PREFACE

The present brochure entitled "Prevention of Environmental Pollution by Ships" is addressed to members of the Union of Greek Shipowners and interested parties and contains information regarding the regulatory and compensation regimes and industry standards applying internationally concerning prevention of environmental pollution by ships. Moreover, interested parties can be informed from the brochure about the extent and content of the regulatory framework and environmental profile of shipping without need for recourse to several sources. Addressees should note that the list of the basic legal instruments (IMO / EU) does not refer to national legislation in the field. The brochure also serves as a means of its contribution to the "precautionary principle" of environmental protection of the seas in keeping with the "social responsibility" of Greek shipping.

In 1982 the Greek Shipping community (shipowners and seafarers) established HELPEPA, the first organization dedicated to the voluntary prevention of pollution of the sea by ships of its kind. Part of the on-going work of HELMEPA has been to translate, simplify, summarize and explain the main IMO conventions and the important national laws with a view to making them friendly and thereby assist compliance.

PREVENTION OF ENVIRONMENTAL POLLUTION BY SHIPS
REGULATORY AND COMPENSATION REGIMES AND INDUSTRY STANDARDS

Contents

INTRODUCTION

The regulatory regime for international shipping covering a wide range of topics is comprehensive. International shipping, if not over-regulated, is sufficiently regulated.

The International Maritime Organization (IMO) has adopted more than 25 major Conventions on maritime safety, pollution prevention and liability and compensation and a large number of free-standing mandatory and non-mandatory codes. These instruments have been successful in drastically reducing vessel-sourced pollution and illustrate the commitment of the Organization and the shipping industry towards protecting the environment (see Annex 2 of this paper).

EU regional measures complement or enhance the international regulatory regime.

In addition, industry has developed its own processes of self-regulation in order to make shipping safe and efficient. The International Safe Management (ISM) Code originates from industry standards and is mandatory across all ships, with obvious beneficial effects. Other examples are the Ship to Ship Transfer Guides, the International Safety Guide for Oil Tankers and Terminals, the Safety Guides for tankers and the Ship Inspection Report Programme (SIRE) and the various Classification Societies rules and detailed requirements.

However, safety and pollution prevention depends on a chain of collective responsibility, namely flag states, port states, shipowners, ship operators, seafarers, classification societies, insurers and charterers.

A. IMO PREVENTION OF MARINE POLLUTION CONVENTIONS IN FORCE

1. International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto

The MARPOL 73/78 Convention is the main international Convention covering prevention of pollution of the marine environment by ships from operational or accidental causes. It is a combination of two treaties adopted in 1973 and 1978 respectively and updated by amendments through the years. The Convention includes regulations aimed at preventing and minimizing pollution from ships - both accidental pollution and that from routine operations - and currently includes six technical Annexes. Special Areas with strict controls on operational discharges are included in most Annexes:

Annex I: Regulations for the Prevention of Pollution by Oil (entered into force 2 October 1983) covers prevention of pollution by oil from operational measures as well as from accidental discharges. The 1992 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.

Annex II: Regulations for the Control of Pollution by Noxious Liquid Substances in Bulk (entered into force 2 October 1983) sets the discharge criteria and measures for the control of pollution by noxious liquid substances carried in bulk. Some 250 substances were evaluated and included in the list appended to the Convention. The discharge of their residues is allowed only to reception facilities until certain concentrations and conditions (which vary with the category of substances) are complied with. In any case, discharge of residues containing noxious substances is not permitted within 12 miles of the nearest land. More stringent restrictions apply to the Baltic and Black Sea areas.

Annex III: Prevention of Pollution by Harmful Substances Carried by Sea in Packaged Form (entered into force 1 July 1992) 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. The International Maritime Dangerous Goods (IMDG) Code has, since 1991, included marine pollutants.

Annex IV: Prevention of Pollution by Sewage from Ships (entered into force 27 September 2003) 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 of ships. The regulations apply to ships engaged in international voyages, of 400 gross tonnage (gt) and over. The ships are required to be equipped with either a sewage treatment plant or a sewage comminuting and disinfecting system or a sewage holding tank.

Annex V: Prevention of Pollution by Garbage from Ships (entered into force 31 December 1988) requires the separation of different types of garbage and specifies the distances from land and the manner in which they may be disposed of, otherwise they should be delivered to shore based reception facilities. The requirements are much stricter in a number of "special areas" 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.

Annex VI: Prevention of Air Pollution from Ships (entered into force 19 May 2005 and the revised Annex VI on 1 July 2010) sets limits on sulphur oxide and nitrogen oxide emissions from ship exhausts as well as particulate matter and prohibits deliberate emissions of ozone depleting substances, such as hydro-chlorofluorocarbons. More stringent standards are set for Emission Control Areas designated by IMO (Baltic Sea, North Sea and North America). Further information on the control of the above emissions, as well as on emissions of carbon dioxide (Green House Gas) emissions is given at Annex 1 of this paper.

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

The Convention was adopted on 29 November 1969 and entered into force on 6 May 1975. It 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 1973 Protocol extended the Convention to cover substances other than oil.

3. International Convention on the Control of Harmful Anti-fouling Systems on Ships, 2001

The Convention was adopted on 5 October 2001 and entered into force on 17 September 2008. It prohibits the use of harmful organotins in anti-fouling paints used on ships and establishes a mechanism to prevent the potential future use of other harmful substances in anti-fouling systems.

4. International Convention on Oil Pollution Preparedness, Response and Co-operation, 1990

The Convention was adopted in November 1990 and entered into force in May 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. They 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 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.

Ships are required to carry a shipboard oil pollution emergency plan and to report incidents of pollution to coastal authorities and the Convention details the actions that are then to be taken.

5. Protocol on Preparedness, Response and Co-operation to Pollution Incidents by Hazardous and Noxious Substances, 2000 (OPRC-HNS Protocol 2000)

The Protocol was adopted on 15 March 2000 and entered into force on 14 June 2007. It follows the principles of the International Convention on Oil Pollution Preparedness, Response and Co-operation, 1990. 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. The HNS Protocol ensures that ships carrying hazardous and noxious substances are covered by preparedness and response regimes similar to those for oil incidents.

6. Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972

The Convention was adopted on 13 November 1972 and entered into force on 30 August 1975. It prohibits the dumping of certain hazardous materials, requires a prior special permit for the dumping of a number of other identified materials and a prior general permit for other wastes or matter. "Dumping" has been defined as the deliberate disposal at sea of wastes or other matter from vessels, aircraft, platforms or other man-made structures, as well as the deliberate disposal of these vessels or platforms themselves, in defined circumstances.

The Convention was replaced by the 1996 Protocol which was adopted on 7 November 1996 and entered into force on 24 March 2006. Rather than state which materials may not be dumped, the 1996 Protocol restricts all dumping except for a permitted list as follows:

1. Dredged material
2. Sewage sludge
3. Fish waste or material resulting from industrial fish processing operations
4. Vessels[1] and platforms or other man-made structures at sea
5. Inert, inorganic geological material
6. Organic material of natural origin
7. Bulky items primarily comprising iron, steel, concrete and similar unharmful materials where such wastes are generated at locations, such as small islands with isolated communities, having no practicable access to disposal options other than dumping.
8. CO_2 streams from CO_2 capture processes.

Tanker

[1] Constructive total loses, e.g. ships which cannot be safely towed to recycling facilities for demolition.

Bulk carrier

B. IMO PREVENTION OF MARINE POLLUTION CONVENTIONS NOT YET IN FORCE

1. International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004

The Convention was adopted on 13 February 2004 and is expected to enter into force in 2012. Parties undertake to prevent, minimize and ultimately eliminate the transfer of harmful aquatic organisms and pathogens through the control and management of ships' ballast water and sediments. Ships must install ballast treatment systems and have a Ballast Water Record Book to record when ballast water is taken on board; circulated or treated for Ballast Water Management purposes; and discharged into the sea. It should also record when ballast water is discharged to a reception facility and accidental or other exceptional discharges of ballast water.

2. The Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships, 2009

The Convention was adopted on 11 May 2009 and will enter into force 24 months after the date on which 15 States, representing 40 per cent of world merchant shipping by gross tonnage have ratified it. It is aimed at ensuring that ships, when being recycled after reaching the end of their operational lives, do not pose any unnecessary risk to human health and safety or to the environment. It intends to address all the issues around ship recycling, including the fact that ships sold for scrapping may contain environmentally hazardous substances such as asbestos, heavy metals, hydrocarbons, ozone-depleting substances and others. The Convention will address concerns raised about the working and environmental conditions at many of the world's ship recycling locations.

C. IMO LIABILITY AND COMPENSATION CONVENTIONS IN FORCE

1. International Convention on Civil Liability for Oil Pollution Damage, 1969

In the aftermath of the grounding of TORREY CANYON off the SW coast of the UK in 1967 tanker owners, through their organizations of mutual insurance P&I (Protection & Indemnity) Clubs, took constructive action to mitigate the effects of oil spills and to assure adequate and timely compensation for those affected. The compensation scheme known as the Tanker Owners Voluntary Agreement concerning Liability for Oil Pollution (TOVALOP) was conceived in 1968. A sister voluntary oil spill compensation regime CRISTAL (Contract Regarding a Supplement to Tanker Liability of Oil Pollution) for cargo owners (oil companies) was developed in parallel as a voluntary industry agreement designed to address oil pollution damage greater than the one envisaged by TOVALOP. Both voluntary agreements were designed to be interim arrangements pending the widespread adoption by maritime states of two international conventions developed under the auspices of the IMO.

The International Convention on Civil Liability for Oil Pollution Damage (CLC) was adopted on 29 November 1969 and entered into force on 19 June 1975. It was replaced by the 1992 Protocol adopted on 27 November 1992 and in force from 30 May 1996. The Convention was adopted to ensure that adequate compensation is available to persons who suffer oil pollution damage resulting from maritime casualties involving oil-carrying ships. It places strict liability[2] for such damage on the owner of the ship from which the polluting oil escaped or was discharged.

The Convention requires ships covered by it to maintain insurance or other financial security in sums equivalent to the owner's total liability for one incident. It applies to all seagoing vessels actually carrying oil in bulk as cargo, but only ships carrying more than 2,000 tons of oil are required to maintain mandatory insurance in respect of oil pollution damage.

Under the 2000 Amendments adopted on 18 October 2000 and in force from 1 November 2003 the compensation limits range from 4.51 mil. Special Drawing Rights ($6,77mil.) for a ship not exceeding 5.000 gt to 89.77 mil. SDR ($134,66 mil.) for a ship over 140.000 gt.

2. International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage (FUND), 1971

The Convention was adopted on 18 December 1971 and entered into force on 16 October 1978. It was superseded by the 1992 Protocol that was adopted on 27 November 1992 and entered into force from 30 May 1996. Under the 1992 Protocol, the maximum amount of compensation payable from the Fund for a single incident, including the limit established under the 1992 CLC Protocol, is 135 million SDR ($202,5 mil.). The 2000 Amendments adopted

[2] Under strict liability the persons who suffer oil pollution damage and are claiming compensation do not have to prove that the defendant was negligent or directly in fault. It simplifies and expedites payments of compensation up to the owner's total liability and at the same time it ensures that the actual value of a company' s assets are not a limiting factor (which they otherwise would be). This feature is important given that shipping companies are predominantly private concerns of varying sizes.

on 18 October 2000 and in force from 1 November 2003 raised the maximum amount to 203 mil. SDR ($304,5 mil.). However, if three States contributing to the Fund receive more than 600 mil. tonnes of oil per annum, the maximum amount is raised to 301 million SDR ($451,5 mil.).

The 2003 Protocol adopted on 16 May 2003 and in force from March 2005 established an International Oil Pollution Compensation Supplementary Fund with the aim to supplement the compensation available under the 1992 Civil Liability and Fund Conventions with an additional, third tier of compensation. The Protocol is optional and participation is open to all States Parties to the 1992 Fund Convention. The total amount of compensation payable for any one incident will be limited to a combined total of 750 million SDR ($1.1125 million) including the amount of compensation paid under the existing CLC/Fund Convention.

Chemical carrier

3. International Convention on Civil Liability for Bunker Oil Pollution Damage, 2001

The Convention was adopted on 23 March 2001 and entered into force on 21 November 2008. It ensures that adequate, prompt, and effective compensation is available to persons who suffer damage caused by spills of oil, when carried as fuel in ships' bunkers. It applies to damage caused on the territory, including the territorial sea, and in exclusive economic zones of States Parties and requires ships over 1.000 gt to maintain insurance or other financial security.

4. Convention on Limitation of Liability for Maritime Claims (LLMC), 1976

The Convention was adopted on 19 November 1976 and entered into force on 1 December 1986. Its Protocol of 1996 was adopted on 3 May 1996 and entered into force on 13 May 2004. The convention specifies two types of claims - claims for loss of life or personal injury, and property claims (such as damage to other ships, property or harbour works). The Convention provides for a system of limiting liability and compensation.

5. Convention relating to Civil Liability in the Field of Maritime Carriage of Nuclear Material, 1971

The Convention was adopted on 17 December 1971 and entered into force on 15 July 1975. Its purpose is to resolve difficulties and conflicts which arise from the simultaneous application to nuclear damage of certain maritime conventions dealing with shipowners' liability, as well as other conventions which place liability arising from nuclear incidents on the operators of the nuclear installations from which or to which the material in question was being transported.

D. IMO LIABILITY AND COMPENSATION CONVENTIONS NOT YET IN FORCE

1. Nairobi International Convention on the Removal of Wrecks, 2007

The Convention was adopted on 18 May, 2007 and will enter into force twelve months following the date on which ten States have ratified it. It provides a sound legal basis for coastal States to remove, or have removed, from their coastlines, wrecks which pose a hazard to the safety of navigation or to the marine and coastal environments, or both. It will make shipowners financially liable and require them to take out insurance or provide other financial security to cover the costs of wreck removal.

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

The Convention was adopted on 3 May 1996 and will enter into force when the 2010 HNS Protocol enters into force. Under the 2010 Protocol, if damage is caused by bulk HNS, compensation would first be sought from the shipowner, up to a maximum limit of 100 million SDR (approx. 150 million). Where damage is caused by packaged HNS, or by both bulk HNS and packaged HNS, the maximum liability for the shipowner is 115 million SDR ($172.5 million). Once this limit is reached, compensation would be paid from the second tier, the HNS Fund, up to a maximum of 250 million SDR ($375 million) including compensation paid under the first tier.

Cruise ship

E. IMO POLLUTION PREVENTION CODES

1. International Safety Management Code

The International Safety Management Code (ISM Code) became mandatory in 1998. Its objective is to ensure safety, to prevent human injury or loss of life, and to avoid damage to the environment, in particular, the marine environment, and to property.

The Code establishes safety-management objectives and requires a safety management system (SMS) to be established by "the Company", which is defined as the shipowner or any person, such as the manager or bareboat charterer, who has assumed responsibility for operating the ship. The company is then required to establish and implement a policy for achieving these objectives. This includes providing the necessary resources and shore-based support. Every company is expected "to designate a person or persons ashore having direct access to the highest level of management and be responsible for monitoring the implementation of the Safety Management System". The procedures required by the Code should be documented and compiled in a Safety Management Manual, a copy of which should be kept on board. A Safety Management Certificate valid for 5 years is issued by the flag State Administration or authorized organizations.

2. International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (IGC Code) and Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (GC Code)

The purposes of these Codes is to provide an international standard for the safe transport by sea in bulk of liquefied gases and certain other substances, by prescribing the design and construction standards of ships involved in such transport and the equipment they should carry so as to minimize the risk to the ship, its crew and to the environment, having regard to the nature of the products involved.

3. International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk (IBC Code)

The Code provides an international standard for the safe carriage by sea of dangerous and noxious liquid chemicals in bulk. To minimize the risks to ships, their crews and the environment, the Code prescribes the design and construction standards of ships and the equipment they should carry, with due regard to the nature of the products involved.

4. Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines

The Code provides mandatory procedures for the testing, survey and certification of marine diesel engines which will enable engine manufacturers, shipowners and Administrations to ensure that all applicable marine diesel engines comply with the relevant limiting emission values of NOx as specified in Annex VI of MARPOL.

F. EU REGULATIONS AND DIRECTIVES

1. Regulation (EC) No 1726/2003 amending Regulation (EC) No 417/2002 on the accelerated phasing-in of double-hull or equivalent design requirements for single-hull oil tankers

The Regulation established an accelerated phasing-in scheme for the application of the double hull or equivalent design requirements of MARPOL to single hull oil tankers.

2. Regulation (EC) No 782/2003 on the prohibition of organotin compounds on ships

The purpose of this Regulation is to reduce or eliminate adverse effects on the marine environment and human health caused by organotin compounds, which act as active biocides in anti-fouling systems used on ships flying the flag of, or operating under the authority of, a Member State, and on ships, regardless of the flag they fly, sailing to or from ports of the Member States.

3. Regulation (EC) No 336/2006 on the implementation of the International Safety Management Code within the Community and repealing Regulation (EC) No 3051/95

The objective of this Regulation is to enhance the safety management and safe operation of ships as well as the prevention of pollution from ships by ensuring that companies operating those ships comply with the ISM Code.

4. Directive 2000/59/EC on port reception facilities for ship-generated waste and cargo residues

The purpose of this Directive is to reduce the discharges of ship-generated waste and cargo residues into the sea, especially illegal discharges, from ships using ports in the EU, by improving the availability and use of port reception facilities, thereby enhancing the protection of the marine environment.

5. Directive 1999/32/EC relating to a reduction in the sulphur content of certain liquid fuels and amending Directive 93/12/ EEC

The purpose of this Directive is to reduce the emissions of sulphur dioxide resulting from the combustion of certain types of liquid fuels and thereby to reduce the harmful effects of such emissions on man and the environment.

6. Directive 2009/20/EC on the insurance of shipowners for maritime claims

This Directive lays down rules applicable to certain aspects of the obligations on shipowners as regards their insurance for maritime claims.

7. Directive 95/21/EC on port State control of shipping

The purpose of this Directive is to eliminate substandard shipping in the waters under the jurisdiction of Member States by:

- increasing compliance with international and relevant Community legislation on maritime safety, protection of the marine environment and living and working conditions on board ships of all flags, and
- establishing common criteria for control of ships by the port State and harmonizing procedures on inspection and detention, taking proper account of the commitments made by the maritime authorities of the Member States under the Paris Memorandum on Port State Control (MoU)[3].

Container ship

[3] An agreement of 14 European Maritime Authorities which was signed in 1982. Since then it has expanded to 27 members and its geographical scope does not only cover the European coastline but it covers the North Atlantic by including the coast of Canada.

G. INDUSTRY STANDARDS

1. Tanker Safety Guide – Chemicals (ICS[4])

The Guide takes full account of IMO developments and the most recent experience of operators with regard to industry best practice and safety advice. This major work, condensed into a single volume and produced by ICS in co-operation with a broad cross section of chemical tanker operators, promotes safe working practices consistent with the very best international standards.

2. Tanker Safety Guide - Liquefied Gas (ICS)

Provides detailed information on the characteristics of liquefied gases, precautions, hazards and emergency procedures. A series of appendices provide additional information, including chemical data sheets for all liquefied gases carried by sea. It is the indispensable operating manual for anyone engaged in the carriage of liquefied gases by sea.

3. ISGOTT - International Safety Guide for Oil Tankers and Terminals (ICS- OCIMF[5]-IAPH[6])

The Guide provides operational advice to directly assist personnel involved in tanker and terminal operations, including guidance on, and examples of, certain aspects of tanker and terminal operations and how they may be managed. It is not a definitive description of how tanker and terminal operations are conducted. It is a general industry recommendation that a copy of ISGOTT is kept and used onboard every tanker and in every terminal so that there is a consistent approach to operational procedures and shared responsibilities for operations at the ship/shore interface.

4. Ship to Ship Transfer Guide - Petroleum (ICS-OCIMF)

The Guide provides advice to masters, marine superintendents and others who are responsible for planning Ship to Ship Transfer (STS) operations. It is primarily about the transfer of crude oil and petroleum products between ocean-going ships.

5. Ship to Ship Transfer Guide - Liquefied Gas (ICS, OCIMF, SIGTTO[7])

Deals with the transfer of liquefied gases by sea and aims to familiarize ship's masters, ship and barge operators, and charterers/traders with the general principles of liquefied gas transfer operations. Includes check lists for various stages of the operation including, pre-fixture

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[4] International Chamber of Shipping.

[5] Oil Companies' International Maritime Forum.

[6] International Association of Ports and Harbours.

[7] Society of International Gas Tankers and Terminal Operators Ltd.

Ore carrier

information, before operations commence, before run-in and mooring, before cargo transfer, and before unmooring.

6. Ship Inspection Report (SIRE) programme (OCIMF)

Under this programme, a pool of technical information about the condition and operation of oil tankers is maintained in a computerised database for use by OCIMF members and certain third parties including government agencies. OCIMF has recently expanded the SIRE system to include small vessels and barges.

7. Tanker Management and Self Assessment - TMSA guidelines (OCIMF)

TMSA builds on the foundations of the ISM Code. Its key elements are that tanker operators audit their own operational, safety, quality, environmental procedures to demonstrate continuous improvement.

8. Chemical Distribution Institute Ship Inspection Report – CDI SIR (CEFIC[8])

The CDI SIR is an inspection regime designed for chemical and gas tankers. It has been developed as part of the CEFIC "Safety and Quality Assessment System for the Management of Ship Operations". The aim of the SIR is to give an accurate assessment of the ship at the time the inspection is carried out. The SIR is essentially a quality assessment of the ship, its operations and personnel which also incorporates essential aspects of safety and environmental protection.

[8] European Chemical Industry Council.

9. Industry Guidelines on Transitional Measures for Shipowners selling ships for recycling (BIMCO[9]-IACS[10]-ICS-INTERCARGO[11]-INTERTANKO[12]-IPTA[13]-ITF[14]-OCIMF)

The Transitional Measures seek to provide a means by which shipowners can start to ensure that their ships will be recycled by facilities that are compliant with the new IMO Convention to the greatest extent possible, while maintaining commercial competitiveness in established markets for the sale of redundant ships.

10. Shipping industry guidance on the use of Oily Water Separators (BIMCO-IACS-ICS-INTERCARGO-INTERTANKO-ITF-OCIMF)

The industry guidelines are intended to highlight some of the issues concerning the use of oily water separators (OWS) and to remind company management, and shipboard personnel, how they can act to prevent MARPOL infringements.

11. Shipping industry guidance on a framework for ensuring compliance with MARPOL Environmental Compliance (ICS-ISF[15])

MARPOL requirements have not always been followed uniformly and instances of deliberate discharges in violation of MARPOL are still being detected by government authorities. While the lack of adequate waste reception facilities and the inefficiency of equipment may be of relevance, they can never justify flagrant breaches of international regulations. The guidance has been prepared as a template for the review of company compliance programmes adopted in accordance with existing regulatory requirements, such as the IMO ISM Code.

[9] Baltic and International Maritime Council.

[10] International Association of Classification Societies.

[11] International Association of Dry Cargo Shipowners.

[12] International Association of Independent Tanker Owners.

[13] International Parcel Tanker Association.

[14] International Transport Workers' Federation.

[15] International Shipping Federation.

H. ENFORCEMENT

1. Role of IMO

The IMO's task is to promote co-operation between governments in order to adopt regulations and recommendations establishing international maritime standards at the highest practicable level in the areas of maritime safety, navigational efficiency, prevention/reduction of marine pollution from ships and other legal matters.

Governments may also have certain limited powers in respect of the ships of other Governments. In some Conventions, certificates are required to be carried on board ship to show that they have been inspected and have met the required standards. These certificates are normally accepted as proof by authorities from other States that the vessel concerned has reached the required standard, but in some cases further action can be taken.

2. Flag State control

Member Governments collectively adopt regulations within IMO but they have the obligation individually or in co-operation to implement and enforce them. Contracting Governments enforce the provisions of IMO conventions as far as their own ships are concerned and also set the penalties for infringements, where these are applicable. The primary responsibility for ensuring that a ship maintains a standard at least equivalent to that specified in international conventions rests with the ship's flag State.

3. Port State Control

Many of IMO's most important technical Conventions contain provisions for ships to be inspected when they visit foreign ports to ensure that they meet IMO requirements. Port State Control (PSC) is the inspection of foreign ships in national ports for the purpose of verifying that the condition of the ship and its equipment comply with the requirements of international Conventions and that the ship is manned and operated in compliance with applicable international laws.

These inspections were originally intended to be a back up to flag State implementation, but experience has shown that they can be extremely effective, especially if organized on a regional basis. Port State control provides a "safety net" to catch substandard ships.

Port State control became widespread initially in Europe through the establishment in 1982 of the Paris Memorandum of Understanding (MoU), followed by the Asia and the Pacific (Tokyo) MoU. IMO has encouraged the establishment of regional port State control organizations and MoUs agreements on port State control - Memoranda of Understanding or MoUs - have been signed covering other parts of the world: Latin America (Acuerdo de Via del Mar); Caribbean (Caribbean MoU); West and Central Africa (Abuja MoU); the Black Sea region (Black Sea MoU); the Mediterranean (Mediterranean MoU); the Indian Ocean (Indian Ocean MoU); and the Persian Gulf (Riyadh MoU).

The U.S. Coast Guard has broad authority to enforce applicable U.S. federal laws against foreign-

Combination carrier

flag vessels on waters subject to U.S. jurisdiction. In order to enforce U.S. laws and international standards, the Coast Guard is authorized to conduct port-state control inspections of foreign-flag vessels.

The pioneering Paris MoU will apply from 1 January 2011 a "New Inspection Regime" (NIR). With the introduction of the NIR the target of inspecting 25% of individual ships calling at each Member State is changed to a shared commitment for full coverage of inspecting all ships visiting ports and anchorages in the PMoU. The banning of ships from port entry following more than 2 detentions for deficiencies within a specified period is envisaged. The regime utilizes the information of a vast data base which can be accessed universally and a system of black listing flag states and shipping companies.

4. Classification Societies

The vast majority of ships are built and regularly surveyed to the standards laid down by classification societies. Classification is important, extending into the design, construction, repair, operation, and maintenance of ships. This is formally recognized by IMO. It is an irreplaceable fount of technical excellence, as well as research and development. IACS[16] brings together the major classification societies for many good reasons. In order to ensure the structural integrity of ships, it is absolutely essential that classification societies collectively apply the highest possible standards in carrying out their tasks. The design and specifications of the structure of the ship, the degree of conformity with the classification society's rules and the supervision of the quality of work during the shipbuilding stages, determine to a large extent the quality of the ship in service.

[16] International Association of Classification Societies. Currently 11 full members: American Bureau of Shipping (ABS), Bureau Veritas (BV), Det Norske Veritas (DNV), Germanischer Lloyd (GL), China Classification Society (CCS), Indian Register of Shipping (IRS), Korean Register of Shipping (KR), Lloyds Register of Shipping (LR), Nippon Kaiji Kyokai (NK), Russian Maritime Register of Shipping (RS), Registro Italiano Navale (RINA).

As a result most flag States authorize class societies to carry out statutory surveys on their behalf to verify compliance with the IMO Conventions and national laws.
5. Industry ship vetting schemes

The control of compliance of ships with the flag State (statutory) and class requirements is complemented by the industry ship vetting schemes, namely the OCIMF Ship Inspection Report (SIRE) programme, the OCIMF Tanker Management and Self Assessment Guidelines and the CEFIC Chemical Distribution Institute Ship Inspection Report. Approvals by these schemes have become in practice a prerequisite for trading.

6. Reception Facilities

The ability of ships to comply fully with the disposal requirements set out in MARPOL depends upon the availability of adequate facilities on land for the reception of ship generated waste. Adequate port reception facilities should meet the needs of users, from the largest merchant ship to the smallest recreational craft, and of the environment, without causing undue delay to the ships using them.

The inadequacy of reception facilities and the charging systems for their use is of continuous concern. In many EU ports delivery ashore of all waste is compulsory, even of small amounts, without taking into account on board management plans and adequate capacity for temporarily keeping waste on board. Charging is not uniform or is inappropriate (e.g. on the basis of gt). Often, waste segregated on board is stored together when delivered ashore.
IMO has emphasized the importance of adequate reception facilities in the chain of implementation of MARPOL and has strongly encouraged Member States, particularly those Parties to MARPOL as port States, to fulfil their treaty obligations and provide adequate reception facilities.

7. Chain of responsibility

Ships have become larger in numbers, much larger in size and faster. In contrast, most ports, their infrastructure and their approaches have not improved to cope with the increased demands of traffic. Most incidents occur close to ports with many involving pilots.

The acknowledgement that maritime safety and environmental protection can be promoted only by the joint effort of all parties involved in the "responsibility chain" underlines the contributing importance of self-regulation. Business-related solutions suggest a high degree of self-regulation, desirable for the industry, but so far mistrusted by governments. In June 1999 the European shipping industry together with 23 private organizations signed in Amsterdam the Maritime Industry Charter on Quality. The Charter was intended to promote the joint effort to eliminate sub-standard shipping which was its main focus. However, maritime safety and protection of the environment is also dependent on the fulfilment by coastal states of their commitments and responsibilities to ensure a safe and adequate framework for shipping operations.

CONCLUSION

Shipping accidents cannot be entirely eliminated, neither can the concomitant occasional loss of life or serious pollution. Such incidents, however, are extremely low statistically and reducing (see Annex 2). The international regulatory regime and its proper enforcement are undoubtedly largely responsible for this. Proper and timely assistance to ships in distress is also most important in this respect.

More significant, but by no means as sensational is operational pollution from ships. This can be entirely eliminated but it requires States who are parties to the major IMO pollution prevention Conventions to honour their obligations by providing the necessary reception facilities and efficient services to ships.

The extensive and comprehensive regulatory and compensatory regimes described in the previous pages apply to ships above 400 gt or higher sizes as defined in each instrument. Ships below these sizes and naval or other government vessels which are scantly regulated amount to thousands of vessels that contribute significantly to environmental pollution. . The USA National Academy of Science estimates that nearly 85 percent of the 29 million gallons of petroleum that enter North American ocean waters each year as a result of human activities comes from land-based runoff, polluted rivers, airplanes, small boats and jet skis, while less than 8 percent comes from tanker or pipeline spills.

Seaborne trade continues to expand, bringing benefits for nations across the world through competitive freight costs. The growing efficiency of shipping as a mode of safe and economic transport and its environment pollution record is proven by the key facts and graphs at Annex 2 of this paper.

ANNEX 1
Control of air emission from ships

A. Marpol Annex VI

Although the emissions from ships dealt with under MARPOL Annex VI do not have the direct effect associated with, for example, an oil spill incident, they have a cumulative effect that contributes to the overall air quality problems encountered by populations in many areas, and also affects the natural environment, for instance through acid rain.

MARPOL Annex VI, first adopted in 1997, limits the main air pollutants contained in ships exhaust gas, including sulphur oxides (SOx) and nitrogen oxides (NOx), and prohibits deliberate emissions of ozone depleting substances (ODS). It also sets out requirements for shipboard incineration and for the control of emissions of volatile organic compounds (VOC) from tankers.

Sulphur oxides (SOx)

SOx and particulate matter emission controls apply to all fuel oil, combustion equipment and devices onboard and therefore include both main and all auxiliary engines together with items such boilers and inert gas generators. These controls divide between those applicable inside Emission Control Areas (ECA) established to limit the emission of SOx and particulate matter and those applicable outside such areas and are primarily achieved by limiting the maximum sulphur content of the fuel oils as loaded, bunkered, and subsequently used onboard. Under the revised MARPOL Annex VI, the global sulphur cap in bunker fuels will be reduced initially from the current sulphur content of 4.50% to 3.50%, effective from 1 January 2012, and then to 0.50 %, effective from 1 January 2020, subject to a feasibility review to be completed no later than 2018. The limits applicable in ECAs for SOx and particulate matter were reduced to 1.00%, beginning on 1 July 2010 (from the original 1.50%); and will be further reduced to 0.10% effective from 1 January 2015.

Notwithstanding the fact that SOx emissions have a cooling effect as regards global warming, and are not harmful for human health on the open seas, the decision to set the 0,10% limit for ECAs was, in addition, taken under political pressure and without assessment of the cost/benefit. There are fears that its economic impact will be such that it will have the counterproductive environmental consequence of a modal 'back' shift from sea back to land transport. An independent impact study commissioned by ECSA[17] made by the Universities of Antwerp (ITMMA)/Leuven (TML) confirms the findings of several studies made by Governments: it will result in a modal 'back' shift from sea to land transport with increased external costs. The study also shows that a decrease in sulphur content to 0.5% would not lead to a modal shift. It is estimated that the 0,1% sulphur content requirement will lead to a modal 'back' shift to land at a level of about 20%.

Nitrogen oxides (NOx)

Progressive reductions in NOx emissions from marine diesel engines installed on ships are included in the revised MARPOL Annex VI, with a "Tier II" emission limit for engines installed on

[17] European Community Shipowners' Associations.

or after 1 January 2011; then with a more stringent "Tier III" emission limit for engines installed on or after 1 January 2016 operating in ECAs. Marine diesel engines installed on or after 1 January 1990 but prior to 1 January 2000 are required to comply with "Tier I" emission limits.

Ozone-depleting substances (ODS)

ODS are the chlorofluorocarbons (CFC) and halons used respectively in older refrigeration and fire-fighting systems and portable equipment. Hydrochlorofluorocarbons (HCFC) were introduced as an intermediate replacement for CFCs but are themselves still classed as ODS. As part of a world-wide movement, the production and use of all these materials is being phased out under the provisions of the Montreal Protocol. No CFC or halon containing system or equipment is permitted to be installed on ships constructed on or after 19 May 2005 and no new installation of the same is permitted on or after that date on existing ships. Similarly, no HCFC containing system or equipment is permitted to be installed on ships constructed on or after 1 January 2000 and no new installation of the same is permitted on or after that date on existing ships.

Volatile Organic compounds (VOC)

Control on VOC emitted from tankers to the atmosphere in respect of certain ports or terminals is achieved by a requirement to utilize a vapour emission control system. Such controls may apply only to particular ports or terminals and only to certain sizes of tankers or cargo types. All tankers carrying crude oil must have and effectively implement an approved ship specific VOC Management Plan.

Shipboard incineration

Incineration on board ships is primarily used for processing ship generated garbage and is only undertaken in equipment designed for that purpose. The disposal of polyvinyl chlorides (PVC) by incineration is restricted to units of approved type. While incineration of ship generated sewage sludge and sludge oil can alternatively be undertaken in main or auxiliary power plant or boilers, it is not to be undertaken within ports, harbours or estuaries.

B. Green House Gases (GHG)

Carbon dioxide (CO_2)

As already acknowledged by the Kyoto Protocol, CO2 emissions from international shipping cannot be attributed to any particular national economy due to its global activities and complex operation.

Exhaust gases are the primary source of GHG emissions from ships and carbon dioxide is the most important GHG, both in terms of quantity and of global warming potential. According to the Second IMO GHG Study 2009, which is the most comprehensive and authoritative assessment of the level of GHG emitted by ships, international shipping was estimated to have emitted 870 million tonnes, or about 2.7% of the global man-made emissions of CO_2 in 2007. The Study identifies a significant potential for reduction of GHG emissions through technical and operational measures.

Although international shipping is the most energy efficient mode of mass transport and only a modest contributor to overall CO_2 emissions, a global approach to further improve its energy efficiency and effective emission control is needed as sea transport will continue growing apace with world trade. Therefore, IMO has been energetically pursuing the limitation and reduction GHG emissions from international shipping, in recognition of the magnitude of the climate change challenge and the intense focus on this topic.

Technical and operational measures for the reduction of CO_2 emissions from ships

The most important technical measure is the Energy Efficiency Design Index (EEDI) for new ships that will require a minimum energy efficiency level per capacity mile (e.g. tonne mile) for different ship type and size segments. With the level being tightened incrementally every five years the EEDI will stimulate continued technical development of all the components influencing the fuel efficiency of a ship.

On the operational side, a mandatory management tool for energy efficient ship operation, the Ship Energy Efficiency Management Plan (SEEMP), has been developed to assist the international shipping industry in achieving cost-effective efficiency improvements in their operations using the Energy Efficiency Operational Indicator (EEOI) as a monitoring tool and benchmark.

Slower steaming is one of the available operational options which can result in immediate reduction of emissions at no cost, provided that for bulk shipping charterers can be committed.

In July 2011 IMO will consider, with a view to adoption, draft amendments to MARPOL Annex VI to make the EEDI mandatory from 1.1.2013 for relevant types of new ships and the SEEMP for all ships.

Market Based Mechanisms (MBM) for the reduction of CO2 emissions from ships

Given the anticipated growth projections of human population and world trade, regulations must focus on continuous improvement of the energy efficiency of the individual ships. Development of the technical and operational measures is a very important step in ensuring that the global shipping industry has the necessary mechanisms to reduce its GHG emissions. Absolute reductions are not possible to achieve as long the overall world trade will increase and as shipping will continue to rely on fossil fuels for its energy. Therefore, market-based mechanisms (MBMs) can only be considered for the purpose of off-setting growing ship emissions and for providing a fiscal mechanism to collect funds which can be used to reduce emissions in sectors primarily outside shipping.

Workable solutions will require a deep insight into the shipping industry and the prevailing contractual complexities and commercial realities. If, notwithstanding the above, an MBM for shipping is introduced, it must be designed, developed and implemented by IMO, as the sole international regulatory body for the shipping industry. The measure should be applied internationally on a global basis, regardless of the flag of the vessel or the country of the loading port or discharge port of the cargo. It must provide a high degree of certainty so that business can invest with confidence. This is most important in order to preserve a competitive "level playing field"' internationally within the maritime transport sector and to avoid any distortion

Gas carrier

of competition within the sector. In view of the mobility of flag state registration within the maritime sector, any solution, which gives certain flag States advantages over others, would be inappropriate for the shipping industry.

Any MBM for international shipping must be judged on its effectiveness as regards the benefits to the environment, i.e., the reduction in GHG emissions overall resulting from the measure, rather than on the revenue generated. As already mentioned, MBMs would not primarily be effective in reducing emissions from shipping since goods will continue to be moved regardless of additional charges. They consequently will increase the cost of transportation of goods by sea and in effect will be a charge on world sea trade.

Devising the most efficient, transparent and fraud proof MBM is indeed a formidable challenge.

Emission Trading Scheme (ETS)

An ETS for shipping has several proponents as it is already in place for land based sectors in the EU and the USA. In discussions in the EU context on emission trading for shipping references are often made to parallels with aviation. However, the sectors are not comparable. As opposed to aviation, which is predominantly part of the leisure industry, shipping serves world trade which is essential for global welfare. International shipping is predominantly occupied in carrying cargoes in constantly changing trading patterns all over the world. Most of the EU vessels have as port of loading or discharge non EU ports which are determined by the charterers. Ships designs are not standardized , so an emissions benchmark is difficult to establish. Many ships, in the bulk sector which comprises the larger part of shipping, call in the EU only occasionally. Refuelling of ships during voyages may take place in non EU ports and fuel consumption between ports is based on estimates only. In the circumstances, several countries could be involved in the allocation of ETS emissions: e.g. the country of shipowner, ship operator, charterer, cargo owner, cargo receiver. Moreover, an EU ETS scheme for maritime transport would have to be applied on all vessels visiting EU ports, with a real possibility of retaliation measures by non EU countries not applying the ETS on behalf of their flagged ships.

The advantages of ETS are overstated. MBMs for shipping will not provide direct certainty of environmental outcome, environmental benefit may come only indirectly through offsetting of emissions. Under ETS the carbon price will be set by the "market" and dictated by it. Hence, ETS permit prices will fluctuate and are therefore unpredictable. Because the economic cost is not known in advance the impact on bulk/tramp shipping will be more severe, as commercial and financial planning will be undermined.

An ETS system does not take the structural, operational and contractual complexities of bulk shipping into account. Hence, ETS will not be cost effective for the vast majority of companies which are engaged in the bulk trades. On the contrary, it will create a heavy and unwarranted administrative burden. The bulk shipping industry has predominantly private small and medium sized companies engaged in the transportation of homogeneous dry bulk cargoes such as coal, grain, iron ore, cement and wet (bulk) cargoes such as crude oil, oil products and chemicals on a voyage by voyage basis. Around 75% of the world fleet are bulk carriers, tankers and general cargo ships. In view of the nature and pattern of tramp shipping operations it is inconceivable how tramp shipping can be brought under any emission trading scheme and how the complicated problem of emissions allocation could be addressed and resolved.

Moreover, an ETS or similar scheme, would be more unsuitable and ineffective for the shipping industry, if third parties outside the maritime sector, such as financial institutions and/or futures trading houses, were permitted to engage in the emissions trading process. Under such a system, the emissions trade would become a zero sum game with some trading counterparts gaining at the expense of others. Those counterparts having the greater expertise in futures trading, including financial institutions and, possibly, large, multinational corporations, with ancillary shipping activities would be most likely to benefit at the expense of other smaller companies. Such gains and losses would pass from one counterpart to the emissions trading transaction to the other, with no benefit, whatsoever, to the environment. This would also create additional distortion of the competitive environment within the maritime sector, which should be avoided at all costs.

The proponents of ETS assert that it promotes innovation and technological improvements. However, most shipping companies do not have resources to individually fund better ship and engine designs and will not secure this through emissions trading.. Therefore, ETS will not

be conducive to achieving the long-term objective of zero-carbon shipping as it could take away from shipping money that could be used to that end.

There are a number of significant issues to resolve for a global ETS (via IMO) to become a viable reality. In particular, decisions would be needed on such issues as allocation criteria, thresholds, setting the global cap, types of ship, addressing evasion possibilities via transhipment and geographical scope. Reaching agreement internationally on such criteria would be both complicated and need to be in line with other relevant international agreements. It is clear that to develop an environmentally effective, cost effective and fair global ETS for shipping, if at all possible, will be very difficult and time consuming.

Finally, an alarming and increasing number of incidents of fraud are being reported within established ETS. This may indicate inherent control and enforcement weaknesses in emissions trading as a system.

International Fund for Greenhouse Gas emissions from ships (GHG Fund)

If an MBM were deemed unavoidable in addition to technical and operational measures already schedule by IMO, the GHG Fund would be the more suitable mechanism, in that it would be applicable to all ships worldwide on the basis of their fuel oil consumption. It would be consistent with the aim of reducing fuel oil consumption and, thus, carbon emissions. In addition, it would allow shipowners to estimate their costs with the required degree of certainty and it is much more likely that the money raised would go directly for the benefit of the environment.

An International Fund for Greenhouse Gas emissions from ships (GHG Fund) could establish a global reduction target for international shipping, set by either the United Nations Framework Convention on Climate Change (UNFCCC) or IMO. Emissions above the target line would be offset largely by purchasing approved emission reduction credits. The offsetting activities would be financed by a contribution paid by ships on every tonne of bunker fuel purchased. It is envisaged that contributions would be collected through bunker fuel suppliers or via direct payment from shipowners. The contribution rate would be adjusted at regular intervals to ensure that sufficient funds are available to purchase project credits to achieve the agreed target line. Any funds would be available for adaptation and mitigation activities via the UNFCCC and R&D and technical co-operation within the IMO framework.

The GHG Fund will be controlled by IMO member governments and the price of carbon will be fixed by them and not by speculators and traders. Moreover, the Fund would be easily administered and would apply to all vessels and all flags world-wide, thus preserving a level playing field that would avoid any distortion of the competitive environment within the international maritime sector.

Furthermore, according to the analysis made by the Congressional Budget Office (CBO) of the United States of America, a levy would be much more efficient in terms of cost and enforcement than emission trading, and this for land based manufacturing businesses which are fewer and, therefore, the cost of administering an emission trading system for land based businesses is much lower than would be the case in the maritime sector.

ANNEX 2
Key shipping facts

Size of world merchant fleet

Total 50.054 ships (October 2010): General Cargo Ships (16.224), Bulk Carriers (8.687), Container ships (4.831), Tankers (13.175), Passenger ships (6.597).

Volume of world seaborne trade

Between 1992 and 2008 world seaborne trade rose from 17.541 billion tonne miles to an estimated 32.746 billion tonne miles, an increase of around 85%.

Cost of sea transportation

The transport cost element in the shelf price of goods varies from product to product, but is ultimately marginal. For example, transport costs account for only 2% of a television shelf price and only 1.2% of a kilo of coffee. On average, the cost is less than 6% of the import value (or shelf price) of consumer goods.

Sources of marine pollution

The U.N. Group of Experts on the Scientific Aspects of Marine Pollution (GESAMP) estimated that land based discharge (sewage, industrial effluent and urban/river run off etc.) and atmospheric inputs from land industry sources account for some 77% of marine pollution generated from human activities. In contrast, maritime transport is only responsible for some 12% of the total. However, these United Nations estimates were produced in 1990 and the proportion of marine pollution that can be attributed to shipping is now thought to be lower than 10%.

Reduction of accidental pollution

The amount of oil transported by sea increased from 1,600 million tonnes in 1992 to over 2,400 million tonnes in 2008. Over 34,000 million tonnes were carried over the 16 year period. By contrast, the number of major oil spills during the same period shows a steady reduction. The average for the 2000s is less than half of the average for the 1990s and just an eighth of the average for the 1970s. The same is true for medium sized spills from tankers (7-700 tonnes) where the average number of spills occurring in the last decade was 14, half of that experienced during the previous decade. The average number of major spills for the decade (2000-2009) is about three. The number of major oil spills involving tankers reached zero in 2009.

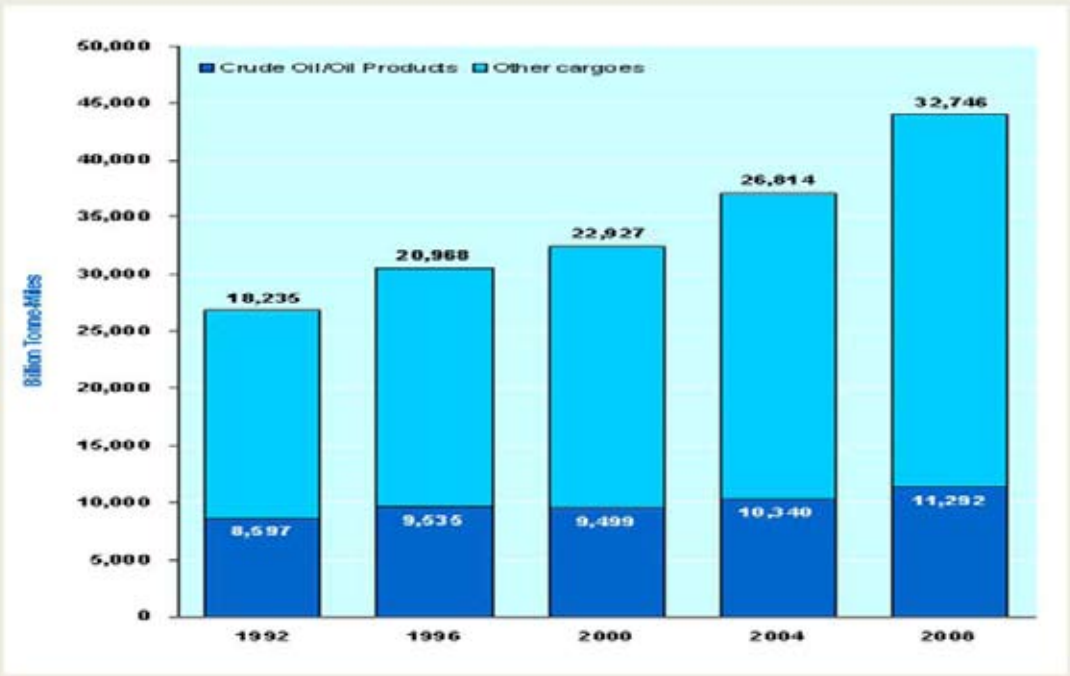
Energy efficiency

A modern large crude oil tanker (VLCC is able to transport the same amount of cargo twice the distance as of 20 years ago using the same amount of energy. In addition, marine diesel engines, the prime mover of the world merchant fleet, have undergone similar efficiency improvements over the same period and modern engines consume considerably less fuel per kilowatt/hour.

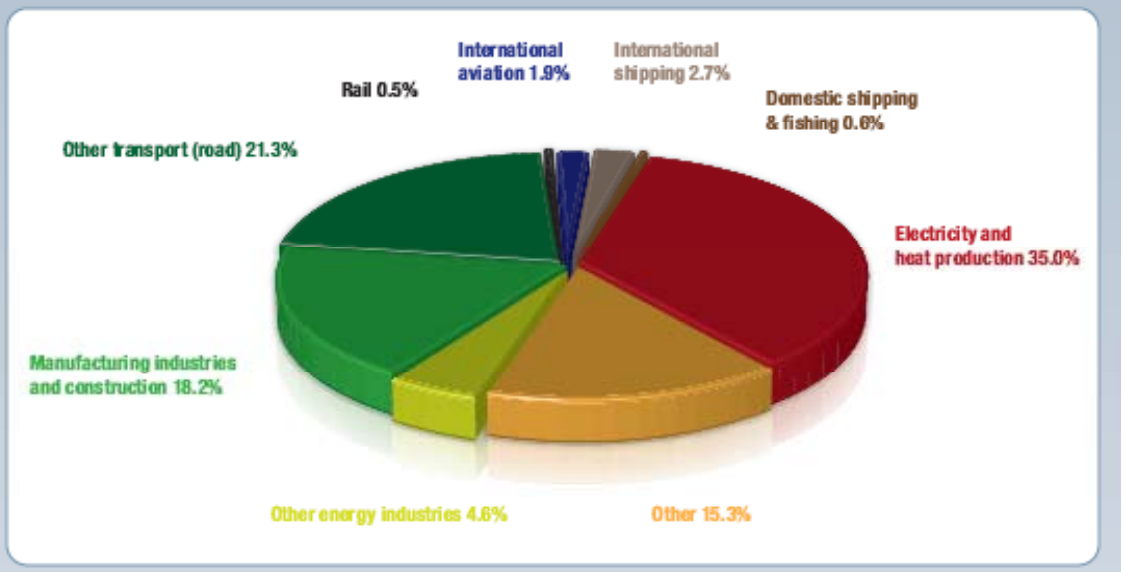
Πηγή: International Chamber of Shipping.

Flyri: International Chamber of Shipping.

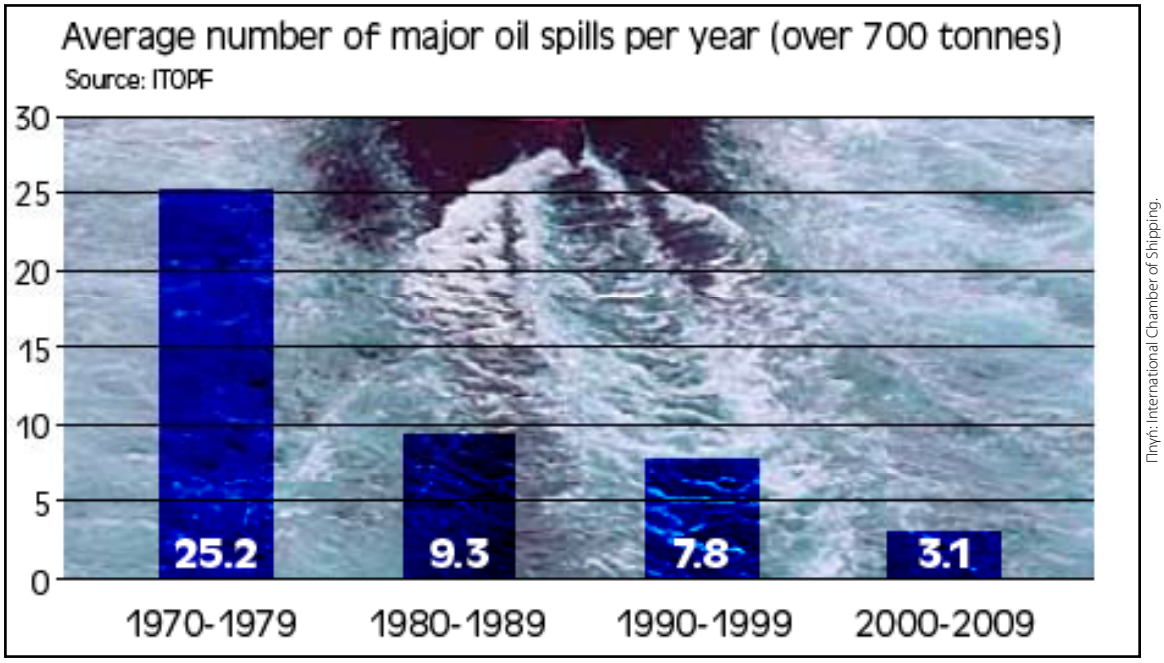
World Seaborne Trade (total)



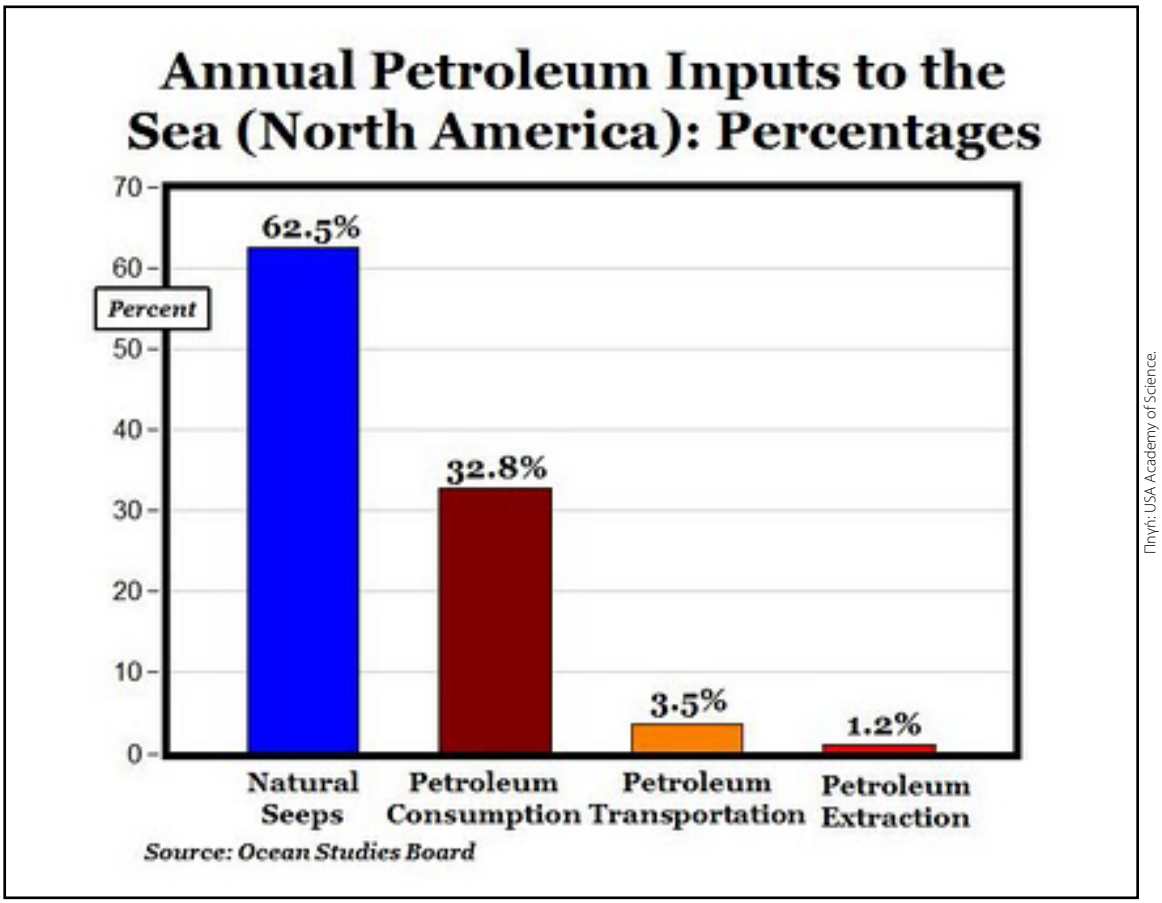
Shipping contribution to global CO_2 emissions



(Source: Second IMO GHG Study 2009 (MEPC 59/INF.10))

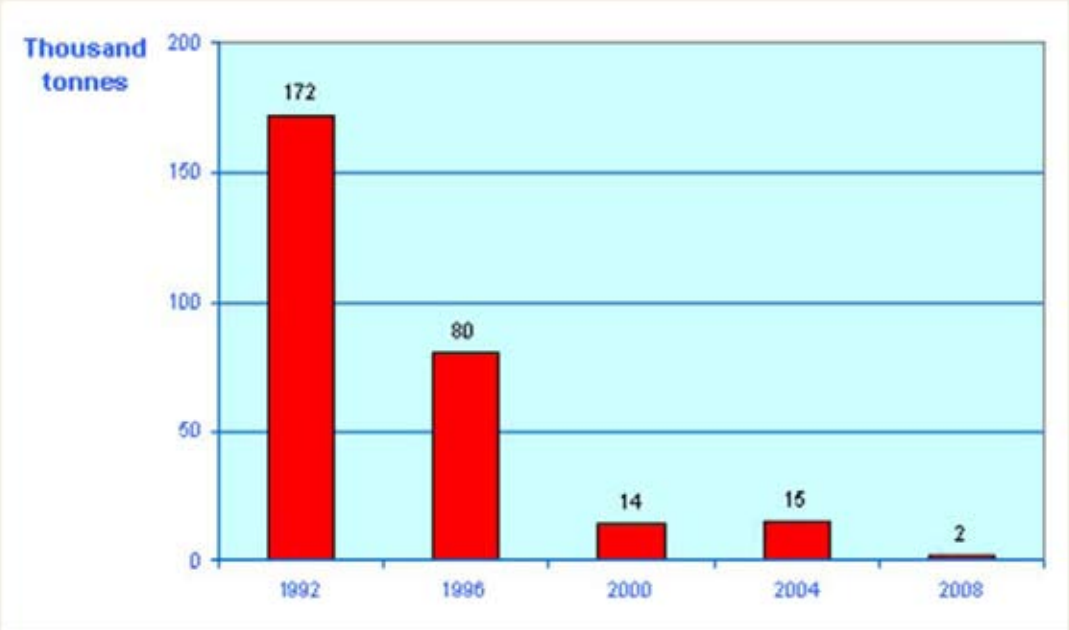


Πηγή: International Chamber of Shipping.



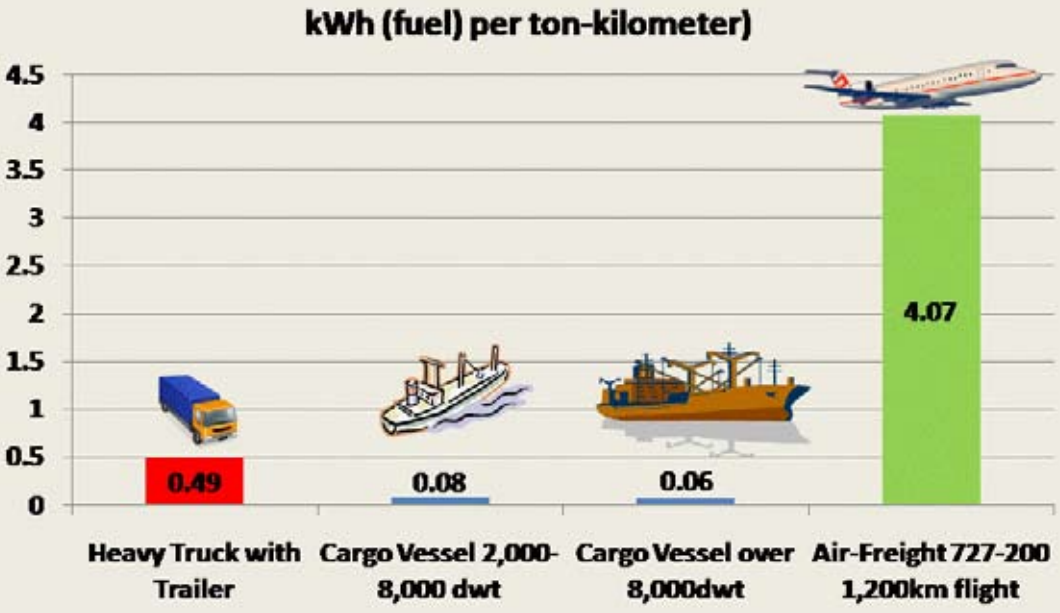
Πηγή: USA Academy of Science.

Estimated quantity of oil spilled



Πηγή: International Chamber of Shipping.

Comparative Fuel Consumption



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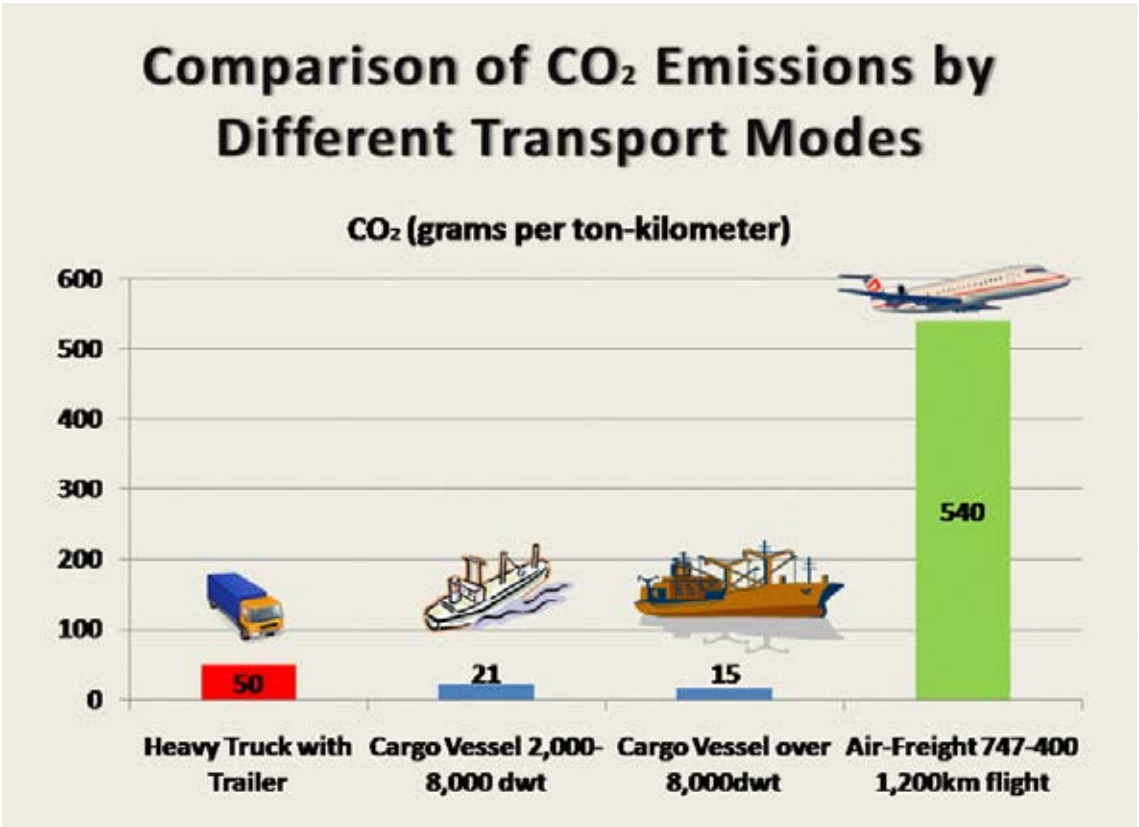

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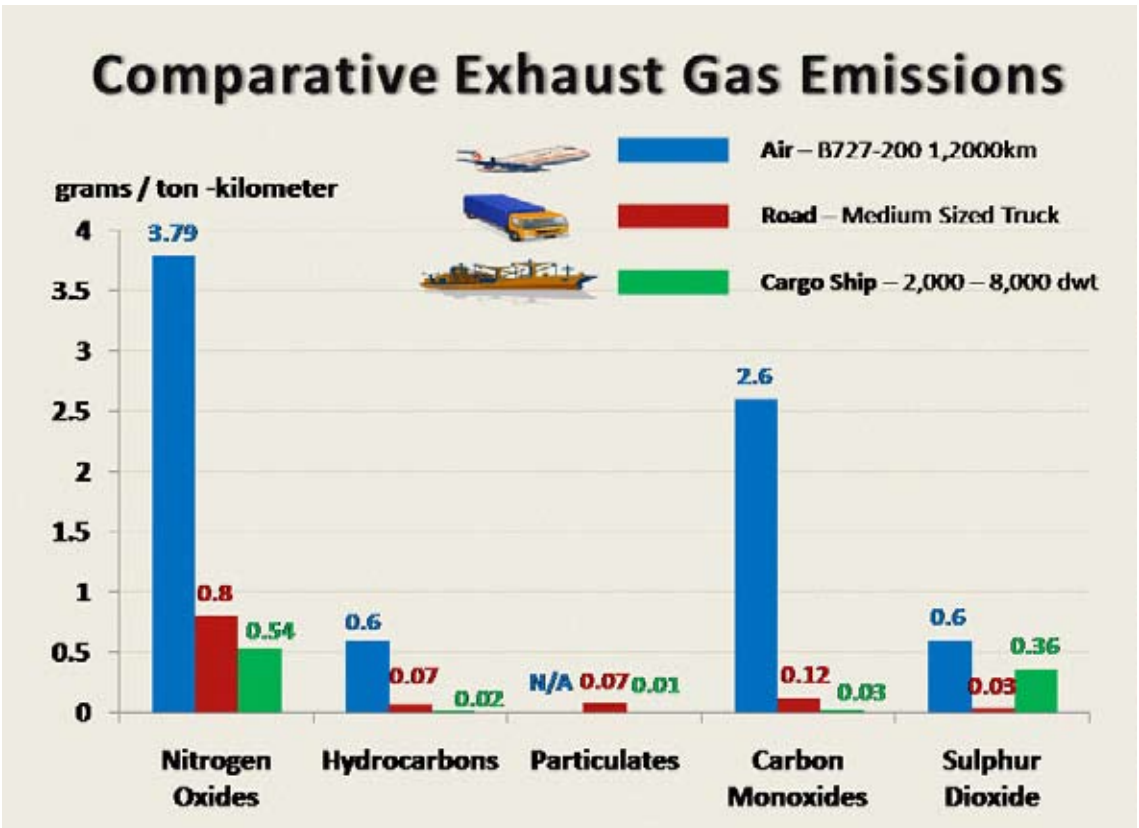

Πηγή: International Chamber of Shipping.

85 Akti Miaouli, 185 38 Piraeus, Greece
Tel: +30 210 429 1159-65 • Fax: +30 210 429 1166
Tlx: 211497 ENEF GR • E-mail: ugs@ath.forthnet.gr