oil as cargo.

Although everyone involved in the oil tanker industry will be very familiar with MARPOL Annex I, only rarely has it come to the attention of a wider audience. Perhaps most famously, it was the very effective amendment process enshrined in MARPOL that enabled the schedule of progressively phasing out the use of single-hull tankers to be accelerated, in the light of the major incidents involving the tankers **Nakhodka**, **Erika** and **Prestige**. The 1992 amendments to Annex I made it mandatory for new oil tankers to have double hulls, and introduced a phase-out schedule for single-hull tankers. This was subsequently revised in 1997, 2001 and 2003 following those three tanker accidents. As a result, with certain carefully-regulated exceptions, oil tankers with a single-hull construction will no longer be allowed to trade after 2010.

Today, it is generally recognized that Annex I of the MARPOL Convention has greatly contributed to a very significant decrease in oil pollution, both operational and accidental, from ships. Statistics developed by the industry show a consistent reduction since the 1970s. The 15 parts-per-million requirement for discharges from engine-room bilges of all ships, the crude-oil-washing procedures or the double-hull standard, to name but a few form an important part of Annex I and have contributed greatly to this outcome.

It is generally acknowledged that MARPOL Annex I constitutes a body of legislation that has reached maturity. More than 30 years after its inception, and some 24 years since its coming into force, its importance for the protection of the marine environment cannot be underestimated. However, as has happened since its inception, this does not mean that it cannot be improved. In the past, the “reactive” approach prevailed and new, ground-breaking provisions were only adopted in the aftermath of well-known pollution disasters. Henceforth, a more pro-active approach will prevail. Issues such as prevention of corrosion in the double hull spaces of oil tankers, for example, need to be addressed before there is a structural failure of a double

hull VLCC. The first generation of double-hullers will soon reach the 15-year-old threshold where it is widely recognized that corrosion and other problems start to become noticeable. Indeed, it has been mooted that it might be worth examining the possible extension of the Condition Assessment Scheme, a reinforced survey and certification programme originally intended for single-hullers, to double-hull tankers.

Other issues are also likely to be dealt with, such as improving the capacity and efficiency of oily water separating equipment (thus facilitating one of the most difficult jobs facing today's crews), tackling the long-standing problem of inadequacy of shore-based reception facilities and enhancing implementation and enforcement policies, both by flag and port States.

## *Annex II*

The revised Annex II to MARPOL also entered into force on 1 January this year, together with an amended version of the International Bulk Chemical Code (IBC Code). This ushered in a new era in the prevention of pollution by noxious liquid substances (NLS), a term that encompasses any bulk liquid that does not meet the definition for oil, as defined in MARPOL Annex I, and includes, among others, petrochemicals, solvents, waxes, lube oil additives, vegetable oils and animal fats.

The carriage of such products is regulated by two international instruments. Annex II of MARPOL allocates products to pollution categories and sets out criteria under which products from each category may be discharged into the marine environment, while the IBC Code prescribes design and construction standards for chemical tankers, grading them from Type 1 to Type 3, and cross-references the products which may be carried under Annex II, together with their specific carriage requirements.

MARPOL Annex II was originally adopted in 1973, at the same time as the MARPOL Convention and Annex I, but certain technical difficulties meant that many States had problems with regard to its ratification. In 1978, the Protocol to the Convention was adopted. In order to encourage ratification of MARPOL, it was agreed that States could become Party to the Convention by first implementing Annex I, with Annex II (as amended) not being implemented until three years after the Protocol entered into force. This meant that Annex II, as amended, finally entered into force on 6 April 1987, by which time the provisions it contained were already 14 years old.

IMO embarked on a complete revision of Annex II in the early 1990s. Meantime, in 1992 the United Nations Conference on Environment and Development (UNCED) had adopted a programme for the harmonization of hazard classification and labelling of chemicals, leading to the development of a globally-harmonized system for hazard classification and communication in areas of transport, as well as consumer, worker and environmental protection. GESAMP undertook to revise its hazard evaluation procedure to bring it in line with the United Nations Globally Harmonized System for Hazard Classification and Communication (GHS) and embarked upon the re-evaluation of the products in the IBC Code so that they might all have hazard profiles according to this new format. It was logical that the revision of MARPOL Annex II should take place in conjunction with this re-evaluation process and that any new categorization system should be based on the criteria used in the revised hazard evaluation procedure.

Over a number of years, the GESAMP group of scientists gradually worked their way through the mammoth task of re-evaluating more than 800 products according to the GHS and assigned revised Hazard Profiles to them all, allowing new pollution categories and ship types to be allocated. It was decided that the number of pollution categories should be reduced, and so the

revised Annex II features a three category system, which classifies substances in decreasing order by virtue of the degree of harm they are deemed to pose to the environment or human health and resources. Category X contains those products deemed to present the greatest hazard to the marine environment, while products presenting only a minor hazard are assigned to Category Z. A small number of products were evaluated and found to present no hazard and these are referred to as “other substances” and are not subject to the provisions of the Annex.

Carriage of chemicals in bulk is also covered by SOLAS Chapter VII – Carriage of Dangerous Goods, and both this and MARPOL Annex II require chemical tankers built after 1 July 1986 to comply with the IBC Code, which gives international standards for the safe transport by sea in bulk of dangerous liquid chemicals, by prescribing the design and construction standards of ships involved in such transport and the equipment they should carry so as to minimize the risks to the ship, its crew and to the environment.

### *Annex III*

Annex III, on the prevention of pollution by harmful substances in packaged form, is the first of the Convention’s optional annexes. States ratifying the Convention must accept Annexes I and II but can choose not to accept the other three – hence they have taken much longer to enter into force. Annex III contains general requirements for the issuing of detailed standards on packing, marking, labelling, documentation, stowage, quantity limitations, exceptions and notifications for preventing pollution by harmful substances, and entered into force on 1 July 1992. A fully revised Annex III was adopted in 2006 and is expected to enter into force on 1 January 2010. Annex III is applied in conjunction with the International Maritime Dangerous Goods Code (the IMDG Code), which was first adopted by IMO in 1965 and lists hundreds of specific dangerous goods together with detailed advice on storage, packaging and transportation.

### *Annex IV*

The discharge of raw sewage into the sea can create a health hazard, while in coastal areas, sewage can also lead to oxygen depletion and an obvious visual pollution – a major problem for countries with large tourist industries. While the main sources of human-produced sewage are land-based – such as municipal sewers or treatment plants – Annex IV of MARPOL nevertheless contains a set of regulations regarding the discharge of sewage into the sea; ships’ equipment and systems for the control of sewage discharge; the provision of facilities at ports and terminals for the reception of sewage; and requirements for survey and certification. It also includes a model International Sewage Pollution Prevention Certificate, to be issued by national shipping administrations to ships under their jurisdiction.

Annex IV entered into force on 27 September 2003. A revised Annex was adopted on 1 April 2004, and this entered into force on 1 August 2005. The Annex requires ships to be equipped with either a sewage treatment plant or a sewage comminuting and disinfecting system or a sewage holding tank. Under the revised Annex IV, the discharge of sewage into the sea is prohibited, except when the ship has in operation an approved sewage treatment plant and is discharging comminuted and disinfected sewage using an approved system, at a distance of more than three nautical miles from the nearest land; or is discharging sewage which is not comminuted or disinfected, at a distance of more than 12 nautical miles from the nearest land. The revised Annex applies to new ships engaged in international voyages, of 400 gross tonnage and above, or ships which are certified to carry more than 15 persons. Existing ships will be required to comply with the provisions of the revised Annex IV five years after the date of its entry into force. Governments are required to ensure the provision of adequate reception facilities at ports and terminals for the reception of sewage.

## *Annex V*

Garbage from ships can be just as deadly to marine life as oil or chemicals. The greatest danger comes from plastic, which can float for years. Fish and marine mammals can in some cases mistake plastics for food and they can also become trapped in plastic ropes, nets, bags and other items – even such innocuous items as the plastic rings used to hold cans of beer and drinks together. MARPOL Annex V deals with different types of garbage and specifies the distances from land and the manner in which they may be disposed of. The requirements are much stricter in a number of “Special Areas” (see below) but perhaps the most important feature of the Annex is the complete ban imposed on the dumping into the sea of all forms of plastic. The Annex also obliges Governments to ensure the provision of facilities at ports and terminals for the reception of garbage. It entered into force on 31 December 1988.

In October 2006, IMO established a correspondence group to develop the framework, method of work and timetable for a comprehensive review of MARPOL Annex V and the associated guidelines for its implementation. This review will take into account resolution 60/30 of the UN General Assembly, which invited IMO to review MARPOL Annex V, in consultation with relevant organizations and bodies, and to assess its effectiveness in addressing sea-based sources of marine debris.

## *Annex VI*

When compared to the likes of automobiles and land-based heavy industries, shipping has not, historically, been a major contributor to overall atmospheric pollution levels. Nevertheless, it has become more conspicuous in this respect as other air pollution sources have succeeded in reducing their own contributions. Annex VI of MARPOL addresses atmospheric pollution from ships. It entered into force on 19 May 2005 and, among other things, it set, for the first time, limits on sulphur oxide and nitrogen oxide emissions from ship exhausts; prohibited deliberate emissions of ozone depleting substances; and put a global cap on the sulphur content of fuel oil.

However, given that the Annex was actually adopted as long ago as 1997, a comprehensive review – to take into account experience gained thus far in its implementation, as well as improvements in engine and fuel technology and the need to further reduce emissions from ships – is currently being carried out, at the request of IMO’s Marine Environment Protection Committee (MEPC), by the Sub-Committee on Bulk Liquids and Gases (BLG). The Sub-Committee has considered the issue at two ordinary sessions and at an intersessional meeting and very good progress has been made on many important issues.

In response to the large number of different proposals considered by the BLG Sub-Committee, IMO Secretary-General, Efthimios E. Mitropoulos, announced his intention to establish a cross government/industry scientific group of experts to examine the various proposals tabled. In turn, the MEPC endorsed the Secretary-General’s initiative and, under the scientific group’s specific terms of reference, it will review the impact of the aforementioned proposals on the environment, on human health and on the shipping and petroleum industries. The outcome of the group’s work will enable the Committee to make learned and sound decisions at the appropriate time and to approve and adopt robust standards within the agreed timetable.

The Secretary-General expressed the hope that, by adopting an inclusive approach, engaging governments, all relevant industry sectors and the scientific community, a clearer understanding of the “big picture” could be gained, enabling proposals for regulatory amendments to be made to the MEPC that would be capable of achieving the agreed objectives.

He said, "Because there are so many voices expressing a variety of positions coming from so many directions, I think that such an approach will provide the Committee with the advice it needs to make balanced decisions, based on sound criteria, which would ensure practicable, workable and affordable solutions."



## ***Greenhouse gases***

Whether we like it or not, there is no avoiding the fact that the modern world is utterly dependent on motorized transport systems that run largely on fossil fuels. Moreover, it is also a fact of life that the use of fossil fuels carries an environmental burden. An engine burning fossil fuel will emit a quantity of so-called greenhouse gases, principally CO<sub>2</sub>, and these emissions are now widely accepted as being significant contributory factors towards global warming and climate change.

MARPOL Annex VI does not specifically cover the emission of GHGs from ships. However, since the adoption of the air pollution regulations in MARPOL Annex VI, in 1997, the MEPC has engaged in discussion on ways to reduce emissions of climate change gases from international shipping, including CO<sub>2</sub>. An IMO study into GHG emissions from ships was undertaken and, in May 2000, the Organization decided to prohibit the use of perfluorocarbons (PFCs) onboard ships. PFCs have extremely long atmospheric lifetimes (in excess of 5,000 years) and possess high global-warming potential.

Although no mandatory instrument has yet been adopted by IMO to cover the emission of GHGs from ships, the Organization has given ample consideration to the matter, leading to the adoption of Assembly resolution A.963(23) – *IMO Policies and Practices related to the Reduction of Greenhouse Gas Emissions from Ships*, in December 2003.

In the first years of the new millennium, the MEPC's work related to the reduction of GHG emissions from ships was focused on the development of a GHG Indexing Scheme for ships. *Interim Guidelines for Voluntary Ship CO<sub>2</sub> Emission Indexing for Use in Trials* were approved in July 2005, with the objective of establishing a common approach for trials on voluntary CO<sub>2</sub> emission indexing, which will enable shipowners to evaluate the performance of their fleet with regard to such emissions. As the amount of CO<sub>2</sub> emitted from a ship is directly related to the consumption of bunker fuel oil, CO<sub>2</sub> indexing will also provide useful information on a ship's performance with regard to fuel efficiency.

IMO has now received results from hundreds of trials conducted over several years. A huge volume of CO<sub>2</sub> data exists and the MEPC is currently considering the development of a central database to make the data accessible for comparison and further studies by Member States and the shipping industry. The MEPC has observed that identical ships in seemingly similar trades produce different results; the difference may result from different weather conditions or from operational differences concerning the specific utilization of individual ships involved in the trials; and issues such as the length of time spent waiting in port areas, the length of ballast voyages, whether the ship is fully laden or not, can all make a difference.

The most recent discussions on GHGs within IMO were at the MEPC in October 2006, where further follow-up to resolution A.963(23) was considered and a work plan and timetable were approved for this purpose. In this regard, among the items agreed, it was decided to update the IMO GHG Study to give a better foundation for future decisions and to help in the follow-up to resolution A.963(23).

Climate change and GHG emissions from burning fossil fuel are steadily growing concerns for most countries, and science has found more and more proof that a connection exists. The threat from global warming is far too serious to be ignored and the shipping industry, although already an environmentally-friendly and fuel-efficient mode of transport, must take action. IMO recognized in resolution A.963(23) that the projected adverse effects of climate change and acidification of the world's oceans called for measures to limit or reduce the emissions from

international shipping. MEPC 55 adopted the aforementioned work plan, with timetable, for IMO's future work on reduction of GHGs from ships and agreed that, to avoid unilateral action either on a global, regional or national level, the Organization should, through the MEPC, continue to take the lead in developing GHG strategies and mechanisms for international shipping and co-operate closely with other relevant UN bodies.

### **Intervention Convention**

The 1967 **Torrey Canyon** disaster in the English Channel revealed certain doubts with regard to the powers of States, under public international law, in respect of incidents on the high seas. In particular, questions were raised as to the extent to which a coastal State could take measures to protect its territory where a ship casualty threatened that State with oil pollution, especially if the measures necessary were likely to affect the interests of foreign shipowners, cargo owners and even flag States.

The general consensus was that a new regime was required which, while recognizing the need for some State intervention on the high seas in cases of grave emergency, clearly restricted that right to protect other legitimate interests. A conference to consider such a regime was held in Brussels in 1969.

The Convention which resulted – the International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties, 1969 – affirms the right of a coastal State to take such measures on the high seas as may be necessary to prevent, mitigate or eliminate danger to its coastline or related interests from pollution by oil or the threat thereof, following upon a maritime casualty.

The coastal State is, however, empowered to take only such action as is necessary, and after due consultation with appropriate interests including, in particular, the flag State or States of the ship or ships involved, the owners of the ships or cargoes in question and, where circumstances permit, independent experts appointed for this purpose.

A coastal State which takes measures beyond those permitted under the Convention is liable to pay compensation for any damage caused by such measures. Provision is made for the settlement of disputes arising in connection with the application of the Convention.

The Convention applies to all seagoing vessels except warships or other vessels owned or operated by a State and used on Government non-commercial service. It entered into force in 1975 and has subsequently been amended on a number of occasions, principally to extend its coverage to substances other than oil.

### **Oil Pollution Preparedness, Response and Co-operation – OPRC**

In July 1989, a conference of leading industrial nations in Paris called upon IMO to develop further measures to prevent pollution from ships. This call was endorsed by the IMO Assembly in November of the same year and work began on a draft convention aimed at providing a global framework for international co-operation in combating major incidents or threats of marine pollution. The result was the International Convention on Oil Pollution Preparedness, Response and Co-operation, which was adopted in 1990 and entered into force in 1995.

Parties to the OPRC Convention are required to establish measures for dealing with pollution incidents, either nationally or in co-operation with other countries.

Under the Convention, ships are required to carry a shipboard oil pollution emergency plan.

Operators of offshore units under the jurisdiction of Parties are also required to have oil pollution emergency plans or similar arrangements, which must be co-ordinated with national systems for responding promptly and effectively to oil pollution incidents.

Ships are required to report incidents of pollution to coastal authorities and the Convention details the actions that are then to be taken. It calls for the establishment of stockpiles of oil spill combating equipment, the holding of oil spill combating exercises and the development of detailed plans for dealing with pollution incidents.

Parties to the Convention are required to provide assistance to others in the event of a pollution emergency and provision is made for the reimbursement of any assistance provided. The Convention also provides for IMO to play an important co-ordinating role.

### **OPRC-HNS Protocol**

The Protocol on Preparedness, Response and Co-operation to Pollution Incidents by Hazardous and Noxious Substances, 2000 (the OPRC-HNS Protocol) follows the principles of the 1990 OPRC Convention and was formally adopted by States already Party to the OPRC Convention at a Diplomatic Conference held at IMO headquarters in London in March 2000. It entered into force on 14 June 2007.

Like the OPRC Convention, the HNS Protocol aims to provide a global framework for international co-operation in combating major incidents or threats of marine pollution. Parties to the HNS Protocol are required to establish measures for dealing with pollution incidents, either nationally or in co-operation with other countries. Ships will be required to carry a shipboard pollution emergency plan to deal specifically with incidents involving HNS.

For the purposes of the HNS Protocol, a hazardous and noxious substance is defined as any substance other than oil which, if introduced into the marine environment is likely 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. The HNS Protocol will ensure that ships carrying hazardous and noxious liquid substances are covered by preparedness and response regimes similar to those already in existence for incidents involving oil.

### **Ballast water management**

Modern shipping cannot operate without ballast water, which provides balance and stability to un-laden ships. When a ship is empty of cargo, it fills with ballast to maintain stability, trim and structural integrity. The ballast is discharged when the ship loads cargo. A potentially serious environmental problem therefore arises when the ballast water that is so discharged contains aquatic life. There are thousands of aquatic species that may be carried in ships' ballast water; basically anything that is small enough to pass through a ship's ballast water intake ports and pumps. These include bacteria and other microbes, micro-algae, small invertebrates and the eggs, spores, seeds, cysts and larvae of various aquatic plant and animal species.

The development of larger, faster ships completing their voyages in ever shorter times, combined with rapidly increasing world trade, means that the natural barriers to the dispersal of species across the oceans are being reduced. In particular, ships provide a way for temperate marine species to pierce the tropical zones, and some of the most spectacular introductions have involved northern temperate species invading southern temperate waters, and vice versa.

The vast majority of aquatic species carried in ballast water do not survive the voyage, as the ballasting and de-ballasting cycle and environmental conditions inside ballast tanks can be quite hostile to organism survival. However, when all factors are favourable, an introduced species may survive to establish a reproductive population in the host environment. It may even become invasive, out-competing native species and multiplying into pest proportions.

As a result, whole ecosystems are being changed. In the USA, for example, the European Zebra Mussel *Dreissena polymorpha* has infested over 40 per cent of internal waterways and is a major problem for industry, fouling all available hard surfaces, including cooling water intake pipes. In Southern Australia, New Zealand and the Mediterranean, the Asian kelp *Undaria pinnatifida* is invading new areas rapidly, displacing the native seabed communities. In the Black Sea, the filter-feeding North American jellyfish *Mnemiopsis leidyi* has depleted native plankton stocks to such an extent that it has contributed to the collapse of entire commercial fisheries. In several countries, introduced, microscopic, 'red-tide' algae (toxic *dinoflagellates*) have been absorbed by filter-feeding shellfish, such as oysters. When eaten by humans, these contaminated shellfish can cause paralysis and, even, death. The list goes on, hundreds of examples of severe aquatic bio-invasions across the globe. Impacts caused can be divided into three main categories; ecological, economic and on human health, although they are all inter-linked and influence each other.

The problem of harmful aquatic organisms in ships' ballast water was first raised at IMO in 1988 and, since then, the MEPC, together with the Maritime Safety Committee (MSC) and technical Sub-Committees, have been dealing with the issue, focusing first on guidelines and then on developing a mandatory instrument – the International Convention for the Control and Management of Ships' Ballast Water and Sediments, which was adopted in 2004.

This Convention requires ratification by 30 States, representing 35 per cent of world merchant shipping tonnage, in order to enter into force. When it does, it will, among other things, require all ships to implement a Ballast Water Management Plan. All ships will have to carry a Ballast Water Record Book and will be required to carry out ballast water management procedures to a given standard. Existing ships will be required to do the same, but after a phase-in period. Parties to the Convention are given the option to take additional measures, which are subject to criteria set out in the Convention and to IMO guidelines.

In addition to developing the new Ballast Water Management Convention, IMO also joined forces with the Global Environment Facility (GEF) and the United Nations Development Programme (UNDP) to implement the Global Ballast Water Management Programme (GloBallast), with a view to assisting developing countries to reduce the transfer of harmful aquatic organisms and pathogens in ships' ballast water, implement existing IMO Guidelines, and prepare for the implementation of the new Convention. The project has recently begun a new phase, entitled *GloBallast Partnerships*, the main objective of which is to assist particularly vulnerable countries and/or regions to enact legal and policy reforms to reduce the risk of aquatic bio-invasions mediated by ships' ballast water and sediments.

This topic continues to have a high profile in the work of the Organization and elsewhere, too. An MEPC Review Group is currently considering the availability of technology required under the Convention, while a GESAMP Ballast Water Working Group is reviewing proposals for the approval of ballast water systems that make use of active substances, which could be used to treat ballast water on board ships. And earlier this year, a documentary film, produced by IMO in conjunction with the BBC, won a top award at a major documentary film festival in New York. Entitled *Invaders from the Sea*, it won the gold award in the category of "Best United Nations Feature" at this year's "Stories from the Field", the third annual United Nations Documentary Film Festival.

## **Control of Harmful Anti-fouling Systems**

Anti-fouling paints are used to coat the bottoms of ships to prevent sealife such as algae and molluscs attaching themselves to the hull – thereby slowing down the ship and increasing fuel consumption.

In the early days of sailing ships, lime and, later, arsenic were used to coat ships' hulls, until the modern chemicals industry developed effective anti-fouling paints using metallic compounds. These compounds slowly "leach" into the water, killing barnacles and other marine life that have attached to the ship. But studies have shown that these compounds persist in the water, killing sealife, harming the environment and possibly entering the food chain. For example, one of the most effective anti-fouling paints, developed in the 1960s, contains the organotin tributyltin (TBT), which has been proven to cause deformations in oysters and sex changes in whelks.

The harmful environmental effects of organotin compounds were recognized by IMO in 1989. In 1990, the MEPC adopted a resolution recommending that Governments adopt measures to eliminate the use of anti-fouling paint containing TBT on non-aluminium hulled vessels of less than 25 metres in length and eliminate the use of anti-fouling paints with a leaching rate of more than four microgrammes of TBT per day.

In November 1999, IMO adopted an Assembly resolution that called on the MEPC to develop an instrument, legally binding throughout the world, to address the harmful effects of anti-fouling systems used on ships.

The resultant International Convention on the Control of Harmful Anti-fouling Systems on Ships will prohibit the use of harmful organotins in anti-fouling paints used on ships and will establish a mechanism to prevent the potential future use of other harmful substances in anti-fouling systems.

Under the terms of the new Convention, Parties are required to prohibit and/or restrict the use of harmful anti-fouling systems on ships flying their flag, as well as ships not entitled to fly their flag, but which operate under their authority, and all ships that enter their ports, shipyards or offshore terminals.

Anti-fouling systems to be prohibited or controlled will be listed in an annex to the Convention, which will be updated as and when necessary.

The Convention was adopted on 5 October 2001 and will enter into force on 17 September 2008.

## **Dumping waste material at sea**

A significant milestone for the protection of the marine environment was reached on 24 March 2006 with the entry into force of the 1996 Protocol to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972, which it will supersede.

The 1996 Protocol represents a major change of approach to the question of how to regulate the use of the sea as a depository for waste materials in that, in essence, dumping is prohibited, except for materials on an approved list. This more restrictive approach contrasts with the original 1972 Convention which permitted dumping of wastes at sea, provided certain conditions were met, except for materials on a banned list. The exceptions to the general prohibition under the 1996 Protocol include relatively benign materials such as dredged material, sewage sludge, fish waste, inert, inorganic geological material (e.g. mining wastes) and organic material of

natural origin. The coverage of the 1996 Protocol is wider, too, as it also governs the storage of wastes in the seabed, including CO<sub>2</sub> captured on land for storage in sub-seabed geological formations, as well as the abandonment, or toppling, of offshore installations.

### **Ship recycling**

When ships reach the end of their working lives, recycling is undoubtedly the most environmentally-friendly way to dispose of them. Virtually every part of the hull and machinery is capable of being re-used and so are a great deal of the fixtures, fittings and furnishings. Ship recycling contributes to sustainable development. Nevertheless, as the world has been aware for some time, while the principle of ship recycling is a sound one, working practices and environmental standards in recycling facilities in certain parts of the world often leave much to be desired.

In view of this, IMO, as the international regulatory body responsible for the safety and security of shipping as well as the protection of the marine environment from ships, has taken action to develop a realistic and effective solution to some of the problems associated with ship recycling.

At the end of 2003, IMO adopted recommendatory Guidelines on Ship Recycling, and has been working with other organizations, including the International Labour Organization and the relevant Basel Convention bodies, in an effort to address the ship recycling issue from all perspectives. At its fifty-third session in July 2005, the MEPC agreed that IMO should develop a new instrument on recycling of ships, with a view to providing legally-binding and globally-applicable regulations for international shipping and for recycling facilities. The task is to draft a pragmatic, workable, effective and well-balanced instrument, in the development of which due account is taken of the need to ensure that ships reaching the end of their operational lives do so with maximum respect for the health of those involved; of the safety of the ships concerned; of the environment of the countries in which the recycling activities take place; and of any other associated issues.

Work on the instrument is now at an advanced stage and the IMO Council has approved a five-day international conference in the 2008-2009 biennium to adopt it.

### **The removal of hazardous shipwrecks**

A new international Convention, setting out the legal conditions under which States can remove hazardous shipwrecks, was adopted at the end of a five-day Diplomatic Conference convened by IMO at the United Nations Office in Nairobi (UNON), Kenya, earlier this year. This was the first such event that IMO has held in Africa.

Once in force, the wreck removal Convention will fill a gap in international maritime law, by providing a sound legal basis for States to remove, or have removed, from their exclusive economic zones (EEZs), wrecks that may pose a hazard to navigation or, because of the nature of their cargo, to the marine and coastal environments, or to both. The Convention also includes an optional clause enabling States Parties to apply certain provisions to their territory, including the territorial sea.

Any wreck posing a threat to navigation will almost certainly also pose a threat to the environment. This is because, even if a ship colliding with a wreck is not carrying oil or any other hazardous cargo, it will be carrying fuel and other oils, which can cause serious environmental damage if spilled into the sea. Furthermore, a wreck may cause other types of environmental damage, such as smothering marine organisms, breaking up coral reefs and, if it is large enough, interfering with spawning and breeding areas.

The new Convention will make shipowners financially liable and require them to take out insurance or provide other financial security to cover the costs of wreck removal. It will also provide States with a right of direct action against insurers.

### **Liability and compensation**

While IMO is primarily concerned with the safety, security and efficiency of shipping and the prevention of marine pollution, the Organization has, over the years, introduced a comprehensive set of regulations covering liability and compensation for damage, including environmental damage, caused by ships.

The **Torrey Canyon** disaster of 1967, which led to an intensification of IMO's technical work in preventing pollution, was also the catalyst for work on liability and compensation. In the wake of that incident, an *ad hoc* Legal Committee was established to deal with the legal issues raised by what was the world's first major tanker disaster and the Committee soon became a permanent subsidiary organ of the IMO Council, meeting twice a year to deal with any legal issues raised at IMO.

Among the main legal issues raised by the **Torrey Canyon** incident were: who is to be held responsible for damage caused by oil pollution from tankers, particularly in the case of foreign-flagged vessels; the basis for determining liability; and the level of compensation for damage. Following completion of the preparatory work undertaken by the Legal Committee, in 1969, a conference convened by IMO adopted the International Convention on Civil Liability for Oil Pollution Damage (Civil Liability Convention), which rendered the shipowner strictly liable for oil pollution damage, irrespective of fault, and which ensured the availability of compensation by compelling the shipowner to take out compulsory insurance. As a *quid pro quo*, the shipowner's liability was capped at a certain level, linked to the tonnage of the ship.

Some delegates to the 1969 Conference felt that the liability limits established were too low, and that the compensation made available in some cases might, therefore, prove inadequate. As a result, a further conference was convened by IMO in 1971 which resulted in the adoption of the International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage (Fund Convention), which entered into force in 1978. Unlike the Civil Liability Convention, which puts the onus on the shipowner, the Fund Convention establishes a fund, made up of financial contributions from oil importers. The idea is that, if an accident at sea results in pollution damage which exceeds the level of compensation available under the Civil Liability Convention, the fund will be available to pay an additional amount, while ensuring that the burden of compensation will be shared between shipowner and cargo interests. The principle of strict liability has, however, been maintained.

Both the Civil Liability and the Fund Conventions were amended by Protocols adopted in 1992. Apart from substantially increasing the limits of liability in each Convention, the treaties were extended to the EEZ and introduced a procedure for updating the limitation amounts. This procedure was put to use by IMO's Legal Committee at its eighty-second session in October 2000 and the new limits entered into force on 1 November 2003.

In May 2003, a Diplomatic Conference adopted the 2003 Protocol on the Establishment of a Supplementary Fund for Oil Pollution Damage. The Protocol establishes an International Oil Pollution Compensation Supplementary Fund, the object of which is to provide an additional, third tier of compensation for oil pollution damage. Participation in the Supplementary Fund is optional and is open to all Contracting States to the 1992 Fund Convention. Under the Protocol, the total amount of compensation payable for any one incident will be limited to a combined total of 750 million Special Drawing Rights (SDR) – or just over US\$1,000 million, including the

amount of compensation paid under the existing CLC/Fund Conventions. The total compensation is equivalent to that available under the United States Oil Pollution Act 1990 (OPA 90).

The Civil Liability and Fund Conventions were primarily concerned with damage caused by oil carried as cargo in oil tankers. In 1996, with the adoption of the International Convention on Liability and Compensation for Damage in connection with the Carriage of Hazardous and Noxious Substances by Sea 1996 (HNS Convention), other hazardous and noxious substances, primarily chemicals transported by sea, also became subject to an internationally agreed liability and compensation regime.

The HNS Convention is modelled on the Civil Liability and Fund Conventions, as amended, and incorporates the key elements of strict liability, limited liability, compulsory insurance and a two-tier system in which the shipowner and cargo interests share the burden of compensation, but instead of two separate conventions, all these elements have been included in a single text. It has yet to enter into force but, once it does, another major step forward in providing compensation to victims of pollution incidents generated at sea will have been taken.

To complete the cycle of liability and compensation regimes for environmental damage, in March 2001, IMO adopted the International Convention on Civil Liability for Bunker Oil Pollution Damage, which, when in force, will establish a liability and compensation regime for damage caused by spills of oil, when carried as fuel in ships' bunkers. This Convention is also closely modelled on the Civil Liability Convention in that it makes the shipowner strictly liable for such damage, up to a limited amount, backed by the requirement of compulsory insurance.

### **Geographical areas needing special attention**

While always advocating a global approach, IMO nevertheless recognizes that some areas need additional protection. To this end, MARPOL defines certain sea areas as "Special Areas" in which the adoption of special mandatory measures for the prevention of sea pollution is required so that such areas are provided with a level of protection higher than elsewhere.

The concept of Special Areas was a new and important feature in Annex I of the 1973 MARPOL Convention. Special Areas are considered to be so vulnerable to pollution by oil that oil discharges within them have been completely prohibited, with minor and well-defined exceptions. The 1973 Convention identified the Mediterranean Sea, the Black Sea, the Baltic Sea, the Red Sea and the Gulfs area as Special Areas. Subsequent amendments to the Convention have seen the Gulf of Aden, the Antarctic Area, North-West European waters, the Oman area of the Arabian Sea and Southern South-African waters, all added to the list of Special Areas.

In these areas, all oil-carrying ships are required to be capable of operating the method of retaining oily wastes on board through the "load on top" system or of discharging them to shore reception facilities. For ships, this may involve the fitting of appropriate equipment, including an oil-discharge monitoring and control system, oily-water separating equipment and a filtering system, slop tanks, sludge tanks, piping and pumping arrangements. With regard to reception facilities, in 2006 the MEPC approved an action plan to tackle the perceived inadequacy of port reception facilities, the effective implementation of which, while providing a solution to a long-standing problem, will promote quality and environmental consciousness among administrations and shipping.

The old MARPOL Annex II, dealing with the carriage of chemicals, defined a number of Special Areas where discharge requirements were more stringent but, in developing the new Annex, it was agreed that the tightening up of requirements across the board, most notably in relation to stripping limits, meant that the Special Areas could largely be dispensed with. The revised Annex II, therefore, identifies only one Special Area, namely the Antarctic, where all discharges



are prohibited. This has helped to simplify the Annex, which was one of the terms of reference given to the group charged with its revision.

MARPOL Annex V totally prohibits the disposal of plastics anywhere into the sea, and severely restricts discharges of other garbage from ships into coastal waters and Special Areas. The Annex also obliges Governments to ensure the provision of facilities at ports and terminals for the reception of garbage. The Special Areas established under this Annex are: the Mediterranean Sea; the Baltic Sea Area; the Black Sea area; the Red Sea Area; the Gulfs area; the North Sea; the Wider Caribbean Region; and the Antarctic Area. These are areas which have particular problems because of heavy maritime traffic or low water exchange caused by the land-locked nature of the sea concerned.

By the same token, MARPOL Annex VI, on air pollution, contains provisions allowing for special SO<sub>x</sub> Emission Control Areas (SECAs) to be established, with more stringent controls on sulphur emissions. In these areas, the sulphur content of fuel oil used onboard ships must not exceed 1.5% m/m. Alternatively, ships must fit an exhaust-gas cleaning system or use any other technological method to limit SO<sub>x</sub> emissions. The Baltic Sea Area is designated as a SECA in the Protocol and the North Sea was adopted as a SECA in July 2005.

Outside of MARPOL, moreover, the IMO Assembly has adopted Guidelines for the designation of Particularly Sensitive Sea Areas (PSSAs), which are deemed to require a higher degree of protection because of their particular significance for ecological or socio-economic or scientific reasons, and because they may be vulnerable to damage by international maritime activities. PSSAs, when adopted with due sense of proportionality and after careful consideration of the environmental attributes of a particular area or region, and with special ship routing and other relevant measures accompanying them, have certainly the potential to contribute substantially to a higher degree of protection and preservation of the environment. To date, eleven PSSAs have been declared by IMO.

### **Current focus of attention**

The Member States of IMO, in partnership with many industry and civil society interests, have made great efforts to develop and adopt the measures outlined above. There remains, however, continuing concern at the slow pace of ratification of IMO's environmental Conventions – even of those already in force. It took almost eight years, for example, for MARPOL's Annex VI to reach its entry into force criteria of ratification by 15 States representing not less than 50 per cent, by gross tonnage, of the world's merchant fleet – by which time, as mentioned earlier, it needed to undergo a substantial review.

The 2004 Ballast Water Management Convention had, by the end of last year (2007), been ratified by just eleven countries with an aggregate merchant shipping tonnage under their flag of 3.46 per cent, against the required 30 countries representing 35 per cent of the world total. Although the lack of effective ballast water treatment technologies is invoked as one hurdle in achieving early entry into force of the Convention (hence the work of the MEPC Review Group and the GESAMP Working Group), early ratification by as many countries as possible will make a major contribution to the protection of fragile marine ecosystems.

The delay in bringing some of these and other instruments into force at a reasonable time after their adoption deprives the environment of their beneficial effects. It may also act as encouragement to individual countries or groups of countries to develop unilateral or regional measures, with all the attendant negative repercussions such actions entail. And the prolongation of these circumstances can lead to ambiguities which, in the final analysis, may count against seafarers, the maritime industry and the environment.

The urgent need to ratify these and, indeed, all outstanding Conventions, as soon as possible, should be promptly recognized by the parties concerned. After all, it is thanks to the strenuous and concerted efforts of the same Governments, working together under the auspices of IMO, over long periods of time, that these Conventions saw the light of day.

But, even more than this, it would be damaging for the maritime community to stand accused of failing in its duty towards the safety of seafarers and those who travel by sea; the security of ships and port facilities; and the protection and preservation of this beautiful planet, the protection and preservation of which is our undeniable responsibility.

### **Galvanizing public awareness**

The glare of international publicity, fuelled by today's global communication infrastructure, ensures that environmental issues are played out on a worldwide stage. The broader concerns of society mean that pressure to be "green and clean" is mounting.

In the world of global business today, it is not unusual to find major commercial concerns freely embracing the notion that good environmental and social stewardship actually make good business sense. Companies are learning the value of their own environmental credentials as their markets and their customers become increasingly sensitized to environmental issues. Shipping is no different from any other industry in that, both collectively and individually, shipowners and operators need to protect their brand image.

However, there is an inherent quandary in the fact that, on the one hand, everybody, it seems, wants more for less, while, on the other, society's concerns about safety and the protection of the environment continue to grow. Of course, shipping needs to do whatever it can to solve this apparent conundrum; but, in the long term, society will need to address its own priorities and understand that nothing comes for nothing.

Shipping has to ensure that its activities are sustainable, which, in this context, is normally understood to mean that any negative impact an activity may have on the environment must be reduced to the point where it is clearly outweighed by the positive benefits that the activity brings. However, global society is rapidly approaching the time when it should move beyond this and understand that caring for our environment must become our top priority, even though that may come with an economic price.

Due to its highly technical nature and the time constraints involved, the IMO regulatory process does not always allow sufficient opportunity to sensitize legislators and the public to the benefits of the Organization's environmental regulations and the need to support their rapid and effective implementation. Therefore, greater attention needs to be given to getting the message across to all levels of society – which is, of course, an essential element of the continuing campaign to raise the profile of shipping.

In this respect, in addition to the work of the MEPC and several Sub-Committees in relation to the environment, IMO's Integrated Technical Co-operation Programme, to which Governments and the industry contribute considerable financial resources and technical expertise, has a long track-record of successfully helping the maritime administrations of developing countries in building up or enhancing their capacities to implement and enforce, effectively and uniformly, IMO's global environmental standards.

These quiet successes also deserve to be highlighted – as does the contribution to the worthy cause of keeping the environment clean and healthy being made by the World Maritime

University (Sweden), the IMO International Maritime Law Institute (Malta) and the IMO International Maritime Academy (Italy).

### **The wider picture**

One of the greatest challenges faced by anyone involved in environmental work is how to overcome the feeling that, because of the sheer scale of the problems to be addressed, individual efforts appear minuscule in comparison with the daunting tasks ahead. At such times, it is always helpful to remember that the efforts of each and everyone contribute to a bigger picture and that there are very capable, clear-sighted people and organizations that not only have a view of it all, but are also getting to grips with it.

For example, more than a decade ago, many countries agreed, through the United Nations Framework Convention on Climate Change (UNFCCC), to consider ways and means to reduce global warming and how best to cope with whatever temperature increases are inevitable. And before that, in 1989, the Montreal Protocol on Substances that Deplete the Ozone Layer had come into force, as a result of which, incidentally, IMO phased out, through appropriate amendments to the SOLAS Convention, the use of halons and perfluorocarbons as fire-extinguishing media in new fire-fighting systems aboard ships. More recently, in December 1997, the Kyoto Protocol (which contains more powerful and legally-binding measures to protect the environment) was agreed as an addition to the UNFCCC treaty; and, in June 2002, as part of the global response, IMO was asked by the UNFCCC's Subsidiary Body for Scientific and Technological Advice to examine the methodological reporting of emissions emanating from fuel used by ships.

In November 2005, Kenya hosted the second meeting of the Parties to the Kyoto Protocol, in conjunction with the twelfth session of the Conference of the Parties to the Climate Change Convention. This massive event was attended by some six thousand participants from 180 countries and included more than 100 Ministers and two Heads of State. It concluded with the adoption of a wide range of decisions designed to mitigate climate change and help countries adapt to the effects of global warming.

IMO's work in this respect should, therefore, be seen in this context; as part of a broad-based effort in which everyone has a responsibility and everyone has a role to play, which is a maxim that is reflected in the well-known environmental call to action "think globally – act locally".

An excellent example of this approach are the initiatives that IMO undertakes to forge alliances with younger generations to raise awareness of environmental protection and the use of practical on-the-ground activities to restore and protect local coastal environments. In this context, IMO provided two children from the Greek and Turkish marine environment protection associations, HELMEPA and TURMEPA, with the opportunity to attend and speak to IMO's MEPC. They spoke about their own hopes and fears for the environment and about the very practical efforts they, and their contemporaries in countries that have embraced the MEPA (Marine Environment Protection Association) movement, are undertaking to make a positive contribution. IMO also facilitated the attendance of children at the UNEP Children's World Summit for the Environment in 2005, in co-operation with the Junior sections of HELMEPA, TURMEPA and CYMEPA (the Cypriot marine environment protection association). Other initiatives, such as the establishment of INTERMEPA (the global version of the same movement) and Intertanko's Poseidon Challenge, which seeks to improve the tanker industry's performance by, *inter alia*, striving to achieve "zero pollution", are also making an important contribution.

And so, to conclude: the huge volume of goods and products transported by sea makes shipping the premier facilitator of world trade and a direct contributor to global economic growth.

Without shipping, there would be virtually no international commerce and, as a result, one half of the world would starve, while the other would freeze. Moreover, statistics reveal that shipping is extremely fuel-efficient and the least environmentally-damaging form of commercial transport and, set against land-based industry, it is a comparatively minor contributor, overall, to marine pollution from human activities. Therefore, both the economic and environmental costs of using any form of transport other than shipping, to move more than 90 per cent of global trade, would be unthinkable high.

Nevertheless, while there is an impressive track record of continued environmental awareness, concern, action, response and other relevant successes scored by IMO and the maritime community over many years, we will not rest on our laurels. IMO continues to pursue a long-term strategy to ensure that shipping maintains and improves its contribution to global sustainability, a strategy that involves Governments, the shipping industry, environmental organizations, engine manufacturers, oil producers, scientists and other relevant interests, so that all parameters can be taken into account when the key decisions are made and implemented.

Thanks to the strenuous, multi-faceted work of IMO over many years and the various initiatives and support of the industry, the potential threat to the environment from shipping operations can now be identified as stemming from gas emissions more than by any other maritime-related source – provided, of course, that the various IMO and industry measures are rigorously and consistently implemented and enforced globally. It is in this arena, therefore, that Governments – through IMO – and the industry, in full recognition of its social responsibility, are now quite rightly directing their collective efforts and energy.

Now that there is widespread recognition that the greenhouse effects represent a real, present, clear and serious threat to the environment and to planet Earth as a whole, public opinion – stimulated by information about the depletion of the ozone layer, gas emissions and climate change – is impatient for action. The ball is clearly in the court of politicians, both in developed and developing countries, in established and emerging economies. In responding, sooner rather than later, they should feel encouraged by the recent review of Sir Nicholas Stern (the former World Bank Chief Economist), which suggested that the economic cost of action against global warming is far lower than the cost of inaction. In acting now – and, in the maritime field, through IMO, particularly as far as atmospheric pollution emanating from ships is concerned – they will also respond positively to the wishes of the 2000 Millennium Summit and the 2005 World Summit, giving, at the same time, effect to one of the Millennium Development Goals (calling for environmental sustainability), in the implementation of which the world community has quite rightly placed so much hope.

The protection of the environment is something that can be, and must be, addressed by all. The work of IMO and others, at the global regulatory level, is only really effective if the measures we adopt are widely implemented, on a daily basis, by ordinary people in the industries that we serve. Everybody, no matter who they are, can, and must, do their bit to make a difference. When it comes to the environment, what we do, what you do, every day, really does matter.

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