

# OIL TANKERS SAFETY: LEGAL ASPECTS

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*Abstract:* The present study aims to show a panoramic vision of the most important maritime safety provisions in relation to oil tankers issued by the IMO, USA (*U.S. Cost Guard*) and more recently by the EU. It also pays special attention to the legal provisions stemming from market practices (Class) and procedures used by oil companies (*Vetting*).

*Keywords:* Tanker Ship; Oil Tanker; Crude Carrier. Very Large Crude Carrier; MARPOL73/78, TSP, OPA 90; Paks ERIKA I, II and III. Double Hull Oil Tankers. *Coulumbi Egg*. New Rules 13 and 20 MARPOL. CAS; Vetting. OBO Carriers.

## 1. Evolution. Types of oil tankers

In the mid 19th century, crude oil was transported in conventional vessels, stowed in barrels. It is said that the sailors of that time were not at all convinced about transporting this type of product in conventional ships and wooden barrels, as they feared that explosions and fires would occur.

The demand for this type of fuel was low and mainly restricted to supplying fuel for lamps and there was little need for transport until diesel and internal combustion engines were invented, when the consumption of oil consumption increased considerably.

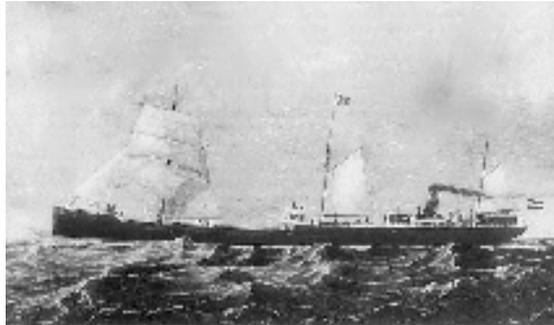
In the year 1861, an exporter from Philadelphia was responsible for making the first export of crude oil to London – in a conventional tanker, the “*Elizabeth Watts*” with a 224-tonne capacity. On that occasion the vessel carried 1329 barrels of oil, and the load safely reached its port of destination.

The *Gluckauf* was built in England, in the year 1886, with a capacity of 2297 tonnes. This was the first ship designed for transporting crude oil in bulk in large, separated tanks, and was in addition, the first oil tanker to be “classified” by a Classification Society (*Bureau Veritas*). This vessel was converted into the prototype of the modern oil tanker. The *Gluckauf* marked the start of a new stage in the transportation of crude oil. It is important to note that in just twenty years, between 1886 and 1906, 99% of all transportation was made in this type of specialised vessel. In 1892 the *Murex* was handed over to its owners (Samuel & Samuel, which later became Shell Oil). This oil tanker was the first to cross the Suez Canal<sup>1</sup>.

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<sup>1</sup> One of the first shipping companies specialising in the transportation of crude oil was BRANOBEL, founded in the year 1876 by Ludwig and Robert Nobel (brothers of the person who discovered dynamite and creator of the Nobel Prizes.) The Nobel brothers were the first to design and build oil tankers. One of their ships, the *Nordenskjöld* exploded in the port of Baku,

The *Gluckauf* sailed for only a few years. In 1893 it foundered in the middle of a dense fog in Fire Island (New York) where it sank, despite various attempts to re-float it.



*Gluckauf* - (1886-1893)<sup>2</sup>

The important capital investments required in building these enormous vessels in addition to the search for greater economic profitability and the possibilities offered in terms of operation during those years led to the building of combination versions, i.e., vessels able to transport ore, oil and dry bulk products. These were what are termed the *OBO (Oil-Bulk-Ore Carriers)*.<sup>3</sup>

The standardisation of oil tankers did not take place until the Second World War. During the war, the US designed the typical T2 container ship, with a deadweight tonnage of 16,400. A total of 620 units were built and after the war, many of these ships were sold. Most of them continued to operate until the end of the 1960s, with some continuing to do so until the 1980s, for instance the "*Caltex Utrecht*".



The *Caltex Utrecht* was withdrawn from operation in 1981.<sup>4</sup>

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in 1881, with a load of kerosene. The first Spanish oil tanker was the *Cadagua* (4000 tonnes), which was registered in Bilbao and operated between the USA and Bilbao (Zorroza Terminal).

<sup>2</sup> Available at <<http://www.aukevisser.nl>> Consulted in June 2009.

<sup>3</sup> See Types of Vessels and Chap. 7 of this publication.

<sup>4</sup> Available at <[www.cetmar.org](http://www.cetmar.org)> Consulted in June 2009.

During the 1950s, the demand for more, larger-capacity oil tankers led to their tonnage increasing year after year, and in 1959 for the first time ever, the 100,000-tonne threshold was exceeded, with the building of the "*Universe Apollo*" which had a capacity of 114,356 tonnes. This vessel was built for the purpose of transporting crude oil from the Middle East to Europe via the Cape of Good Hope. It should be said that the building of these vessels posed no technical problems, and the designs were relatively simple, without any relevant technical sophistication.



Universe Apollo<sup>5</sup>

During the 1960s, shipping companies started to apply an economy of scale policy, with oil tankers of 200,000 tonnes being built. In 1980 an oil tanker of 200,000 tonnes required a crew of 24 men, whereas a T2 required 45, with 2.7 times more force and transporting 4.3 times more cargo, and so once again the limit was set by nature, since most straits and canals did not admit vessels of more than 250,000 tonnes, (at that time, the Suez Canal and the straits of Malacca and the Bosphorus were for vessels of up to 70,000 tonnes...).

Another factor that had an effect on the enormous increase in the size of oil tankers was the closing of the Suez Canal in 1956 and 1967 which made it necessary to transport these and other products via the Cape of Good Hope (making it necessary to sail around the horn of Africa), at the confluence of the Indian and Atlantic Oceans, this distance being much longer than that of the routes normally used.

The oil crisis of 1973 led to another increase in the tonnage of oil tankers, and vessels of 300,000 tonnes were built, in an endless spiral of growth which reached its peak with the building of the "*Jahre Viking*" in Japan, in 1979. This was the largest oil tanker in history, weighing 564,763 dwt, with a length of 458.45 m, a breadth of 68.86 m and a depth of 24.61m.

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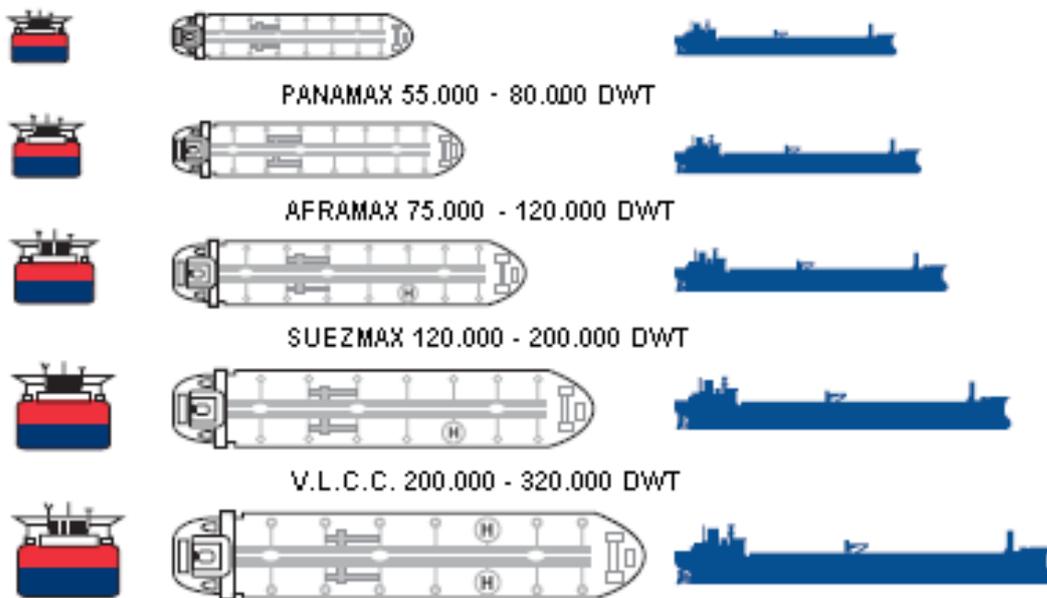
<sup>5</sup> Available at <[www.t2tanker.org](http://www.t2tanker.org)> Consulted in June 2009.



*Jahre Viking*

### Classes and Type of Oil Tankers:

At the present time, the oil tankers most often used to transport crude oil, classified by types, based on their displacement, are the following:<sup>6</sup>



Oil tanker types.<sup>7</sup>

<sup>6</sup> Available at <<http://www.pier400berth408.info>> Consulted in June 2009.

<sup>7</sup> See RICARDO GADEA, G., in *Los buques tanque y su clasificación*. Petrotecnia. April 2004.

**Panamax:** The largest oil tanker that can pass through the Panama Canal (deadweight tonnage of up to 70,000 tonnes).

**Aframax:** This is a tanker size that uses the Average Freight Rate Assessment to calculate the transportation cost (deadweight tonnage of 70,000 to 120,000 tonnes).

**Suezmax:** The largest oil tanker that can pass through the Suez Canal (between 120,000 and 200,000 dwt).

**Very Large Crude Carrier (VLCC):** A huge oil tanker (between 200,000 and 325,000 dwt).

**Ultra Large Crude Carrier (ULCC):** An oil tanker with a capacity of more than 325,000 dwt. These tankers are no longer built.

#### OIL TANKERS AND MARKET

AFRA Scale		Flexible market scale			
Class	Size in <a href="#">DWT</a>	Class	Size in DWT	New price	Used price
General Purpose tanker	10,000 - 24,999	<a href="#">Product tanker</a>	10,000 - 60,000	\$43M	\$42.5M
Medium Range tanker	25,000 - 44,999	<a href="#">Panamax</a>	60,000 - 80,000		
LR1 (Large Range 1)	45,000 - 79,999	<a href="#">Aframax</a>	80,000 - 120,000	\$58M	\$60.7M
LR2 (Large Range 2)	80,000 - 159,999	<a href="#">Suezmax</a>	120,000 - 200,000		
VLCC (Very Large Crude Carrier)	160,000 - 319,999	<a href="#">VLCC</a>	200,000 - 320,000	\$120M	\$116M
ULCC (Ultra Large Crude Carrier)	320,000 - 549,999	<a href="#">ULCC</a>	320,000 - 550,000		

(Source: Evangelista, Joe, Ed. (Winter 2002). "[Scaling the Tanker Market](#)" *Surveyor* (American Bureau of Shipping) (4): 5–11. Retrieved 2008-02-27)<sup>8</sup>

Other types, depending on their function:

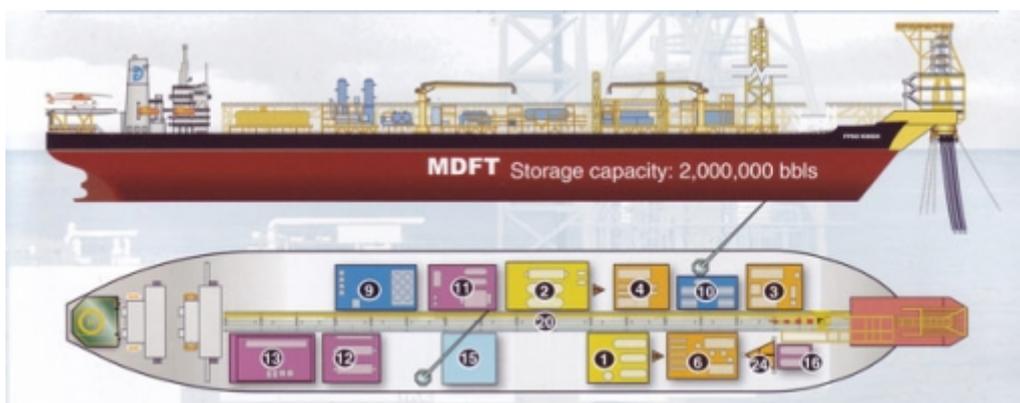
**Vessels for the simultaneous carriage of oil and bulk. OBO (Oil/Bulk/Ore) and O/O Oil/Ore.**

**OBO.** Due to their specificity and particularities, these will be examined at the end of this study. (See Chap. 7)

**O/Os, Oil/Ore:** These are designed for heavy cargo and conceived to carry all their dead weight when transporting heavy ore cargo or cargo as oil tankers. The holds are built to occupy half of the breadth, with conventional tanks at the sides. Their holds are completely smooth and the lateral reinforcements are located at the tanks on the side.

**New types of oil tanker:**

**FPSO Floating Production Storage Offload:** These are anchored in secondary or marginal fields so that after receiving the crude from the oil wells, the water treating and crude stabilising processes can be executed, after which it is stored and then transferred to other oil tankers. The Dynamic Positioning (DP) navigation system is used for anchoring them.



(SOURCE: [raablog.wordpress.com/2009/01/03/](http://raablog.wordpress.com/2009/01/03/))

<sup>8</sup> AFRA: *Average Freight Rate Assessment*. This system was initiated by Shell in 1954, to match the vessels and their sizes. To obtain an independent assessment, the *London Tankers Brokers' Panel (LTBP)*, which is the basic market reference, is consulted.

**FSU Floating Storing Unit:** It only performs storage and deposit functions.

**ST Shuttle Tanker:** An oil tanker that follows a fixed route, and regularly links up the loading and unloading point, performing shuttle services.

**LNG-LNP:** These are not dealt with in this study, due to their special treatment and particularities. Gas carriers are divided into two main groups: LPG, which transport oil-based liquefied gases (propane, butane, etc.) and LNG which transport natural gas (methane)<sup>9</sup>.

## 2. - MARPOL 73/78

The special treatment of the MARPOL Convention is justified for two relevant reasons: firstly, it is the most important legal instrument in preventing pollution arising from maritime transport activities, and secondly, Annexe I, Rule 10.1 of the Convention includes the Mediterranean Sea, among others, as a “*special zone*”, imposing an extremely regime of protection and restriction of tipping.<sup>10</sup>

### 2.1. The origins of MARPOL 73/78

At the beginning of the century, the problem of marine pollution by hydrocarbons started to be considered. The first countries to adopt measures in this respect were the UK and the USA, who prohibited the illegal unloading of hydrocarbons. However, the first country to establish national legislation for preventing pollution was the UK in the year 1922, through the “*Oil Pollution Act*”. Later on, it was observed that the pollution problem was not only a national issue, but needed to be treated as an international one, since it not only affected just a handful of countries but many more.

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<sup>9</sup> Despite being considered as oil tankers for the purposes of the MARPOL Convention, readers are referred to the work by the author, RODRIGO DE LARRUCEA, J. See *Seguridad en buques Gaseiros (Safety on Gas carriers)*; UPCcommons (<http://hdl.handle.net/2117/2448> <http://hdl.handle.net/2072/12923>)

<sup>10</sup> See Rule 10 Annex I. “The term “*Special zone*” is taken as any extension of the sea where, due to technical reasons acknowledged in relation to its oceanographic and ecological conditions, and the specific nature of its maritime traffic, it is necessary to adopt special compulsory procedures for preventing pollution of the sea by hydrocarbons”.  
Rule 10.1: “For the purposes of this Annexe, these “*special zones*” are: the Mediterranean Sea, the Baltic Sea, etc.

In 1954, the UK organised a conference on pollution of the sea by hydrocarbons that ended with the adoption of the OILPOL 54 (*International Convention for the Prevention of Pollution of the Sea by Oil, 1954*). This convention entered into effect on 26 July 1958. It established a series of "prohibited zones" for performing unloading operations in the sea at a distance of less than 50 miles from the nearest coastline and that the oil content unloaded should not exceed 100 parts per million. This made it necessary for tankers to have on board a system for retaining and receiving those oily residues.

However, the decisive factor promoting MARPOL 73/78 was undoubtedly the accident of the *Torrey Canyon* in 1967 in which the 120,000 tonnes of crude oil it was carrying were spilled. At the request of the British Government, the IMO called for a conference to be held in 1973 to deal with the problem of pollution of the sea. The success of this conference obtained little support from maritime countries and only 3 states ratified the convention of 1973. As a result, in 1978 the IMO organised a conference in which the important matter for debate was the manner of building oil tankers and the operating measures of those vessels, giving rise to the *Protocol of 1978 (TSPP-Tankers Safety and Pollution Prevention)*). This protocol therefore absorbed the conference of 1973 which in turn, led to the revising of OILPOL 54.

The most important amendment made from the standpoint of building the vessels was the introduction of separate ballast tanks, thereby preventing the use of the loading tanks as ballasts.

In addition to the Convention of 1973 for preventing sea pollution by tankers and the 1978 Protocol, MARPOL 73/78 also contains 6 annexes: Regulations for preventing pollution of the sea by hydrocarbons, by toxic liquid substances transported in bulk, by toxic substances transported by sea in containers, by waste water from ships, waste from ships and air pollution<sup>11, 12</sup>.

Annex	Content	Date of effect
Annex I	Hydrocarbons	2 October 1983
Annex II	Toxic liquid substances transported in bulk	6 April 1987
Annex III	Toxic substances transported by sea in	1 July 1992

<sup>11</sup> Art. 1 of the 1978 Protocol affirmed the following, in relation to the Convention of 1973 and Protocol of 1978: "they shall be read and interpreted jointly, as a single document". Apart from this, the Protocol of 1978 led to important amendments in Annexes I and II of MARPOL 1973, which were also modified by the amendments made in 1990 (introduction of the harmonised system of acknowledgements and certification of Annexes I and II, published in Official State Gazette n° 231 of 27 September 1999).

<sup>12</sup> Acknowledgement in Spanish law was made through the Ratification Document of 22 June, 1984 (OSG numbers 249 – 250 of 17 and 18 October, 1984).

	containers	
Annex VI	Waste water from ships	27 September 2003
Annex V	Waste from ships	31 December 1988
Annex VI	Air pollution	19 May 2005

Table showing the dates on the annexes took effect<sup>13</sup>

## 2.2. International Convention for Preventing Pollution by Ships, 1973

That convention consists of 20 articles that determine the legal framework for fighting pollution arising from maritime transport activities. It starts off with a definition of what is understood by unloading (art. 2.3.) According to the Convention, “*unloading is any spillage that originates in a ship, no matter what the cause*”. This term includes potential overflowing during the operations of loading the substance. Therefore, the term unloading covers a wide range of possibilities, but that word does not include substances that are produced from installations of mineral resources that are found out at sea or pollution arising during the study made and the ensuing application of measures to prevent environmental pollution.

In principle, the Convention was applicable to all vessels from member countries of the Convention (art. 3). The only vessels considered exempt from complying with this obligation are warships. Therefore, the sanctioning body in the event of breach is the state in which the ship is registered which must impose the sanctions in the event of infringement of the convention. In the case of Spain, the classification of such infringements is given in National Ports Act 92/97, in articles 114, 115 and 116, which classifies the offences as minor (Art. 114), serious (Art. 115) and very serious (Art. 116).

All states signing the Convention and ratifying it are obliged to comply with the terms of Annexes I and II of the Convention. The other annexes are optional (art. 14). As regards Annexe I, it applies to all ships, regardless of the type, and vessels that are not oil tankers but have holds that are suitable for carrying hydrocarbons in bulk and whose total cargo capacity is equal to or more than 200 cubic metres.

In the event of an infringement committed in a country other than the country in which the ship is registered, or if that country refuses to let the vessel enter its waters due to its belief that it fails to comply with the terms of the convention, the country must be informed (through the consulate or directly by the ship’s marine authority) of that prohibition and the reasons that have led to this decision. Therefore, the existence of inspections on the ships is observed, albeit

<sup>13</sup> Own elaboration based on IMO data.

only to verify whether or not any unloading of toxic substances has taken place. It is quite clear that making such inspections may lead to delays in the ship's operations. If the inspection made fails to prove that the convention was breached, the ship is entitled to receive compensation for the delays suffered. This leads to countries using inspection elements that are effective in preventing unnecessary inspections that will only lead to losses for the administration.

All infringements must be recorded in the statistical report issued every year by the Convention member countries and submitted to the IMO.

There are certain countries in which the lack of resources makes it necessary for the inspections to be carried out by specific organisations, which is the case of the Classification Societies. These are non-government companies and may substitute a state in matters concerning the planning, building and fitting out of ships that carry toxic substances, provided they are included in the list sent of those companies sent by the member states to the IMO.

The role played by those Classification Societies is again put into question by the *Erika I*<sup>14</sup> legislative package, since it must be borne in mind that on the one hand, these organisations act as inspectors and controllers over the vessels and on the other, they have a merely commercial function and therefore obtain a profit. The problem that these companies pose is their liability, since there are many cases in which even when faults are observed in a vessel, it had managed to obtain the "Class" certificates.<sup>15</sup>

For this reason the *Erika I* legislative package aims to control those *Class* certificates and if necessary, withdraw the authorisation that allows them to carry out their activities, either temporarily or permanently.

At all events, at the time when the vessel is involved in an event that entails pollution, the ship's captain or any other crew member, if the captain is absent, must send a detailed report of the occurrence as soon as possible, giving reasons why the pollution took place. That information must be sent to the country whose coastline is nearest the place where the substance was unloaded. That report must contain the following information, in all cases:

- a) Identity of the vessels involved;
- b) Time, type and geographic location of the event;

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<sup>14</sup> European Parliament and Council Directive 2001/105/EC of 19 December 2001, amending Council Directive 94/57/EC on common regulations and standards for organisations responsible for inspecting and appraising vessels and the activities that correspond to maritime authorities. From the standpoint of the IMO, the recognition of an organisation is regulated by two decisions, A.739 (18) and A.789 (19) "Guidelines" and "Specifications for the Survey and Certification functions of Recognized Organizations on behalf of the Administration".

<sup>15</sup> The liability of Classification Companies is a classic theme in maritime law, but as previously mentioned, it was not until now, following the accidents of the *Erika* and the *Prestige*, that the role of Classification Companies has been questioned and analysed in depth. In both cases, the two companies (RINA-Italian Naval Registry and ABS - *American Bureau of Shipping*) were involved in court proceedings and the authority granted by some states regarding the functions of private mercantile companies in accrediting the technical conditions of ships and the conditions under which such verifications are made have been put into question.

- c) Quantity and type of toxic substances involved;
- d) Assistance and salvage methods applied

That unloading operation may be accidental (the most usual cases are boarding a vessel or running aground, but in the more recent case of the *Prestige*, neither of these cases was responsible for causing the pollution) or voluntarily, in the case that, had that action had not been carried out, the event would have posed a risk to the lives of the ship's crew or jeopardised the stability of the ship.

### 2.3. Annexe I

Regulations for preventing pollution of the sea by hydrocarbons

Compliance with the terms of this first annexe, along with the second, is compulsory and if a government approves or signs the Convention, it cannot reject the terms set forth in these two annexes. On the contrary, as stipulated in the Convention, Annexes III, IV, V and, in future, the new annexe VI are all optional, i.e., the governments of adhering states may or may not adopt them, depending on their interests.

It could be said that oil tankers are the cornerstone of MARPOL; however, given the evolution of vessels as regards their shapes and types, oil tanker is not a vessel that carries only oil, but the convention enlarges this definition.

The definition of oil tanker given by MARPOL not only includes the image of an oil tanker that carries crude oil or its by-products, but it also includes OBO (*Ore Bulk Oil*) tankers or tankers carrying combined loads and vessels carrying chemicals and gases.

According to Regulation 1, all vessels to which the Convention applies can be divided up into two main groups: new vessels or previously-existing vessels.

New vessels are considered to be the following (Regulation 1, section 6):

- Vessels whose construction contract was formalised after 31-12-1975, or
- whose keels were either installed or being installed after 30-6-1976, or
- vessels delivered after 31-12-1979, or
- vessels that have undergone any kind of important transformation<sup>16</sup>

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<sup>16</sup> The term "important transformation" refers to any transformation in an existing vessel that alters its dimensions or its transportation capacity, or that changes the type of vessel, or

Consequently, all vessels not complying with the above stipulations are considered to be previously-existing vessels (Regulation 1, section. 7).

However, the main difference of MARPOL with respect to previous agreements was the installation of separate ballast tanks in vessels, unlike non-MARPOL vessels, whose ballast tanks were also used as cargo tanks. Given that although, with the entry into effect of MARPOL, there are still vessels without these separate ballast tanks, those vessels are authorised to sail, provided the amount of clean ballast is not harmful to the sea. Therefore, clean ballast is considered to be seawater coming from a tank carrying a cargo of hydrocarbons, that, when unloaded, produces no visible traces on the water surface when the water is calm and clean. States that lack sufficient resources have stations that control and watch over these unloading operations, and simultaneously obtain samples of the liquid content that remains in the ballast tank, as even if that unloading operation done out at sea could cause visible traces of hydrocarbons on the surface, the ballast is considered clean if the quantity of hydrocarbons does not exceed 15 parts per million.

All new oil tankers with deadweight tonnages equal to or more than 20000 dwt used for transporting crude oil or those with deadweight tonnages of over 30000 dwt used for carrying oil-based products, and existing oil tankers that are used to carry crude oil whose deadweight tonnages are equal to or more than 40000 dwt must be fitted with separate ballast tanks.

In no case must the cargo tanks be used as ballast tanks. This is what is set forth in the general legislation. However, the case may arise that in bad weather conditions that could jeopardise the safety of the vessel while sailing, the only way to guarantee the vessel is to use the cargo tanks as ballast tanks.

In the case of these vessels, the size of the ballast tanks must be sufficient for the ship to maintain more favourable conditions for ensuring safety while sailing without having to use the cargo tanks for ballast purposes, in which case we are not referring to separate ballast tanks.

Consequently, having separate ballast tanks is a great step forward in preventing pollution. Although these tanks usually contain only seawater, they may be used as cargo tanks, provided the cargo is not a hydrocarbon or a toxic substance.

At all events, as stipulated in MARPOL, Annexe 1, Regulation 9, Control over unloading hydrocarbons, section 1), it is absolutely forbidden for vessels to unload hydrocarbons or oily mixtures into the sea. However, there is a series of exceptions to this, since the convention foresees only two types of vessels: oil tankers and vessels other than oil tankers. Below is a chart showing those exceptions, in which case it is permitted to carry out unloading operations in the following cases:

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*changes that are so important that they convert an already-existing vessel into a new type of vessel, or transformations that are made to lengthen the operating life of the vessel, etc.*

Oil Tankers	Vessels other than Oil Tankers Gross Tonnage ≥ 400 T	Vessels other than Oil Tankers Gross Tonnage < 400 T
<ul style="list-style-type: none"> <li>• They must be outside a special zone</li>   <li>• They must be more than 50 nautical miles from the nearest coastline</li> <li>• They must be on course</li>   <li>• Hydrocarbon unloading regime<sup>17</sup> ≤ 30 litres per sea mile</li>   <li>• The total quantity of hydrocarbons unloaded into the sea MUST NOT exceed: 1/15000 of the total load for existing oil tankers and 1/30000 for new oil tankers</li>   <li>• The oil tanker must have a vigilance and control system for unloading hydrocarbons</li> </ul>	<ul style="list-style-type: none"> <li>• They must be outside a special zone</li>   <li>• They must be on course</li>   <li>• The limit of 15 parts per million must not be exceeded</li>   <li>• The vessel must have a vigilance and control system for unloading operations and hydrocarbon-filtering equipment<sup>18</sup></li> </ul>	<ul style="list-style-type: none"> <li>• They must be outside a special zone, and the government is responsible for ensuring that those vessels are fitted with installations for retaining hydrocarbon waste</li> </ul>

Exceptions to regulation 9 *Control in unloading hydrocarbons*

A check can be performed that the unloading is permitted if the ship is sailing outside a special zone, unless it is sailing in a special zone in the Antarctic, in

<sup>17</sup> The term “instantaneous hydrocarbon unloading regime” refers to the result of dividing the hydrocarbon unloading flow rate in litres per hour at any time by the speed of the vessel in knots at that same instant.

<sup>18</sup> Regulation 16 of Chapter I, Annexe I of MARPOL

which case it is forbidden for any type of vessels to perform unloading operations.

Nevertheless, the possibility exists, even in the case of unloading with negative consequences for the marine environment, that this is not considered to be an infringement of the Convention<sup>19</sup>. Such cases are those in which the lives of people might have been endangered if that unloading operation had not been carried out, which is referred to by the “*state of need*” juridical concept, in which preference is given to the juridical good protected (human life) than to the natural environment.

To prevent unloading of hydrocarbons in the case of running aground or boarding, one of the measures adopted in Annexe I was the installation of ballast tanks or spaces not used for loading or for diesel near the cargo tanks. Those tanks may be lateral tanks laid out along the length of the ship’s side or laid out at the bottom of it, known as double-bottomed tanks. These lay-outs are applicable to oil tankers with deadweight tonnages equal to or more than 5000 tonnes, with building contracts awarded as from 6 July, 1993. This regulation is of vital importance since it obliges oil tankers built after July 1993 to have double hulls, thereby leading to a substantial reduction in the international fleet of single-hull ships in the future.

## 2.4. Certificates, Recognition and Inspections<sup>20</sup>

MARPOL states that shipping companies must be in possession of an *International Oil Pollution Prevention Certificate*, also known by its initials in English, “*IOPP*”. That certificate must be renewed at least every five years. To ensure a correct verification, vessels are submitted to a series of inspections and examinations in the case of oil tankers whose gross tonnage is equal to or more than 150 T or in the case of all other vessels whose gross tonnage is equal to or more than 400 T. The first of these inspections must be made before the vessel is put into operation or before the issuance of the “*IOPP*” certificate. The administration makes regular checks at intervals not exceeding five years, which makes it possible for it to make a check every year or every six months on the vessel, on issues related to preventing pollution. Such inspections, which were, until now, probably not made in an efficient manner, have now been stepped up following the measures adopted in the *Erika I* legislative package.

For that purpose, these inspections have been carried out by inspectors appointed by the administration. This is contemplated in *European Parliament and Council Directive 2001/106/EC of 19 December, 2001* on compliance with the international maritime safety laws and pollution prevention. In relation with

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<sup>19</sup> Annexe I, Chapter II, Regulation 9

<sup>20</sup> Annexe I, Chapter I, Regulations 4 and 5

what has been said up to now, this directive aims to substantially increase inspections on vessels, particularly with respect to one of the ballast tanks. Depending on the age of the vessels, those inspections are to be performed at shorter intervals than for relatively new vessels. Furthermore, that European directive sets forth that the vessels must send a series of documents to the authorities responsible for vessel that are mooring with information about the vessel and its pollution prevention systems, in order to facilitate such inspections. However, this still does not remove sub-standard vessels from the seas since the easiest option for such vessels is to go to states in which this and other equally restrictive directives are not applicable, although it seriously impairs their range of operations in maritime trade.

## 2.5. Reception Facilities and Services<sup>21</sup>

The adoption of this Convention entails, among other things, that the ports of the states signing it must have stations for unloading hydrocarbons and oily mixtures, even though they do not originate from cargo tanks. Therefore, as a general rule, all ports in which unloading of crude is carried out must have those facilities. However, this regulation not only affects ports used to unload crude oil, but also applies to shipyards. This is due to the fact that repairs of cargo tanks or cargo space is performed in those facilities, or in facilities in which those tanks are cleaned.

## 2.6. Retaining of hydrocarbons on board<sup>22</sup>

In this section, reference has been made to vessels with systems for retaining hydrocarbons on board, particularly in oil tankers with gross tonnages that are equal to or more than 150 T. Reference is made to having a washing system for cargo tanks, provided that system is approved by the government of the country where the tanker is registered. In addition, this requires the existence of a decantation tank to which the water used to clean the cargo tanks is piped. This tank is emptied in the event that it is possible to connect a line to land or to a vessel provided for that purpose. For vessels visiting Spanish ports, there is a discount of 2% off the port rates for vessels presenting an invoice proving they have used a MARPOL waste-collection system. Lastly, there is a vigilance and control device for operations involving the unloading of hydrocarbons.

The decantation tanks must have a capacity greater than 3% of the hydrocarbon transportation capacity, and in exceptional cases, this percentage is reduced to 1%<sup>23</sup>.

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<sup>21</sup> Annexe I, Chapter II, Regulation 12

<sup>22</sup> Annexe I, Chapter II, Regulation 15

However, it is of vital importance to say that the tankers must have a device that is efficient at all times for controlling the unloading of hydrocarbons from the vessel itself. For this purpose there must be a meter that constantly shows the total number of litres unloaded per nautical mile. In addition, that system must be approved by the administration and also record the litres per mile, date and time when the unloading operation is performed, which must be kept for at least 3 years. This constitutes an extremely effective control of unloading operations performed on board the tankers. Since it is an automatic device, it reduces the possibility of the unloading operation being inaccurately recorded, in addition to being set into operation as soon as an unloading operation is detected. To prevent the system from being unable to control the unloading operations due to a failure, the administration obliges the vessel to have another manual device.

According to the regulation itself, the vessel can be immobilised by the port authorities in the case of that automatic unloading control system functioning. At most, it can allow the tanker to sail if the destination is simply a shipyard in order to undergo repairs. Therefore yet again, it is obvious that non-adapted vessels will have problems in docking in certain ports, but there is a series of exceptions to this, and the administration may authorise the vessel to continue its journey. Those exceptions are described in Annexe I, Chapter II, Regulation 15, section 3.

## **2.7. Hydrocarbons Register<sup>24</sup>**

This is a very simple element, consisting of a document in the form of a register in which all unloading operations made from the vessel must be recorded. Therefore, it includes both operations involving the ballasting of cargo tanks, unloading the ballast if there are no separate ballast tanks, and the loading or unloading hydrocarbon waste, including a record of the closing of the valves after those unloading operations. It must be kept in an adequate place to allow it to be inspected at any reasonable time and must always remain on board. It should be kept for three years after recording the last entry. All copies certified by the ship's captain as a true copy of an entry made in the Hydrocarbons Register is admitted in any court proceedings as proof of the facts declared therein.

That register has two parts: Operations in machine areas and Loading and ballasting operations, for oil tankers (with the meaning given to the term oil tanker in the Convention) with gross tonnages of over 150 T.

## **2.8. MARPOL 73/78- Annexes II, III, IV, V and VI**

### **2.8.1. Annexe II - Toxic liquid substances in bulk**

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<sup>23</sup> Annexe I, Chapter II, Regulation 15, section 2) c) i) - ii) – iii)

<sup>24</sup> Annexe I, Chapter II, Regulation 20

The transportation of chemicals cannot be treated in the same way as transportation of hydrocarbons, due to their lack of stability and the reactions generated with each other, water and the atmosphere. For this reason a series of special guidelines is required to be followed to prevent them from being spilled into the sea.

The problem, apart from a lack of knowledge regarding their properties, lies in the diversity of nomenclatures and codes used in the different maritime, land and air transport conventions<sup>25</sup>.

The fundamental objective of the MARPOL Convention was to reduce the spillage of wastes into the sea by incorporating operational guidelines on board the vessels and regulations with respect to the fitting-out of the vessels to guarantee the unloading and cleaning of tanks, and the establishing of specific criteria for evacuating waste, either to special facilities or land, or to the sea, in compliance with certain conditions.

One of the main problems of the entry into effect of Annexe II on 6 April 1987 was the requirement regarding waste-receiving facilities, due to the heavy investments required by countries not ratifying the convention, which led to difficulties in complying with the obligations of tankers transporting chemicals.

At present, the problem lies in effective operational control in loading and unloading operations, washing of tanks and the evacuation of waste to receiving facilities.

Annexe II of the MARPOL Convention consists of 15 regulations and 5 appendices describing the procedure to be followed when handling bulk toxic substances.

Firstly, it defines several concepts that are useful in understanding that annexe with no problem. Thus, the following terms are defined: *Toxic substances, special zones, new vessels...*

It also limits the scope of application of the annexe, and obliges new vessels built after 01/07/86 to comply with the IcQ (*International Chemical Code* dated 17/07/1983 (IMO - 103S)), and vessels built before 01/07/1986 to comply with the IBC (*Bulk Chemical Code* 1971, amended for MARPOL on 06/04/1987 (IMO-774S)).

A classification is available by categories with a list of liquid substances ranging from category A to D, depending on the pollution factor they contain.

In regulation 5 limits are set on the unloading of toxic substances in both special zones and in any other zone. Unloading in the sea is forbidden, in addition to ballast water and the washing of tanks or other waste or mixtures containing those toxic substances. If the tanks must be washed, the waste must be deposited in a receiving facility until the concentration is as follows:

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<sup>25</sup> Only 1% of all the 100000 most common potentially toxic chemical substances have been investigated.. But there are several information centres such as CHEMDATA syst. CIRCUS, the London Fire Brigade. *Environmental Chemicals Data and Information Network (CE)*.

- For type A substances:  $< 0.1\%$  in weight (0.01 if yellow phosphorus)
- For type B substances:  $< 1/1000000$  in the portion of the ship's wake immediately to stern
- For type C substances:  $< 10$  parts per million in the portion of the wake.
- For type D substances:  $< 1$  part of the substance/10 parts water.

It may be unloaded into the sea if:

- Sailing at  $> 7$  knots with own propulsion or 4 knots (vessels without own propulsion)
- Unloading under the waterline

Unloading is done  $> 12$  miles from the coast and at a depth of  $> 25\text{m}$

The appropriate ventilation methods approved by the administration may be used. The water that is poured into the tanks thereafter is considered to be clean water.

Unloading of substances that are not included in any category is PROHIBITED.

In special zones, the required concentrations before unloading into the sea are different:

- Type A:  $[ ] < 0.05\%$  weight (0.005% if yellow phosphorus)
- Type B:  $[ ] < 1/1000000$  in the portion of the wake immediately to stern
- Type C:  $[ ] < 1/1000000$  in the portion of the wake immediately to stern

Section 5 A of the same rule describes the methods for pumping, transferring through pipes and means for unloading the cargo. It mentions that for new vessels ( $> 01/07/86$ ) carrying type B substances, when performing the pumping operation the pipes must retain no more than 0.1 cubic m and no more than 0.3 cubic m if type C substances. In older vessels ( $< 01/07/86$ ) carrying type B substances the pipes must not retain more than 1 cubic m or  $1/3000$  of the tank's capacity and for type C substances, the limits are 3 cubic m or  $1/1000$  of the tank's capacity.

It is not compulsory to comply with this regulation in cases in which it is necessary to ensure the ship's safety, in the case of a breakdown or in the case of palliating / combating specific cases of pollution.

The ports of the countries adhering to the Convention must be equipped with the appropriate receiving facilities. Similarly, those countries must designate their inspectors and only receiving ports may grant exemptions.

All tankers to which this rule applies must have a Cargo Register in which the respective entries will be made for each tank, every time cargo is loaded, transferred, the tanks are cleaned, or sea waste is eliminated,... This register must always be stored on board the vessel and will be kept for 3 years after the date of the last entry made in it.

Regulation 10 of the convention specifies the inspections to be made for all the vessels included under the terms of this annexe.

- A complete initial inspection.
- Complete regular inspections (< 5 years)
- An intermediate inspection, during the validity term of the certificate, in which the equipment, pumping system and pipes will be examined.
- A complete annual inspection.

Following an inspection, the respective administrations will issue an International Prevention Certificate for the vessel, valid for the time stipulated by the inspection authority, but in no case within a term of less than 5 years, and that certificate will cease to be valid if any important alterations are made to the vessel as regards its equipment, structure, etc.

### **2.8.2. Annexe III – Regulations for preventing pollution by toxic substances transported by sea in containers**

Toxic substances are understood to be substances considered as harmful to the sea by the IMDG<sup>26</sup>.

Member countries must establish the regulations regarding packaging / containers, markings on labels, documentation..., in such a way that the packages are able to minimise the risk of causing harm to the marine environment, considering their contents. Similarly, the labels must be durable (resisting > 3 months of immersion in seawater) and will bear the technical name and if possible, the United Nations reference number (IMDG n°).

The documents must also include all the names of the toxic substances being carried, adding the words “*sea pollutant*”, in addition to certifying the correct state of the packages and their labels.

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<sup>26</sup> Approved by the Organisation in Resolution A.716 (17): *International Dangerous Goods Code*.

The vessel will also have a list declaring the location of the toxic substances on board. If there should be a list or detailed drawing of the stowing operations, in accordance with the regulations for transporting dangerous goods in SOLAS 74, they may be combined with the previous documents, making a clear distinction between dangerous goods and toxic substances for the purpose of this annexe.

The toxic substances will be properly stowed and secured. The limitations will be in keeping with the dimensions and vessel equipment, and with the type of packages and substances carried.

### 2.8.3. Annexe IV - Regulations for preventing pollution by waste water from ships

Annexe IV<sup>27</sup> considers that the term “*waste water*” can be divided into:

- *Grey water*: water coming from showers, WCs, bathtubs or waters that have first passed through a grease filter, in the event that they come from laundry and kitchen facilities.
- *Black waters*: this comes from drainage systems and areas used to transport live animals.

Annexe IV of MARPOL refers to the prevention of marine pollution caused by tipping waste water included in this annexe into the sea:

a. New vessels:

- With a gross tonnage of > 200 T
- - With a gross tonnage of < 200 T but > 10 passengers
- - With no estimated gross tonnage but > 10 persons.

b.- Existing vessels:

- Gross tonnage of >200 T, (10 years after its entry into force)
- Gross tonnage of < 200 T but > 10 passengers (10 years afterwards)
- - With no estimated gross tonnage but > 10 passengers (10 years afterwards)

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<sup>27</sup> In Spanish law, annexes III, IV and V of MARPOL 73 / 78 were ratified and published in Official State Gazette nº 56 of 06/03/1991, decision MEPC.2 (VI) (IMO-592-E publication).

All vessels visiting ports of member states are subject to an initial inspection before the vessel enters into service, to guarantee that the vessel is fitted out with a waste water treatment system approved by the committee, including a facility for breaking down waste, a retaining tank and a pipe leading outside the vessel. Regular inspections must also be made at intervals of no more than 5 years.

Once the vessel has been inspected, the administration issues an *International Waste Water Pollution Prevention Certificate* (1973). This certificate is in no case issued for more than 5 years and has a maximum extension term of 5 months if the vessel is out at sea or in a non-member state. The certificate loses its validity if any important alterations are made to the equipment on board the vessel.

The unloading of waste water is absolutely forbidden unless the vessel is more than 12 miles from the nearest coastline or 4 miles if the waste water has been broken down and disinfected. At all events, unloading must be done when the vessel is moving at a moderate speed, in all cases, more than 4 knots.

The vessel does not have to comply with these regulations if the unloading operation is done to protect the vessel's safety or due to a breakdown.

The Governments of the countries in question are obliged to equip their ports with waste water receiving facilities.

The terms of this Annexe took effect on 27 September, 2003.

#### **2.8.4. Annexe V – Regulations for preventing pollution by waste from ships**

Annexe V of MARPOL applies to all vessels.

This annexe enforces the prohibition to throw plastics, cordage and the remains of nets made from synthetic materials into the sea from vessels or fixed platforms, and also the prohibition to throw board, stowage materials or floatable materials at a distance of less than 25 miles from the coastline. It is also prohibited to tip food and waste at a distance of less than 12 miles from the coastline, and within 3 miles if the remains have been broken down or crushed and passed through mesh with a diameter of 25 cm.

The governments in question agree to have the appropriate waste-receiving facilities in the ports. In addition, authorised inspectors must be designated to visit the vessels if it is suspected that the captain and crew are not familiar with this aspect.<sup>28</sup>

Ships with a length of more than 12 m will have signs on them bearing the regulations regarding waste disposal. Vessels with deadweight tonnage of

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<sup>28</sup> Procedures for the supervision of ports by the Governing Body approved by the Organisation through A.787 (19) (IMO-650 E publication).

>400T or >15 passengers will have a waste-disposal plan that must be complied with by the crew, with procedures for collecting, storing, treating and evacuating waste<sup>29</sup>.

Vessels with a dwt of > 400T visiting ports of states not signing the convention must keep a Waste Register with a record of all unloading operations or incineration operations that take place. This register must be stored on board at all times, and kept for 2 years after the last entry made in it.

The governments may demand vessels staying in port for less than one tour that carry fewer than 15 passengers or marine bed research platforms to comply with the regulations regarding this Register.

Concerning Annexes III, IV and V

The ratification by Spain of Annexes III, IV and V of MARPOL 73/78 was published in Official State Gazette nº 56 on 06/03/1991.

Royal Decree 488/1994 of 11/03 published in the Official State Gazette on 8 April 1994 establishes that all vessels, no matter what their class, must deliver oily waste to authorised waste-receiving facilities (MARPOL Stations). Similarly, Act 27/1992 of 24/09 on National Ports and the Merchant Navy determines the prohibition to unload waste of any kind in the public port domain.

#### **2.8.5. Annexe VI- Prevention of atmospheric pollution caused by ships**

Annexe VI has been incorporated into the MARPOL 73/78 Convention, which is comprised of specific regulations governing atmospheric pollution caused by ships.

These regulations establish the following:

- Limits on sulphur oxide (SO<sub>x</sub>) and Nitrogen (NO<sub>x</sub>) emissions from ship exhausts.
- International limit of 4.5% mass / mass of the diesel sulphur content
- SO<sub>x</sub> emissions control zone.
- Prohibition on deliberate emissions of substances which cause harm to the ozone layer.
- Limits on emissions of Nitrous Oxide (NO<sub>x</sub>) from diesel engines.

This Annexe was adopted on 26 September 1997 and took effect on 19 May, 2005.

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<sup>29</sup> It is applied from 01/07/1998 to ships built before 01/07/1997.

### 3. Specific risks in transporting Crude. Description of the main operating procedures

The physical and chemical properties of oil and, fundamentally, its flammability, which in certain circumstances determines a series of extremely dangerous transportation conditions<sup>30</sup>. In relation to the above, the release of electric energy through electrostatic discharges can lead to fire or explosion of mixtures of air and flammable hydrocarbons.

Oil tankers are, on the other hand, a very dirty type of vessel for the marine environment, due to the dangerous nature of their cargo and the large quantities they carry. In a port, it is almost inevitable for small quantities to escape into the sea during loading and unloading operations. There are oil tankers that take advantage to clean their tanks while they are sailing. On the other hand, when an oil tanker sinks, this is a catastrophe due to the enormous pollution generated that has a serious effect on marine life. Despite the cleaning operations that are carried out, an ecosystem affected by a spillage of crude oil needs well over several decades to recover from the tragedy.

For the above reasons, prevention and protection of marine safety and the fight against pollution conditions the design of new vessels in general, and oil tankers in particular, since they are potentially dangerous vessels. In the same way, their handling and operating procedures and dysfunctions in such procedures or their irregular operation is the underlying cause of many important marine accidents.

In this section, we will merely give a broad description of the main operating procedures, in relation to oil tankers<sup>31</sup>.

#### **Inert gas:**

Inert gas is a gas or mixture of gases in which the oxygen content is so low that combustion is not possible. Hydrocarbons and their by-products cannot burn in atmospheres containing less than 11% of oxygen in volume. It is considered that maintenance of cargo tanks with a maximum level of 8% is sufficient safety margin. This gas is obtained from the combustion of a boiler, an engine exhaust (e.g. *British Petroleum Flue Gas*), from a separate generator or from a storage tank.

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<sup>30</sup> Petroleum gases only ignite when they are mixed with air in certain proportions. For a mixture to be considered likely to ignite or explode, it must be between 1-10% of the gas volume in the atmosphere of the tank.

<sup>31</sup> For a more operative and technical perspective, see: PUERTOLAS GORINA, E. *Manual del Buque Tanque*, Madrid, ed. COMME, Madrid 1993; REIGADAS I.G. *El Buque Tanque*, ed. TGD, Santander 2004.

The main purpose of inert gas is to provide protection against explosions in tanks when the air is displaced from them (with their oxygen content being 21%). The inert gas is also used to ventilate cargo tanks and/ or prevent conditions of excess pressure or vacuum.

Before being distributed to the tanks the inert gas must be cooled and purified as it is necessary to eliminate solid particles and corrosive elements such as sulphur.

In the unloading process, the vessel will arrive with the inert gas plant checked and the tanks rendered inert. The supply of inert gas will start immediately before the unloading commences, in order to raise the pressure in the tanks.

At no time must air be let into the tank, for which purpose the tank must always have a positive pressure. Before starting to clean the tanks, it must be assured that the percentage of oxygen is less than 5%.

The washing operations will be interrupted if the inert gas plant is not in order, if the percentage of oxygen is higher than 5% or if the pressure in the tank is less than the atmospheric pressure.

The legal references with respect to Inert Gas are set forth in SOLAS 74, Chap. II-2, amended by Decision MSC (99)73 in force since 1 January 2002, which establishes the obligation to have an inert gas system that is in keeping with the provisions of the Fire Safety Systems Code<sup>32</sup>.

### **Cleaning of tanks:**<sup>33</sup>

At present, newly-built vessels use the following method:

The vessel leaves the unloading terminal in a separate ballast situation. At a determined phase during the crossing, the tanks are cleaned with crude. The action of the machines used for washing with crude, which are fixed to the interior of the cargo tanks, must cover the whole internal surface of the tanks. The mixture of crude and waste is pumped out to the decantation tanks which, in this specific case, perform the function of waste storage tanks. The resulting mixture is completed with crude in the loading terminal, (i.e., in the loading trip, the *Slop* decantation tanks also contain cargo) and it is unloaded in the refinery. This process of filling the decantation tank with the cargo and mixing it with the waste is known as *Load on Top*. The refinery absorbs the small amount of pollution that results with no problems.

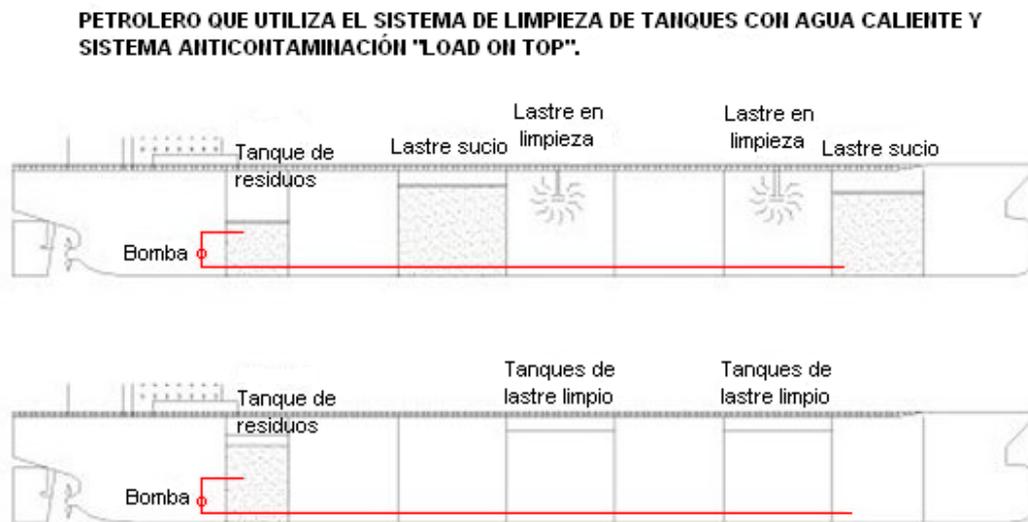
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<sup>32</sup> For an eminently illustrative perspective, see *Inert Flue Gas Safety Guide* of ICS, OCIMF and the official IMO publication on the subject: *Inert Gas Systems*.

<sup>33</sup> In accordance with RODRÍGUEZ VIDAL C. in *Los buques petroleros*. Revista Naval. January - February 2003.

The system used in previously-existing tankers without double hulls and with ballast in the cargo tanks is the following:

After unloading and having to make the return trip empty, the vessel must be ballasted. For this purpose, several cargo tanks are filled with seawater (dirty ballast). Washing is performed in the empty tanks with hot seawater. All the water from washing the tanks is sent to the waste tank in the stern (decantation tank or *slop tank*). In the dirty ballast tanks, the clean salt water beneath the floating crude oil is returned to the sea and the oily waste remaining in the tank is pumped to the waste tank. The washed tanks are then filled with clean ballast. All the contaminated water and crude oil is kept in the waste tank and the crude is given time to separate from the water. Then the water beneath the oil is pumped into the sea. Once in the port loading terminal, the oil is loaded on top of the oil in the waste tank.



Oil tanker using system for cleaning tanks with hot water and the *Load on top* anti-pollution system  
(Source: RODRIGUEZ VIDAL, C. , Op. Cit..)

<b>OIL TANKER USING SYSTEM FOR CLEANING TANKS WITH HOT WATER AND THE <i>LOAD ON TOP</i> ANTI-POLLUTION SYSTEM</b>					
Pump	Waste tank	Dirty ballast	Ballast washing	Ballast washing	Dirty ballast
Pump	Waste tank		Clean ballast tanks		Clean ballast tanks

### **Cleaning of tanks using the COW washing (*Crude Oil Washing*) system**

To clean with crude oil, the vessel must have an inert gas system installed, which operates correctly and has a specific manual entitled *Crude Oil Washing Manual*, approved by the government of the country in which the vessel is registered. It is extremely important to consider the regulations set forth in the

ICS/OCIMF publications *Inert Flue Gas Safety Guide* and *Guidelines for Tank Washing with Crude Oil*.

Crude oil tankers generate a large quantity of sediments (which may represent up to 0.5% of the total cargo), formed by clay, silt, oxide flakes and sand, which together with paraffin, are deposited all over the tank structure.

The advantages of crude oil washing are:

It reduces marine pollution.

It is an economical method (on unloading most of the waste, losses are kept to a minimum).

It is simpler in operating terms (the operations of baling out the tanks and the final emptying are easier and performed in less time, since there is no waste blocking the rope holes).

The material (the equipment during the trip is minimal).

Conservation (it reduces corrosion by reducing the use of salt water and the oxygen percentage).

At the present time, with vessels having separate ballast tanks, pollution is practically non-existent since the clean ballast does not need to be rinsed (with water). These operations are only performed in exception cases of inspection or repair.

There are two washing process techniques:

1) One-stage washing; this consists of washing the tank in full until it is clean, continuously and without interruption. To do this, the tank must be dry, with no liquid accumulated in it during the washing process.

2) Washing in two or more stages; this consists of performing the operation with interruptions during the time the operation of unloading the tanks for cleaning lasts, using the parts of the tank that are free of crude to do the washing. It is recommended to use programmable machines, which reduces the costs.

Washing of the tanks with crude is usually done while unloading, and before starting the operations a check must be made to ensure the tanks are rendered inert and that the oxygen concentration is equal to or less than 8%.

The responsible officer must supervise the control of the whole operation: rendering the tanks inert, percentage of oxygen in the tanks, pressure in the COW line, unloading, keeping the pressure positive while unloading the tanks, etc. and pay special attention to leaks and spills.

## 4. The withdrawal of single-hull vessels

MARPOL 73/78 establishes a series of regulations that introduced the double hull architecture or an equivalent design for oil tankers, in order to prevent pollution by the oil tanker in the event of being boarded or running aground. This was a progressive withdrawal programme for oil tankers with a single hull. The problem arose because it referred to a long-term withdrawal that did not please the Americans.

Transforming a single-hull oil tanker into a double hull one entails a great cost and enormous structural difficulties. It is difficult to expect shipbuilders to assume such expenses in reforming their fleets. For this reason the law establishes the gradual withdrawal of these oil tankers.

In 1990, following MARPOL 73/78, but with greater demands, after the accident of the “*Exxon Valdez*” the Americans used the OPA to introduce another calendar to speed up that withdrawal of single-hull tankers. As a result the IMO was forced to amend the MARPOL 73/78 Convention in 1992 regarding tankers with double hulls. Similarly, in 1994, on an independent basis through Council regulation EC 2978/94, and later in 2002, through Council Regulation EC 417/2002, the EU introduced its own laws to prevent this type of tankers, which were banned from operating in the US, from sailing in its waters.

The legislation considers the withdrawal of single-hull tankers in relation to the useful economic life of the vessel using the American “*Oil Pollution Act*” of 1990 and regulations 20 and 21 of Annexe I of the MARPOL Convention, based on the international vision. In this way, the withdrawal had no direct effect on the economic activity of the shipbuilders.

Following the Erika accident, the European Union signed European Parliament and Council Regulation EC 417/2002 on 18 February 2002, in relation to the accelerated introduction of the withdrawal of oil tankers, by derogating Council Regulation EC 2978/94. Later, in 2003 Regulation EC 1726/2003 came into effect, followed by EC Regulation 2172/2004 in 2005 and during the course of last year, Regulation EC 457/2007.

However, the differences between the US system and the international system led to certain consequences in 2005. Oil tankers with single hulls banned from US waters due to the age continued to sail in other regions of the world, including the European Union where the risk of pollution increased. This applied to single-hull tankers belonging to category 1 that were not withdrawn until 5 April 2005<sup>34</sup> in the case of having been delivered before 5 April 1982 and up to the end of 2005 for tankers delivered after 5 April 1982.

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<sup>34</sup> Rule 20.4 of Annexe I of MARPOL 73/78.

#### 4.1. The Oil Pollution Act of 1990

The *Oil Pollution Act* (OPA) was signed in August 1990, mainly in response to the growing public concern after the accident of the *Exxon Valdez*. The OPA improved the capacity of the US to prevent and respond to oil spills through provisions that extended its powers, providing the necessary funds and resources to respond to oil spills. The OPA also created the *Oil Spill Liability Trust Fund* which is in a position to pay up to one billion dollars per accident.

The USA imposed the demands of the double hull unilaterally on new oil tankers and existing ones through limits on age (from 2005, between 23 and 30 years) and terms (2010 and 2015) for the total withdrawal of single-hull tankers.

The OPA increased sanctions imposed for breaching the regulations and extended the response of the authorities to establish legislation regulating the prevention of spills of hydrocarbons by oil tankers.

#### 4.2. International Maritime Organisation (IMO)

MARPOL 73/78 established a calendar for the withdrawal of double hulls that spanned a considerable term. In view of the unilateral measure taken by the US, the International Maritime Organisation (IMO) was forced to adopt certain measures and in 1992, the international convention established guidelines in relation to double hulls, to prevent pollution by oil tankers (MARPOL 73/78). This Convention required all oil tankers with a deadweight equal to or more than 600 tonnes delivered after July 1996 to be built with a double hull or equivalent design. Consequently, from that date no oil tankers with this tonnage have been built with single hulls.

By means of an amendment of the convention in 1973, in December 2003 the International Maritime Organisation Marine Environment Protection Committee (MEPC) approved a series of amendments to Annex I of MARPOL 73/78, based on the measures adopted by the European Union. However, those amendments contain certain exceptions, which are foreseen in section 7 of Regulation 13G<sup>35</sup>, in reference to the calendar for withdrawing single-hull oil tankers and in sections 5, 6 and 7 of Regulation 13H<sup>36</sup>, in reference to the prohibition to transport heavy hydrocarbons in single-hull oil tankers.

In the case of single-hull oil tankers with a deadweight tonnage equal to or more than 20,000 tonnes, delivered before 6 July 1996, this International Convention requires that they fulfil the guidelines regarding double hulls at no

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<sup>35</sup> In the new edition of MARPOL 73/78 of 2006 (revised edition) that Regulation is shown as section 20.7 of Annex I.

<sup>36</sup> In the new edition of MARPOL 73/78 of 2006 these Regulations are shown as sections 21.5, 21.6 and 21.7.

later than the age of 25 or 30 years, depending on whether or not they have separate ballast tanks<sup>37</sup>.

The objective of separate ballast tanks is to reduce the risks of pollution caused by operations, guaranteeing that the ballast water is never in contact with the oil. On the other hand, the separated ballast tanks are positioned as a means of protection in places where the impact caused by running aground or being boarded may be more serious.

The MARPOL Convention makes a distinction between three oil tanker categories:

Category 1:

*Oil tankers with deadweight tonnages equal to or more than 20,000 tonnes transporting crude oil, diesel, heavy diesel or lubricants as their cargo and those with deadweight tonnages equal to or more than 30,000 tonnes transporting hydrocarbons other than those mentioned above that do not fulfil the requirements applicable to oil tankers delivered after 1 June 1982, as defined in regulation 1.28.4 of MARPOL Annexe I.*

Category 2:

*Oil tankers with deadweight tonnages equal to or more than 20,000 tonnes, transporting crude oil, diesel, heavy diesel or lubricants as their cargo, and those with deadweight tonnages equal to or more than 30,000 tonnes transporting hydrocarbons other than those mentioned above, that do not fulfil the requirements applicable to oil tankers delivered after 1 June 1982 and before 1996<sup>38</sup> as defined in regulation 1.28.4 of MARPOL Annexe I.*

Category 3:

*Oil tankers with deadweight tonnages equal to or more than 5,000 tonnes but less than the figures for categories 1 and 2.*

However, regulation 20.7 of Annexe of MARPOL 73/78 specifies that if the tanker passes a series of inspections proving its good conditions, it can continue to operate until 2015 or until the age of 25 years from the date of delivery, if that date is earlier.

The IMO has amended the MARPOL Convention for the purpose of applying a similar regime as the EU one to the international oil tanker fleet. The new international guidelines amending Annexe I of the MARPOL 73/78 Convention establish the following:

- An accelerated programme for the gradual withdrawal of single-hull tankers that cannot continue in service beyond the year 2010;

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<sup>37</sup> The withdrawal of single-hull tankers depends on the age and category, as specified below.

<sup>38</sup> All oil tankers built after 1996 have double hulls or an equivalent design as specified in Regulation 19 of Annexe I of the international convention MARPOL 73/78.

- The extension and early application of the special inspections scheme for oil tankers with single hulls aged over 15 years. (CAS)

As a result, since the entry into force of the amendments of Annexe I of MARPOL 73/78 (5 April 2005), international legislation has sought a solution that is similar to the European one, and that is binding on all tankers, regardless of their country of registration and destination. All in all, it offers single-hull oil tankers from member states that operate outside the European Union the possibility of benefiting from the exceptions of Regulation 13H<sup>39</sup>.

#### 4. 2.1. CAS (*Condition Assessment Scheme*)

The scheme for assessing the condition of the tankers (or «*Condition Assessment Scheme*» - CAS) is applicable to oil tankers of all types over the age of 15 years, from 2005. The CAS is an additional scheme of specially reinforced inspections for the purpose of detecting structural defects in single-hull oil tankers. Its origin lies in the practices of the Classification Societies and implies a solution based on political compromise with shipbuilders.

A review of regulation 13G<sup>40</sup> of MARPOL 73/78 Annexe I, approved by the Marine Environment Protection Committee MEPC<sup>41</sup> shows that it imposes a certain degree of prevention on pollution that could be caused by a single-hull oil tanker.

It is required that in categories 2 and 3, oil tankers aged 15 years or more after their delivery date are subject to the Condition Assessment Scheme (CAS).

The requirements of CAS also apply to oil tankers subject to the provisions of regulation 13G section 7<sup>42</sup>, in which authorisation is requested to continue in service beyond the anniversary of the date on which the oil tanker was delivered in 2010, for oil tankers with deadweight tonnages of 5,000 tonnes or more and an age of 15 years or more from the delivery date of the tanker, that, are necessary for the purpose of transporting crude oil, with a density at 15° C that is higher than 900 in kg / cubic m but less than 945 kg / cubic m in accordance with regulation 13H section 6<sup>43</sup>.

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<sup>39</sup> The new edition of MARPOL 73/78 of 2006 shows these Regulations as 21

<sup>40</sup> In the new edition of MARPOL 73/78 of 2006 that Regulation is shown as section 20 of Annexe I.

<sup>41</sup> *Marine Environment Protection Committee*: the MEPC.94 (46) makes reference to the CAS surveys.

<sup>42</sup> In the new edition of MARPOL 73/78 of 2006 that Regulation is shown as section 20.7 of Annexe I.

<sup>43</sup> In the new edition of MARPOL 73/78 of 2006 that Regulation is shown as section 20.6 of Annexe I.

Decision MEPC.94 (46) in its amended form requires that certain preparatory measures be implemented before executing the survey, as follows:

- Notification sent by the Company to the Administration and to the Group Office, of its intention to proceed with the CAS. This must be sent 8 months before the foreseen commencement of the CAS surveys.
- The company must complete and return the planning survey to the Group Office no later than 5 months before the foreseen start of the CAS survey. The company must also present a copy of the survey, completed by the Administration.
- The CAS Study Plan must be completed, signed and submitted by the company to its premises 2 months before the foreseen start of the CAS survey. The company must send a copy of the CAS Survey Plan to the Administration.

A provisional declaration of conformity is issued, valid for a term of 5 months, allowing the Declaration of Conformity to be issued following the conclusions of the CAS. In addition the CAS survey is sent at intervals of 5 years, following the same procedure described above.

### 4.3. EU Legislation

The international legislation envisaged the withdrawal of single-hull tankers transporting heavy hydrocarbons in large quantities during a very long term. The fact that the US went one step further and, following the pollution caused by the accident of the oil tanker *Erika* in December, 1999 in European waters, urged the Commission to adopt Regulations with a calendar for withdrawing single-hull tankers that was more similar to the US legislation than international legislation.

European Parliament and Council Regulation n° 417/2002/EC of 18 February 2002, on the accelerated introduction of legislation with respect to double hulls or an equivalent design for single-hull oils tankers, which derogated Council Regulation 2978/94/EC.

In its original version, Regulation n° 417/2002/EC aimed to introduce a series of laws on double hulls or an equivalent design for single-hull oil tankers with a view to reducing the risk of pollution of European waters by hydrocarbons.

Following the urgent measures taken after the accident of the oil tanker *Prestige* on 20 December 2002, the Commission decided to postpone amendments to Regulation n° 417/2002/EC in order to speed up the initial calendar for withdrawing single-hull oil tankers and prohibit the transportation of heavy fuels with immediate effect in single-hull tankers entering or leaving ports, terminals and anchoring zones of European Union member states.

In June 2003 the European and Council approved the main components of the Commission's proposal. European Parliament and Council Regulation n° 1726/2003/EC of 22 July 2003, modifying Regulation n° 417/2002/EC, took effect on 21 October 2003.

The Regulation applies to oil tankers with deadweight tonnages equal to or more than 5,000 tonnes:

- They must enter non-coastal ports or terminals subject to the jurisdiction of a European Union member state or leave such ports and terminals or be anchored in a zone that is subject to the jurisdiction of a European Union member state, regardless of their country of registration;
- They must be registered in a European member state country.

The categories of heavy fuels to which this regulation refers are diesel, heavy crude, used oils, pitch and tar.

No oil tankers are authorised to sail under the flag of a European Union member state or allowed access to non-coastal ports or terminals under the jurisdiction of member states, irrespective of their country of registration, one year after the date on which the vessel was delivered as specified below, unless they are double hull tankers:

As regards oil tankers belonging to category 1:

- Not currently compliant, unless double hull tankers.

As regards oil tankers belonging to categories 2 and 3:

- 2007, for tankers delivered in 1980 and 1981<sup>44</sup>,
- 2008, for tankers delivered in 1982,
- 2009, for tankers delivered in 1983,
- 2010, for tankers delivered in 1984 or later.

It is forbidden for oil tankers transporting heavy fuels<sup>45</sup>, to enter non-coastal ports or terminals under the jurisdiction of a European Union member state or to anchor in a zone under the jurisdiction of a European Union member state, no matter what its country of registration, unless it has a double hull. Furthermore, no oil tanks transporting heavy fuels are allowed to operate under the flag of any member state unless that vessel has a double hull.

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<sup>44</sup>Oil tankers from these years cannot operate in these waters anymore

<sup>45</sup>These are oil tankers belonging to category 1

However, according to EC Regulation 417/2002, in its amended version, tankers operating under the flag of a member state cannot benefit from the exceptions established in Rule 13G<sup>46</sup>.

On the contrary, tankers sailing under the flag of a member state may benefit from the exceptions established in Rule 13H<sup>47</sup> provided they operate outside sea ports or terminals subject to community law, without as a result, breaching the provisions of Regulation 417/2002/EC (in its amended version).

Following the accident of the *Prestige* the European Community speeded up the prohibition for single-hull tankers to dock at EU ports or sail under the flag of a European Union member state over a term of 5 years, but some may still do this until the year 2010.

2010 was the new date set following the disaster of the *Prestige* for the prohibition of single-hull oil tankers with deadweight tonnages of more than 5,000 tonnes to sail under flags of European Union member states or dock at ports in the European Union. Nevertheless, a new aspect was introduced; oil tankers with single hulls from any category, loaded with non-heavy fuels were allowed to be registered by and dock at ports of European member states (in other words, light and medium crude defined as those having gravities greater than 22.3 °API<sup>48</sup>) that had left the shipyard after 1984, provided they complied with certain technical requirements.

In addition, there is the prohibition that took effect this year for single-hull tankers transporting heavy fuels that cannot dock at European ports or sail under community flags. This does not affect vessels with a deadweight tonnage of less than 600 tonnes. With respect to these and other tankers with deadweight tonnages of less than 5,000 tonnes not carrying heavy fuels, light fuels, diesel, oil tanker pitch and tar, the community legislation imposes no future restrictions.

Another problem is the fact that there is no restriction on single-hull tankers of all sizes transporting fuel of all types passing near European coasts, and so the risk of spills continues to exist.

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<sup>46</sup> In the new version of MARPOL 73/78 of 2006 (ed. Ref.) that Rule is shown as section 20 of Annexe I.

<sup>47</sup> In the new version of MARPOL 73/78 of 2006 (ed. Ref.) these Rules are shown as section 21 of Annexe I.

<sup>48</sup> A density measurement that describes the degree of heaviness or lightness of oil by comparing it to water. If the API grades are greater than 10, it is lighter than water and would therefore float on it.

Following the EU initiative, the MARPOL 73/78 Convention brought forward the date for withdrawing oil tankers without double hulls, but certain exceptions are contemplated. During the second half of 2008 the European Community is expected to approve a legislative package known as Erika III, which will mean an increase in inspections performed on potentially dangerous vessels and greater severity in imposing sanctions. In addition, it will establish the obligation to have insurance for classification societies and vessels sailing in European waters and a better regulation of places of refuge for tankers suffering from problems.

<b>Act</b>	<b>Entry into force Expiry date</b>	<b>Official Journal</b>
<a href="#"><u>EC Regulation n° 417/2002</u></a>	27.03.2002	DO L 64 of 7.3.2002
<a href="#"><u>EC Regulation n° 1726/2003</u></a>	21.10.2003	DO L 249 of 1.10.2003
<a href="#"><u>EC Regulation n° 2172/2004</u></a>	07.01.2005	DO L 371 of 18.12.2004
<a href="#"><u>EC Regulation n° 457/2007</u></a>	20.05.2007	DO L 113 of 30.4.2007

The above charts shows the latest European Regulations, in reference to the withdrawal of single-hull vessels, the date of entry into force and the official journal in which they are published <sup>49</sup>.

<sup>49</sup> Available at <[www.europa.eu/scadplus/leg/es](http://www.europa.eu/scadplus/leg/es)> Consulted in January 2009.

<b>WITHDRAWAL OF SINGLE-HULL TANKERS</b>			
	<b>EC Regulation</b>	<b>Council proposal</b>	<b>Approved 22/07/2003</b>
<b>Category 1</b>	2003/2007	2003/2005	2003/2005
<b>Category 2</b>	2003/2005	2003/2010	2003/2010
<b>Category 3</b>	2003/2015	2003/2010	2003/2010
<b>Barges</b>	Not included	2010	2008

This chart shows the withdrawal dates for single-hull tankers, depending on their category.

## 5. Double Hull and Equivalent Design

Oil is the most widely-transported basic commodity in the world. The European Union occupies first place in the trade of oil-based products. Its imports of crude represent approximately 27% of total world trade, whereas US imports account for 25 %. Around 90% of oil trade in the EU is made by sea (with the rest being carried by oil pipelines, road or shipping routes). A steady growth is foreseen in the oil trade during the next few years, due to the greater demand for oil-based products.

Every year, some 800 million tonnes are transported from European ports to those ports. Approximately 70% of maritime oil transport in the European Union takes place on the coasts of the Atlantic and the North Sea (the remaining 30% is done in the Mediterranean), due to which fact these zones are the ones most vulnerable to black tides, as shown by the wreck of the Erika or, more recently, the *Prestige*.

Furthermore, many oil tankers sail in community waters without making stops and this entails an additional volume (and therefore, an additional hazard). The most important oil ports in the Union are Rotterdam, Marseilles, Le Havre, Trieste and Wilhelmshaven. The oil imported comes mainly from the Middle East and North Africa, whereas European exports (oil deposits in the North Sea) are sent largely to the USA.

Large oil tankers (those of more than 200,000 tonnes) dominate the crude oil transportation market. However, in the North Sea, smaller tankers are used, with a gross tonnage of 5,000 to 50,000 tonnes. Every year between 1,500 and 2,000 oil tankers sail in community waters.

In 2005 the average age of the world oil tanker fleet was 20 years with 41% of the tankers being more than 22 years old. The gross tonnages of the latter

represent 36% of the total gross tonnage of oil tankers. The average age of oil tankers registered in the European Union was 19.1 years in 1999. More than 45% of the European fleet is aged over 20 years.

European companies often use foreign flags under which to register their vessels. Thus, European tankers often use countries such as Liberia, Panama, Cyprus, Malta or the Bahamas, which have not signed international shipping conventions that make it compulsory for the tankers to respect the safety regulations required by other countries.

In addition, these countries with flags of convenience are usually tax havens and offer lower prices, and this appears to have an effect on the lack in the building quality and even the professional qualifications of the crew. Some countries, such as the USA, are opposed to these vessels with flags of convenience docking in their ports.

On a worldwide scale, between 1992 and 1999, a total of 593 vessels were wrecked, of which 77 were oil tankers, i.e., only 13% of the total number, but representing a gross tonnage of 31%. In the light of these figures, it can be said that the results in terms of safety are relatively positive. Maritime accidents can occur for several reasons:

- a) The accidents are usually attributed to human error (errors committed in navigation or piloting). It is recognised that the training and skills of the crew are essential elements for improving safety at sea. The working conditions are also an important factor; thus, fatigue is considered an ever-increasing cause of accidents at sea.
- b) There is a general correlation between the age of the vessels and the accidents. Of the 77 oil tankers wrecked between 1992 and 1999, 60 were over 20 years old.
- c) Other causes of accidents are structural failures (fissures in the hull, corrosion, etc.), fire and explosion.
- d) The situation is even more complex, due to the charter practices used in the oil trade. Oil companies only control one-quarter of the world oil tanker fleet which results in the "dispersion" of shipbuilders. On dividing their fleets up into companies with just one vessel, especially in the form of fictitious companies registered in tax havens, the shipbuilders are able to reduce their financial risk. It is often difficult to know who takes the decisions and as a result, to determine the parties who are really responsible.
- e) The oil trade and charter market are highly competitive. Finding the cheapest tankers in the market is an essential part of the business. The volatile nature of the market is also evident in the growing preference for short-term contracts between charter companies and carriers (what is known as the cash market) instead of long-term contracts. The competition as regards prices in the cash market is extremely fierce. In actual fact, the age of the tanker is rarely taken into consideration when taking the decisions, as the prices are often dictated by the cheapest

gross tonnage offered by older vessels. Therefore, it is difficult for quality to be profitable, and so smaller low-cost operators are rapidly obtaining greater market shares to the detriment of companies with a well-established reputation, with the ensuring risks for safety.

### **5.1. - Legislative background and Rule 13G. New Rule 20. (MARPOL ed. revised in 2006 – adopted on 15 October 2004 that took effect on 1 January, 2007))**

The accident of the oil tanker "*Erika*" in December 1999 gave rise to a period of negotiations aimed at reforming safety on board oil tankers. Although it had no direct relation with the "*Erika*" accident, the convenience of speeding up the withdrawal of single-hull oil tankers in European waters was debated.

Both the EU Commission and Council and the EU Parliament supported this type of measures during 2000 and approved the respective legislative packages based on a proposal made by the Commission in March 2000.

To prevent the introduction of a regional safety regime superimposed on the system already existing in the USA (the *Oil Pollution Act* of 1990 (OPA90)) and the international provisions of the International Maritime Organisation (IMO), the need for adopting new international regulations was posed, which would also converge with the OPA90 to a greater extent than the existing ones.

The IMO agreed to discuss the matter through an urgent procedure and during the 45th session of the Marine Environment Protection Committee (MEPC) several proposals from European countries (France, Belgium, Germany, Spain, Denmark, Holland and the UK) were included in the agendas, requesting a reform of the 1973/78 International Convention for Preventing Sea Pollution (MARPOL), advancing the prohibition on single-hull oil tankers. The most radical proposals made by France opened up the way for a solution of compromise supported by Denmark, which was adopted at the end of the session, for final approval during the next meeting of the MEPC, once the public information terms for the IMO member states had expired.

It appeared to be the final solution, but during the period between sessions, a protest was made, led by Brazil and supported by many under-developed countries that made it necessary to again amend the elimination calendars. Eventually, in April 2002, the negotiations and discussions were closed by the approval by the IMO MEPC during the 46th session, of an amendment to Rule 13G of Annex 1 of MARPOL which took effect from the end of 2002 for the operation to commence on 1 January 2003.

This amendment brought forward the prohibition to use single-hull oil tankers from 1 July 2006 to 31 December 2010, with variations that allowed many vessels to continue operating until 31 December 2015 or even in some cases, until 2017.

In turn, within the framework of oil tankers with double hulls, it should be mentioned that ANNEXE I of MARPOL includes Rules 13F, which deal with Prevention of pollution by hydrocarbons in cases of boarding or running aground, with the obligation of all oil tankers delivered by 6 July 1996 or afterwards with a tonnage equal to or more than 5,000 tonnes to have lateral tanks or spaces and double-bottomed tanks or spaces to protect the cargo tanks along all the ship's length, instead of complying with the provisions of Rule 13E on the layout of separate ballast tanks. This has become one of the measures of reference in construction that is equivalent to a double hull, through which recently-built oil tankers are much safer as opposed to the risks commented on above. This rule specifies all the dimensions and space that must exist between the hull lining and the screens as the side and bottom of the cargo.

Rule 13F of Annexe I makes special mention of the definition "*equivalent construction*".

### **Significant aspects of Rule 13G**

- 1) The provision is extended to smaller vessels, above 5,000 dwt.
- 2) It puts crude carriers transporting persistent products such as heavy fuel, lubricants, etc. in the same category.
- 3) It brings forward the dates for banning single-hull oil tankers.
- 4) It establishes a series of special inspections for checking the status of the vessels (*condition assessment scheme* - CAS) that are necessary for operating from determined dates. These inspections are inspired by the CAP programmes of the classification societies.
- 5) It establishes minor differences between tankers with segregated ballast in situation - SBT/PL – and those without this system.
- 6) It does not affect double hull vessels that comply with MARPOL.

## **Political objectives of the amendment of Rule 13G (new Rule 20, MARPOL 2006 revised version)**

- 1) This is an international provision with a worldwide scope, issued by the IMO to prevent the proliferation of regional regulatory systems.
- 2) Practically complete convergence is reached with OPA90 by 31/12/2016 with majority and growing convergence from 2010.
- 3) The completely withdrawal of Category 1 oil tankers (*crude carriers* with tonnages of over 20,000 dwt and *bulk carriers* that are greater in size than 30,000 dwt that do not have SBT/PL) by 2005, although if they pass the CAS, they are allowed to continue operating for three more years.
- 4) The formal withdrawal of Category 2 oil tankers (*crude carriers* greater than 20,000 dwt and *bulk carriers* that are greater in size than 30,000 dwt that do have SBT/PL) by 2010, although if they pass the CAS, they are allowed to continue operating for six to eight more years.
- 5) The petitions of developing countries are assumed, permitting the operation of certain tankers without double hulls until the end of 2017, but without freedom of global trade.
- 6) The petition of shipbuilders is assumed, of not strictly linking the withdrawal of a vessel to its age, since the CAS scheme poses a solution based on compromise that allows the life of tankers in better conditions to be extended, thereby stimulating the maintenance of seaworthiness.
- 7) Excessive and early peaks have been avoided in the withdrawal of vessels that could lead to the temporary lack of oil tankers or overload the capacity of the shipyards to replace the fleet that must be substituted.

### **The fleet affected by the new regulations:**

Based on data updated at the end of 2000, the international oil tanker fleet of vessels with a tonnage of over 5,000 dwt is formed by some 4,871 tankers, with approximately 324 million dwt.

A considerable part of this fleet (35.6%) is formed by double hull vessels and the rest are affected by the new regulations (some 3,000 oil tankers of 200 million dwt that will require the building of just over 60 million CGT (compensated gross tonnages) of oil tankers during the next 15 years.

As a reference, the construction of oil tankers between 1999 and 2000 was on average, 20.7 million dwt and 4.85 million CGT per year. The portfolio of orders made it necessary to maintain those delivery levels from 2001 to 2002.

Consequently, until the end of 2015 310 million dwt and 73 million CGT could be delivered at the same rate, which is well in excess of the needs for

replacement and leaves sufficient margin for an increase in the fleet of around 2% per year, which is comparable to that of recent years, and seems to be sufficient to guarantee the transportation of oil on a worldwide scale.

Both the older version of Rule 13G and the new one impose a series of age limits on single-hull oil tankers. However, at least during the few years, these limits are not particularly strict. In practice, the maximum ages are much higher than the average scrapping age for different oil tankers. For instance, the average age for scrapping an oil tanker during recent years is 27 years, when there was a good market, and 25 years in the opposite case.

It may occur that commercial reasons continue to affect the age for scrapping oil tankers, for<sup>50</sup>:

- Who would charter a single-hull oil tanker aged between 10-15 years?
- What goods and charters remain for these vessels when there is an abundance of double hull tankers available in all sizes?
- How many shipbuilders would decide to invest and try and get their single-hull ships to pass the CAS from the year 2010?

## 5.2. Double hulls and equivalent design

### Double hull oil tankers:

The maritime transport of crude oil and refined products have led to tankers being built based on the strictest naval engineering conditions and those of classification societies, and they now have advanced technology to guarantee safety during transport and thus protect the environment.

In this respect, legislation has been approved in international spheres (International Maritime Organisation) and by the European Union, to speed up the replacement of single-hull oil tankers by double hull tankers.

Unlike single-hull tankers, in which the oil in the cargo tanks is only separated by the seawater by a plate at the bottom and sides, in double hull oil tankers, the cargo tanks are surrounded by a second internal plate at sufficient distance from the external plate to ensure that there is double protection in the case of the first plate being damaged. This ensures that the risk of pollution is considerably reduced. The double hull also has additional advantages in the case of problems arising in any of the storage tanks, since there is the option of pumping the oil into the spaces that are between both hulls.

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<sup>50</sup> A personal reflection about the withdrawal of single-hull tankers and/or the building of double hull vessels.

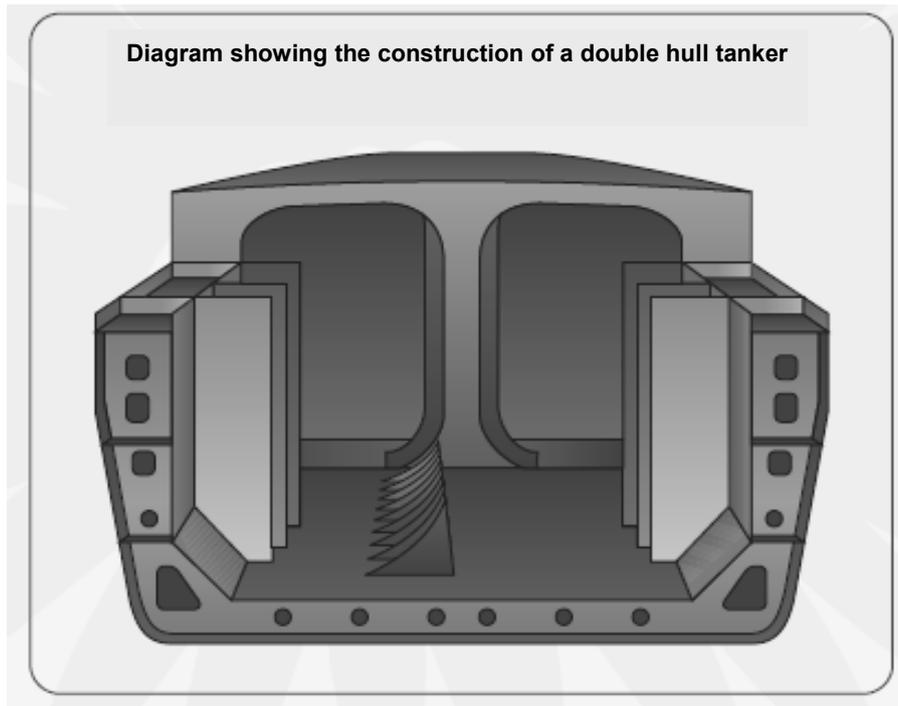


Diagram showing the construction of a double hull tanker. Source: *Asociación Española de Operadores de Productos Petrolíferos (Spanish Association of Oil-based Product Operators)*.

However, the design of a double hull oil tanker is quite different from that of a single-hull oil tanker. The materials used and the corrosion margins and templates are smaller; and experience with double hull VLCCs during the last 7 or 8 years have shown that the crude oil tanks in some of these tankers undergo problems of severe premature corrosion which leads to the layers of rust flaking from the steel surface coming into direct contact with the crude oil.

Another way to increase safety in oil tankers is to install protective ballast tanks located around the cargo tanks, in order to protect places in which an impact may be more serious. To encourage the use of double hull oil tankers, the European Union has established a system of economic aid, based on reducing port charges. The European Union has also approved a series of regulations aimed at controlling oil tankers with a view to increasing maritime safety and protecting the marine environment (*Port State Control*). In this way, oil tankers which in 2004 did not adapt to certain regulations are not allowed to sail in European waters. In turn, the International Maritime Organisation has already passed a series of regulations with the same purpose, that affect countries that are not EU member states.

Apart from eliminating single-hull oil tankers, other measures have been adopted, such as (ERIKA I and ERIKA II)<sup>51</sup>:

1. Control of oil tankers in ports

These measures are intended to reinforce controls in ports and ensure that vessels in poor condition are banned and refused entry into

<sup>51</sup> Changed made after the wreck of the *Prestige*.

European Union ports, based on a blacklist<sup>52</sup> published by the European Union authorities.

The new legal measures establish that, in addition, all vessels must be subjected to an annual inspection, i.e., not limited to a superficial examination of the conditions of the ship, but a thorough and systematic check of the ship's vital elements. Problems of corrosion and structural problems, which have sometimes caused accidents, are easily detected.

Tankers must be fitted with recording devices, similar to those installed on board aircraft, in accordance with a schedule that runs from 2002 to 2007. The absence of this recording device on board oil tankers is sufficient grounds to immobilise the tanker in the port.

## 2. Greater control for classification societies

There are certain organisations known as classification societies that make an important contribution to maritime safety, by being entrusted with inspecting the ships. The new regulations require them to have increased technical training and more resources to perform their tasks, which is that of assessing the quality of the structure of these ships and their maintenance.

All these measures had to be put into practice by 2004, but the European Union recommended European Union member states to apply them earlier.

Furthermore, since the beginning of 2003, the European Union has published a blacklist of ships (*Black List, Grey List, etc.* updated regularly by EMSA)) that fail to comply with the regulatory provisions.

## 3. Creation of a compensation fund for damages

The EU also approved the creation of a community fund that would compensate victims for up to a total sum of one billion euros in the event of oil being spilled into the sea.

The EU member states can impose fines in the case of negligence acts committed by any company or person involved in transporting hydrocarbons by sea.

## 4. Creation of a European Maritime Safety Agency (EMSA)<sup>53</sup>

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<sup>52</sup> List of vessels not complying with EC Directive 95/91.

In addition, a European Maritime Safety Agency (EMSA) has been set up to control the efficacy of the established measures, gather information, operate databases on maritime safety and inspect member states to check that control are being put into practice by the state in which the port in question is located.

## 5. Improvements in Safety in Maritime Traffic

Legal measures have been adopted for improving safety in maritime traffic and preventing pollution by ships. Furthermore, vessels not docking at EU ports will also be watched. From now on, any vessel may be prohibited from abandoning a port in extremely unfavourable weather conditions. In addition, the procedures for transmitting and using data on dangerous cargo have been improved and an authentic system has been set up to provide information and monitor vessels approaching European coasts.

Lastly, the obligation is established to set up refuge ports in each member state which can receive vessels suffering from problems.

## 6. The so-called "*Erika III Package*", whose objective is to protect European coasts from maritime disasters and improve the safety of passengers and crew, was approved by the European Parliament on 11 March, 2009

The eight regulations that comprise it stipulate stricter safety requirements for vessels sailing under the flag of an EU member state and in community waters, in order to help prevent maritime disasters.

The approval of the third maritime safety package three years after the proposal was an important step forward in improving the efficacy of the existing measures for preventing accidents and in controlling their consequences, in the case of the worst scenario occurring.

\* Permanent blacklists of dangerous vessels, and stricter, more frequent inspections

\* Stricter insurance requirements for shipbuilders and improved compensation for passengers in the event of an accident

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<sup>53</sup> European Parliament and Council Regulation n° 1406/2002/EC of 27 June 2002 through which the European Maritime Safety agency was created [COM (200) 842]. Amended by European Parliament and Council Regulation n°1644/2003/EC of 22 July, 2003.

\* The obligation to comply with the international safety guidelines for vessels sailing under member-state flags

\* An independent authority to be established by each member state, with the power to implement rescue operations and decide on the place where vessels at risk should be sent

### 5.3. - The double hull and equivalent design solution. *The “Couloumbi Egg” Project*

The measures taken by the European Union in 2000 in response to the accident of the *Erika*, by shortening the calendar foreseen by the IMO for the complete substitution of single-hull vessels by double hull ones and the guidelines adopted by the Spanish government to prohibit single-hull vessels transporting certain contaminants from entering ports have led public opinion to think that the solution to marine accidents affecting oil tankers lies in the double hull<sup>54</sup>. This is not true; the double hull is not the solution for certain types of marine accidents and certainly not for all of them, but only some.

The idea of designing an oil tanker with a double hull was first conceived at the end of the 1970s, due to the existing similarity between gas ships and chemical carriers, whose cargo was transported in special tanks inside the ship's hull, to protect them from accidents. It should be said that the idea of an oil tanker designed in a similar way to a double hull vessel had already appeared in specialist technical publications long before 1970. However, these were inventions, not innovations. The "*double hull*" design for oil tankers that existed before the end of the 1970s were nothing more than theoretical exercises with no real projection in the naval industry.

For many years, the idea of designing a VLCC with a double hull was discussed in the offices of the most important classification societies, university classroom and technical spheres of the IMO. However, the economic cost of the transformation (a double hull design costs between 15 and 25 per cent more than a single hull design) paralysed any decision in this respect.

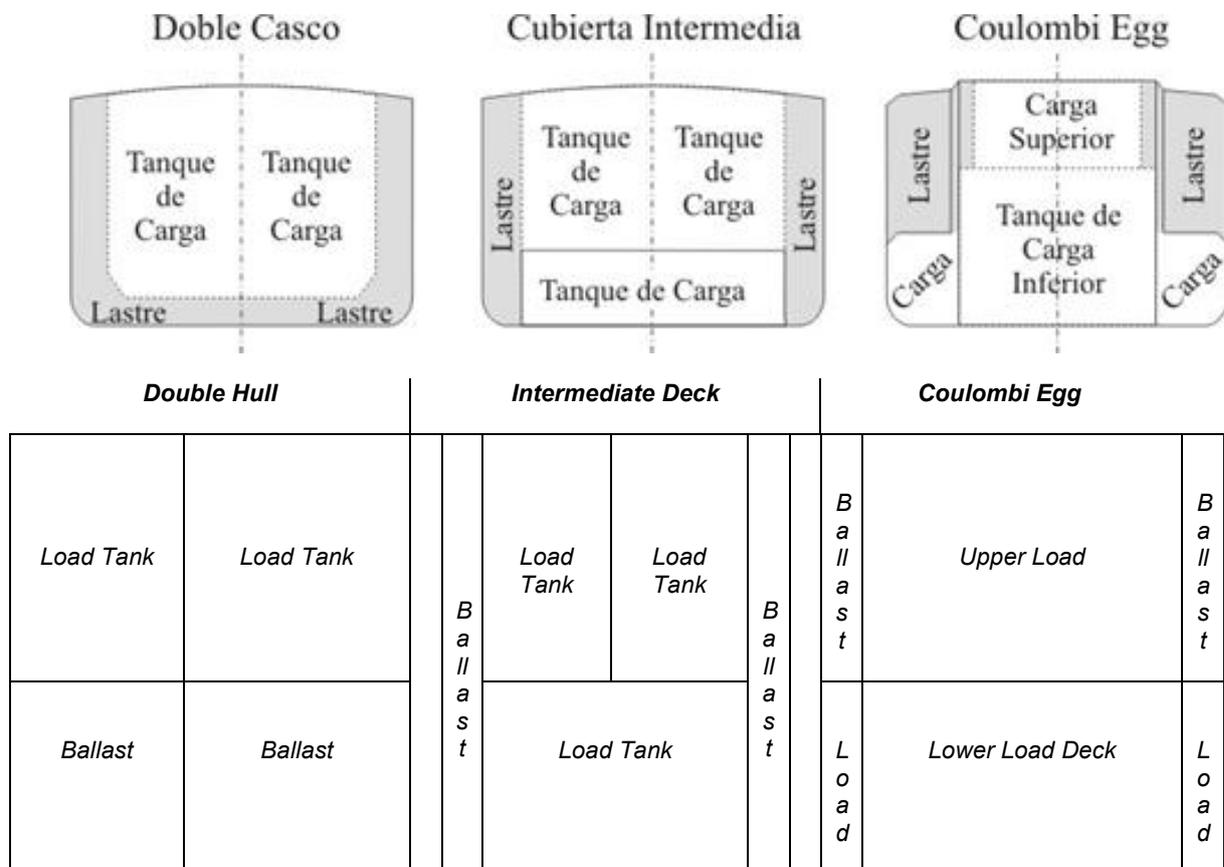
Nonetheless, in March 1989 the *Exxon Valdez* accident took place and the commotion suffered by American society led to the taking of drastic decisions by its government. The media coverage of the Exxon Valdez accident aroused

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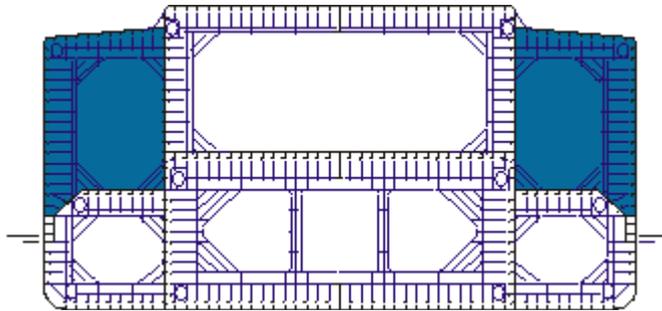
<sup>54</sup> European Parliament and Council Regulation 417/2002 of 18 February 2002 concerning the accelerated introduction of provision regarding the double hull or equivalent design for single-hull oil tankers.

social awareness about oil tanker accidents. For the first time, those shocking images of sea birds covered in oil led public opinion to express its indignation en masse against the ships that caused so much damage.

Just over one year later, the OPA/90 was passed (*Oil Pollution Act of 1990*, published on 18 August), which made it compulsory for all vessels entering the waters of the USA to have double hulls from certain dates: vessels with single hulls were not permitted to operate from 1 January 2010 and vessels with double bottoms and single sides were permitted to operate until 1 January 2015. That unilateral decision by the USA posed a real challenge for the international community by eliminating the regulatory role of the IMO and also had two other consequences of enormous relevance: it awoke the IMO from its lethargy regarding the double hull issue and on a practical level, it put an end to the debate on options for designing oil tankers, abandoning the Japanese oil tanker project of an oil tanker with a mid deck and double lining at the sides (*IOTDw/DS, Intermediate Oil-Tight Deck with Double Side*, an innovative technological application using hydrostatic pressure based on the different densities of oil and sea water, in theory, just as effective as the “U”-shaped double hull), as well as the European project known as the “*Coulombi Egg*”.

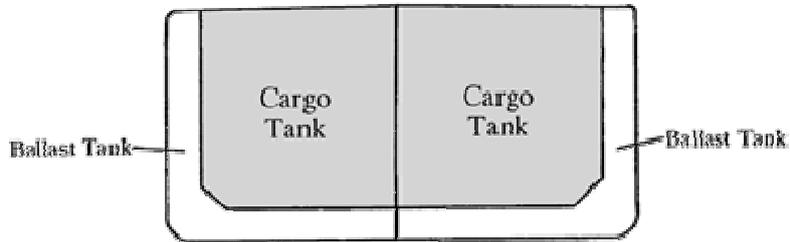


Cross sections of different double hull designs and the “*Coulombi Egg*” (the figs. on the right and below)

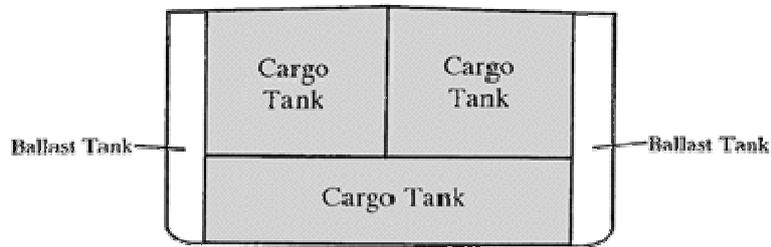


The "*Coulumbi Egg*" was an extremely revolutionary project created by the Swedish naval engineer Anders Björkman. It constituted a feasible and efficient alternative to the "*double hull*", and in fact, won the approval of the IMO in September 1997, under MARPOL Annexe 1-13 F. This type of oil tanker has a single hull and a conventional design, but includes a new interior structure that reduces the spilling of crude caused by running aground to a minimum in a higher proportion to double hull tankers, in addition to facilitating cleaning and maintenance operations in a much better way than "*double hull*" ships, based on the structural complexity of the ballast tanks. However, the US Government (U.S.G.C.) maintained the supremacy of the "*double hull*", pursuant to the OPA, and so the "*Coulumbi Egg*" was reduced to the status of merely an interesting research project.

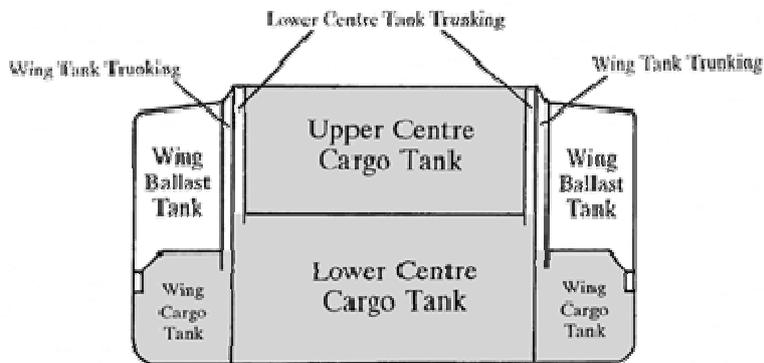
## Typical Cross Sections of Various Tanker Types



### General Layout of Double Hull Tanker



### General Layout of Mid Deck Tanker



### General Layout of *Coulombi Egg* Tanker

(SOURCE: [www.archive.official-documents.co.uk/document](http://www.archive.official-documents.co.uk/document))

The commitment of US industry to the double hull design, based on a report by the US National Academy of Sciences, foresees in section 4115, letter (e) *Secretarial Studies*, of the OPA/90 that the fact of having double hulls would have prevented the spilling of between 3,000 and 5,000 tonnes of oil a year on the coasts of the US alone, which accounts for almost 50 per cent of the annual spills volume in the USA.

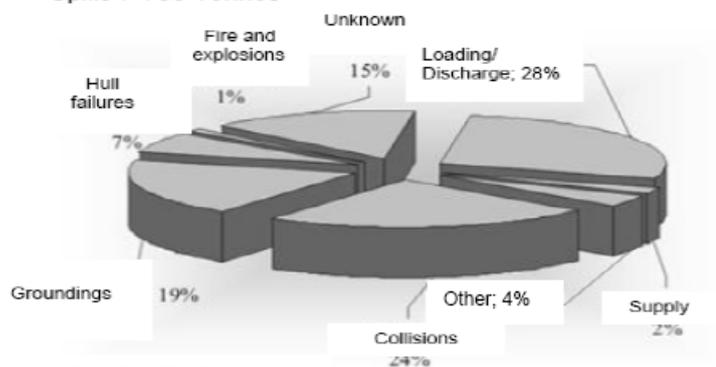
The double hull affords additional protection and is therefore beneficial in preventing spills of hydrocarbons in certain types of accidents, but its influence is practically non-existent in the case of getting bogged down or running aground violently (e.g., in the case of the *Aegean Sea* the ship had a double bottom that was of no use in preventing the cargo from spilling and being set on fire after becoming stuck near the Torre de Hercules), in cases of vessels colliding with a certain degree of intensity and of course, in accidents involving explosion and/or fire. It is, precisely, those types of accidents that are responsible for the greatest spills of hydrocarbons into the sea from oil tankers.

**OIL SPILLS FROM VESSELS FROM THE YEAR 1967 (SOURCE: ITOPF - 2009)**

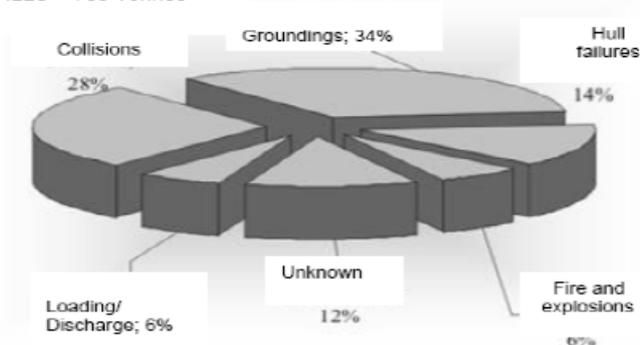
Position	Ship name	Year	Location	SIPI Size (tonnes)
1	<i>Atlantic Empress</i>	1979	Off Tobago, West Indies	287,000
2	<a href="#"><i>ABT Summer</i></a>	1991	700 nautical miles off Angola	260,000
3	<a href="#"><i>Castillo de Bellver</i></a>	1983	Off Saldanha Bay, South Africa	252,000
4	<a href="#"><i>Amoco Cadiz</i></a>	1978	Off Brittany, France	223,000
5	<i>Haven</i>	1991	Genoa, Italy	144,000
6	<a href="#"><i>Odyssey</i></a>	1988	700 nautical miles off Nova Scotia, Canada	132,000

7	<a href="#"><u>Torrey Canyon</u></a>	1967	Scilly Isles, UK	119,000
8	<a href="#"><u>Sea Star</u></a>	1972	Gulf of Oman	115,000
9	<a href="#"><u>Irenes Serenade</u></a>	1980	Navarino Bay, Greece	100,000
10	<i>Urquiola</i>	1976	La Coruna, Spain	100,000
11	<a href="#"><u>Hawaiian Patriot</u></a>	1977	300 nautical miles off Honolulu	95,000
12	<i>Independenta</i>	1979	Bosphorus, Turkey	95,000
13	<i>Jakob Maersk</i>	1975	Oporto, Portugal	88,000
14	<a href="#"><u>Braer</u></a>	1993	Shetland Islands, UK	85,000
15	<i>Khark 5</i>	1989	120 nautical miles off Atlantic coast of Morocco	80,000
16	<i>Aegean Sea</i>	1992	La Coruna, Spain	74,000
17	<a href="#"><u>Sea Empress</u></a>	1996	Milford Haven, UK	72,000
18	<i>Katina P</i>	1992	Off Maputo, Mozambique	72,000
19	<i>Nova</i>	1985	Off Kharg Island, Gulf of Iran	70,000
20	<a href="#"><u>Prestige</u></a>	2002	Off Galicia, Spain	63,000
35	<a href="#"><u>Exxon Valdez</u></a>	1989	Prince William Sound, Alaska, USA	37,000

### Spills 7-700 Tonnes



### SPILLS > 700 Tonnes



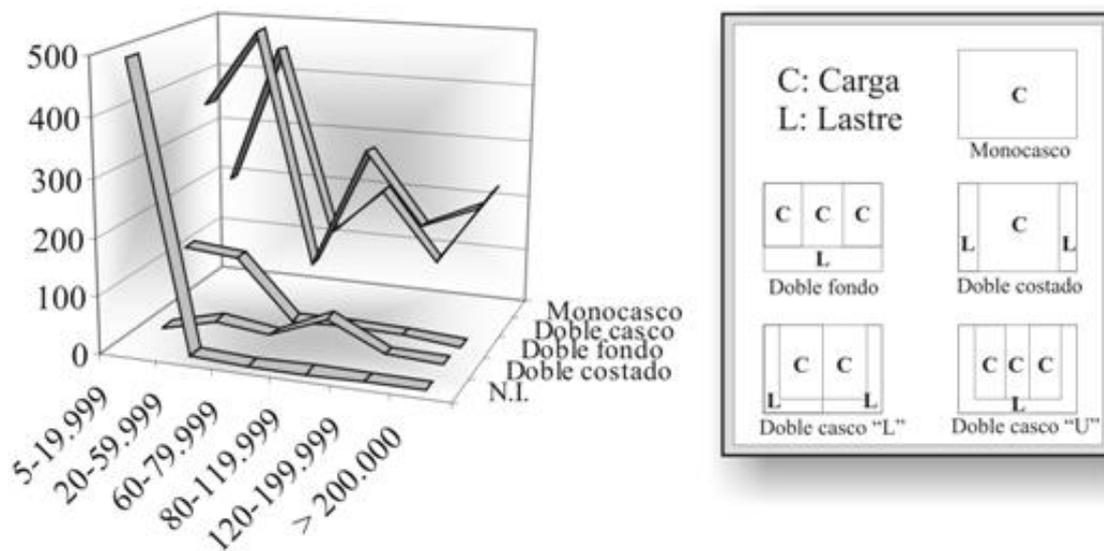
Origin of oil spills, depending on the quantity. Source: ITOFF

### TYPES OF OIL SPILLS DEPENDING ON CAUSE 1974-2008

	<7 Tonnes	7-700 Tonnes	>700 Tonnes	Total
<b>OPERATIONS</b>				
Loading / Discharging	2825	334	30	3189
Bunkering	549	26	0	575
Other Operations	1178	56	1	1235
<b>ACCIDENTS</b>				
Collisions	175	303	99	577
Groundings	238	226	119	583
Hull Failures	576	90	43	709
Fire & Explosions	88	16	30	134
Other/Unknown	2188	152	26	2366
<b>TOTAL</b>	<b>7817</b>	<b>1203</b>	<b>348</b>	<b>9368</b>

(Source: ITOFF: [Trends in Oil Spills from Tanker Ships 1995-2004 \(2005\)](#))

Furthermore, it is foreseen that double hull tankers pose enormous problems as they get older, as it is well known by persons with experience at sea that the ballast tanks are prone to corrosion, the accumulation of explosive gases, uncontrollable leaks, etc. unless greater attention is paid to them than that paid to tanks and loading equipment, machines and on-board navigation assistance systems. The *Erika* is a clear and recent example, and the initial breakdown of the *Prestige* had a great deal to do with problems of corrosion in the ballast tanks, according to all the investigations carried out.

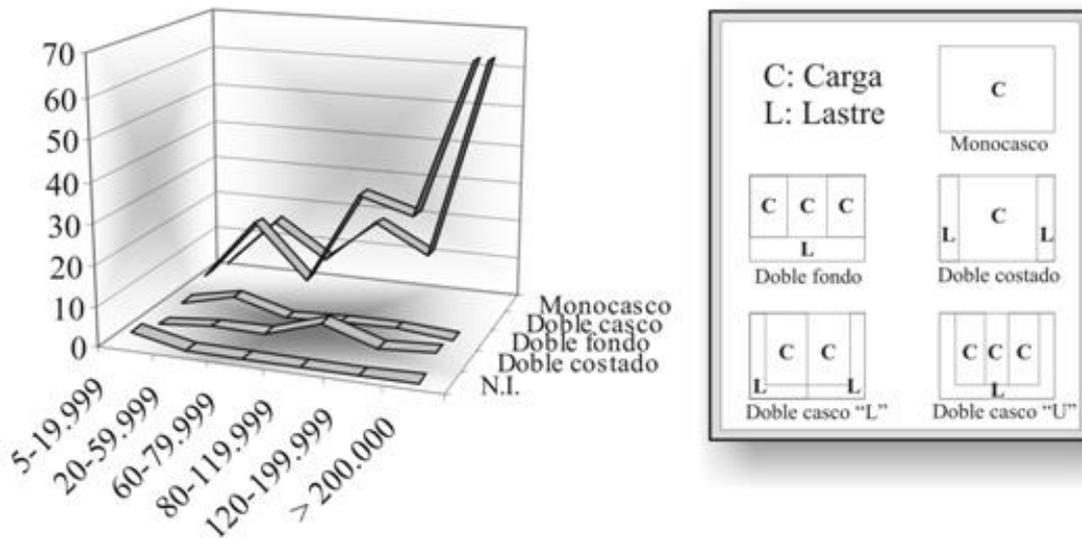


	C: Load L: Ballast	C Single hull
Single-hull	C    C    C L	L    C    L Double-side
Double-hull	Double-bottom	
Double-bottom		
Double-side	C    C	C    C    C L
N.I.	L            L Double-hull "L"	Double-hull "U"

Number of vessels belonging to the international oil tanker fleet in 2001, based on the type of hull and DWT sections. (Source: *Fairplay/Lloyd's Register*).

During forthcoming years, it will be necessary to investigate in depth the sea water ballasts foreseen between the inner lining containing the cargo and the outer lining that is contact with the sea, in order to find the best way to protect them, and palliate and/or reduce those problems or other unexpected problems that could arise to a minimum. After considering this possibility, in May 2003 the European Parliament approved a report asking the Commission to entrust the European Maritime Safety Agency (EMSA), which was created as part of the

Erika 2 package), to make an urgent examination of the specific risks presented by double hull tankers: corrosion, metal fatigue, risk of explosion, solidity of the linings and screens and risks of collision. As a result, on 3 June 2005, the EMSA published “*Double Hull Tankers: High Level Panel of Experts*”.

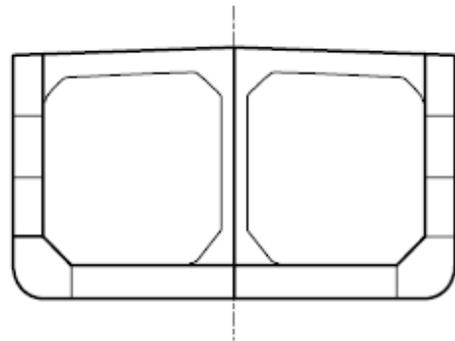
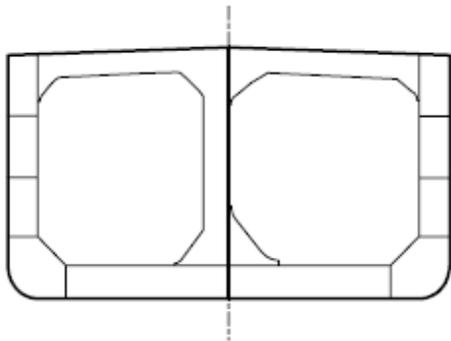
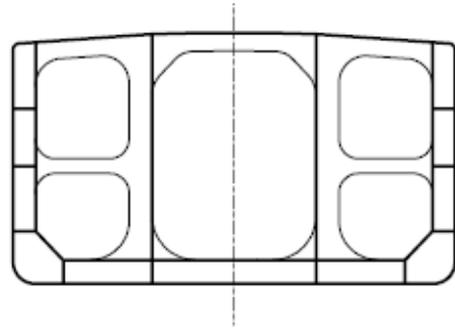
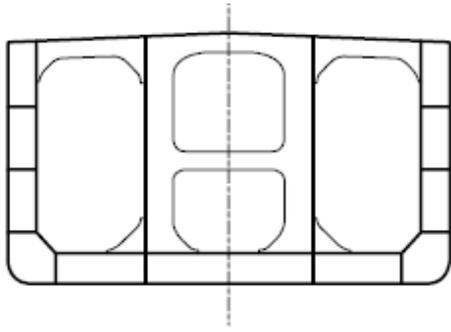


Total tonnage of the oil tanker fleet, in millions of DWT depending on the type of hull, by DWT sections.  
Source: Fairplay/Lloyd's Register.

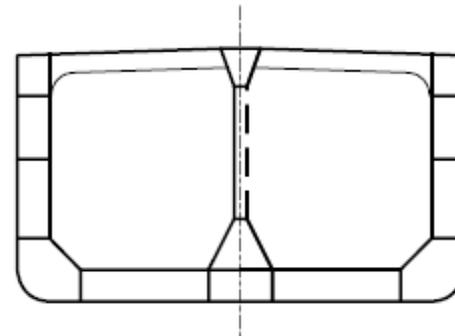
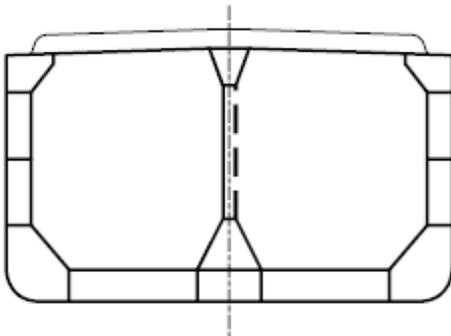
On analysing the current situation of the oil tanker fleet from the standpoint of the configuration of the hull, it is clear that approximately half of the vessels have double hulls that are compliant with the terms of Rules 13G and 13F of Annexe of the MARPOL Convention. It is expected that oil tankers with single hulls will continue to exist until 2025, but their number will be small and they will only operate in marginal areas, in compliance with the terms of Directive 407/2002 by virtue of which the European Union has joined the USA in promoting the OPA/90 calendar.

### 5.3.1. IACS Common Structural Rules for Oil Tankers

Within the framework of the *IACS Common Structural Rules for Double Hull Oil Tankers*, it is essential (according to in Section 2.- Principles of the Rules) to refer to paragraph 3.- Databases, which, among other provisions, describes the potential configurations that are accepted as standard structural layouts for double hull oil tankers:



IACS, "Common Structural Rules for Oil Tankers" Page 22



IACS, "Common Structural Rules for Oil Tankers" Page 22

## 5.4. IACS guidelines with respect to oil tankers

The most relevant technical publications of the IACS that are specifically drafted for oil tankers include the “*Common Structural Rules for Oil Tankers*”. This publication is compendium of different procedures and general requirements in technical and fitting-out terms that apply to all classification societies that are members of the IACS, as regards oil tankers.

These guidelines were published on 1 January 2006 and took effect on 1 April 2006, on which date they had to be incorporated into the specific guidelines of each society with respect to double hull oil tankers.

The publication “*Common Structural Rules for Oil Tankers*” is divided up into a series of sections and sub-sections that establish a whole set of specifications, requirements and fittings that the tanker must have as regards certain aspects of safety and technique requirements that are regulated.

The guidelines establish the technical requirements to be met in respect of both structural elements and different pieces of equipment and installations on board the ship. Likewise, these guidelines establish the need to send certain documents concerning the design of the equipment and elements for the approval thereof.

The basis used by the CRS for controlling oil tankers and bulk carriers is essentially based on the *ShipRight* calculation procedures, with the study of the detailed designs of the ship being the most important element.

In order to ensure efficient production, a new structural design will be necessary, such as for example, the size of the reinforcements, the location of the joints between plates and changes in the shape of the hull and supporting structures.

The aim of the changes is also to achieve a more robust structure for all sizes of vessel with a tolerance margin that is greater than the current one, with an increase of between 4 and 7% in the weight of the steel in the ship’s cargo area. The CRS also seek to define a template that is the same for all constructions; in short, a homogeneous solution.

The fundamental basis of the CRS is to achieve greater solidity, thanks to the application of the principle of net thicknesses. “Net thickness” is the thickness required to withstand the stress that the ship must support in normal conditions during its service life, thanks to an additional corrosion margin that is obtained from statistical measurements and is a conservative tolerance, based on a reduction between inspections of 0.5mm.

The corrosion margin is increased in the tank ceiling structure by 1.0mm and in cargo tanks with heating, by 0.3mm. In addition, stricter inspections are to be carried out on corrosion, both locally and in general.

The guidelines make constant references to the need for complying with all other more restrictive specifications that might be imposed by any of the IACS Classification Societies, regarding any of the elements or aspects that are regulated. In this way, it is quite clear that the “*Common Structural Rules*” are a framework that each individual Classification Society can adapt to its own requirements.

The criteria, specifications and requirements of some of the most important elements and installations regulated by the “*Common Structural Rules for Oil Tankers*” are listed in Section 11.-General Requirements of that publication.

## 6. Vetting<sup>55</sup>

As a consequence of the latest environmental disasters, the main oil companies demand more guarantees; they are not willing to run risks or find themselves involved in situations such as that of the “*Prestige*” that could harm their images and interests. The three major oil companies operating in Spain, *Repsol*, *Cepsa* and *BP*, have increased the levels of their requirements on shipping companies transporting crude for their refineries. This standard had already been raised to a considerable extent after the catastrophe of the “*Erika*” in France.<sup>56</sup>

The oil companies operating in Spain say that their commitment to the “safe” maritime transport of crude oil is a tradition. Spokesmen from *Repsol*, *Cepsa* and *BP* affirm that their *vetting* departments have been investigating the conditions in which the ships they contract for transporting crude oil from the place of origin to their refineries for a great many years.

The strategy used by oil companies with respect to the transportation of crude oil has undergone a profound change over the last few years. The refineries have abandoned their policy of having their own fleets and have decided to use ships chartered at long term, in addition to using the *spot* market<sup>57</sup>. The latter, which is a competitive market used by refinery companies from all over the world, is useful for executing occasional operations of transporting crude in which the conditions are agreed, basically for specific terms or traffic.

Sources from the naval sector affirm that oil companies operating in Spain have taken greater precautions as regards the transportation of raw materials to their refineries. On chartering tankers at long term (*Time Charter*), strict technical

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<sup>55</sup> *Vetting*: This comes from the verb “*To vet*” and means to examine or inspect.

<sup>56</sup> The major oil companies have gradually got rid of their fleets during the past few decades. One decisive factor was the maritime accidents, which led to a decline in their activities in world stock markets. Another fundamental aspect is the legal one: the new civil liability schemes with respect to hydrocarbons (CLC-FUND 1992) impose joint and several liability on the loaders. These factors have led the main oil companies taking special care in chartering their vessels.

<sup>57</sup> Oil tankers market waiting to be chartered

controls are stepped up and constant inspections are made. Both *Repsol* and *Cepsa* and *BP* have several vessels with charter agreements lasting for several years.

In the case of chartering an oil tanker in the *Spot* market, the *vetting* departments get down to work. They usually ask the shipbuilders to complete a questionnaire that includes questions related to technical aspects, insurance, inspections and crew. Furthermore, their control duties go as far as requesting the shipbuilders for the names of the last companies to charter the ships. *Cepsa* and *Repsol*, according to the spokesmen from these companies, work mainly with shipbuilders from Scandinavia. The multinational *BP* channels all its tanker-chartering operations from London.

*Repsol YPF* has set up an internal previous inspection or *Prevetting* procedure that establishes the requirements to be met by oil tankers that are to be chartered for transporting the company's cargo or which are authorised to visit its port terminals.

This inspection task (*Vetting*) is undertaken using a large team of inspectors with technical and operational experience in maritime transport, who are empowered to vet any ship that does not meet the appropriate characteristics.

This inspection procedure is focused on aspects as relevant as the age of the ship, the builder, the flag, the last inspection in the dock, the Classification Society, the characteristics and the crew's experience, the functioning of the equipment used for safety and prevention of pollution, the cargo and ballast system, the fire-fighting equipment, etc.

With a view to increasing strictness standards in chartering oil tankers, *Repsol YPF* has introduced a series of amendments to its internal guidelines. The most important changes made are the following:

- The oil tanker must be registered by a Classification Society that is a member with full rights of the IACS, an association that encompasses the 10 most important Classification Societies in the world.
- Tankers aged over 15 years must have passed an inspection in the dock at some time during the previous 30 months, and an inspection at sea during the previous 6 months.
- All tankers aged over 20 years require the CAP ("*Condition Assessment Programme*") certificate, from their next inspection in the dock onwards, which entails the establishing of extremely strict conditions by the Classification Society in the ship maintenance programme.

The *Vetting* department of *Repsol* also asks the builders of the vessels for other documents that must be sent by fax or by e-mail: an updated list of the inspections made on the vessel, the classification conditions, recommendations and memoranda.

- If the tanker is over the age of 19 years and its summer deadweight tonnage (SDWT) is greater than 5,000 tonnes, the shipyard must provide a copy of the CAP (*Condition Assessment Programme*) certificate, which in all cases must be renewed every 36 months.
- If the tanker is over the age of 19 years and its summer deadweight tonnage (SDWT) is less than or equal to 5,000 tonnes, the shipyard must provide a copy of the ESP<sup>58</sup> or the latest report on measures regarding the thickness of the ship's hull.

Additional information may also be provided, such as that required by *Repsol* based on the following parameters or criteria<sup>59</sup>:

- Age of the tanker: Tankers aged over 23 years or with single hulls will be immediately rejected.
- Flag.
- Shipbuilder: In the event of disclosing the identity of the shipbuilder, a favourable report will be issued for the tanker.
- Crew: The rating is given in accordance with the different nationalities on board the tanker.
- Classification Society: It must be a member of the IACS.
- *Protection and Indemnity Clubs (P&I)*.
- Dry Dock: Tankers aged over 15 years must have been inspected in dry dock at least once during the past 36 months and twice during the last 60 months.
- *SIRE*: SIRE reports.
- *Class Recommendations*.
- Hull design.
- Evaluation of the condition of the hull (CAP)<sup>60</sup>: Tankers aged over 20 years require a CAP 2 evaluation (Good).
- CAP for the machinery and systems used to handle the cargo.
- Structural analysis of hull fatigue.

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<sup>58</sup> *Enhanced Survey Programme (ESP)*.

<sup>59</sup> Available at <[www.repsol.com](http://www.repsol.com)> Consulted in June 2009.

<sup>60</sup> *Condition Assessment Programme (CAS)*. Programme for evaluating the status of a tanker.

- Change in name: The number of changes in name will be taken into account.
- Inspections made by the *Port State Control* and *US Coast Guard*.
- Acceptance by other oil companies.
- Safety organisation.

All the above parameters or criteria are assigned a rating between 0 and 10. Based on the average of all these ratings, if the vessels scores 5 or over, it is considered acceptable and this preliminary evaluation means the vessel is approved for operating in a *Repsol* Terminal during the next three months, where it will be duly inspected by a company *vetting* inspector.

Vessels obtaining an average rating of less than 5 in this preliminary evaluation will be considered unacceptable, meaning that it must be inspected in another port before visiting a *Repsol* terminal or before handling any *Repsol* cargo. In these cases, the shipyard must request this inspection in writing and pay all the expenses incurred in performing it.

It is an essential and priority condition that the shipyard authorises the vessel to be inspected by an inspector. If the vessel refuses to be inspected, that vessel will not be chartered by the company unless it is subjected to an inspection.

*Repsol* has a series of inspectors specifically assigned to the task of performing these inspections. The result of such inspections is very important for both the shipbuilders and the companies chartering it, since the approval or rejection of the vessel for other potential operations depends on the result.

Normally, a *vetting* inspection takes from 4 to 8 hours, in all cases taking into account the assistance provided to the inspection and the conditions of the vessel. The vessel must have a person responsible for providing all the necessary information for making a rapid inspection.

### **The Oil Companies International Marine Forum (OCIMF)<sup>61</sup>**

This is a voluntary association of oil companies that are interested in crude oil and oil-based products. The mission of the OCIMF is to be the number one authority as regards safety and marine pollution by oil tankers and in terminals dedicated to handling petroleum. It also promotes the ongoing improvement of tanker design and operating standards.

All companies that are members of this association must provide the information resulting from each inspection made on a vessel, for the purpose of creating a common database that contains all the information on the latest inspections, and in particular all faults detected or recommendations made.

This database is a programme called the *SIRE Programme (Ship Inspection Report Programme)*<sup>62</sup>. Access is open to members of the OCIMF for a nominal

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<sup>61</sup> *Oil Companies International Marine Forum (OCIMF)*.

<sup>62</sup> Available at <[www.ocimf.com](http://www.ocimf.com)> Consulted in June 2009.

fee, and also to port terminal operators, etc. In addition, it can also be used free of charge by government organisations responsible for safety and pollution prevention.

The *SIRE* inspectors from the different oil companies post their reports in that database. These reports are extremely detailed and standardised, since all the *SIRE* inspectors must respond to the same questionnaire.

The consent of the shipyard is necessary to be able to input the result of the inspection in the *SIRE* programme.

The *vetting* inspector coordinates the inspection with the information he has been provided with by the vessel's consignee.

These inspections cover approximately 16 sections:

- a) Certificates, documentation and information.
- b) Crew and level of the certificates.
- c) Address of the safety teams.
- d) Pollution prevention.
- e) Life-saving equipment.
- f) Fire-fighting equipment.
- g) Loading and ballast systems.
- h) Inert gas system.
- i) Cow/gas/chemical.
- j) Mooring equipment.
- k) Bridge equipment and procedures.
- l) Radio and GMDSS equipment.
- m) Machines room.
- n) Cargo lines.
- o) Overall appearance.
- p) Operating standard.

The average of all these ratings for each section gives the overall score assigned to the vessel.

On completing a *vetting* inspection, the inspector hands over a document on board the ship, containing all the faults and recommendations observed during the course of the inspection. This document must be signed by the inspector and by the Ship's Captain in acknowledgement of receipt of the same.

All inspections made on board ships aged over 15 years will be valid for six months, whereas those made on ships aged less than 15 years will be valid for one year.

## 7. OBO tankers

To enumerate the international legislation that applies to this type of ship, first of all we must know how they are defined by the principal maritime regulatory body. Nevertheless, the International Maritime Organisation (IMO) does not give a precise definition of them.

Chapter I - Part A - Rules 2 - Definitions of the amended version of SOLAS gives no specific mention for this type of vessel. However, it does define the term tanker and says:

*“(h) A tanker is a cargo ship constructed or adapted for the carriage in bulk of liquid cargoes of an inflammable\* nature.”*

In this definition, it is seen that the term “*adapted*” may give rise to the interpretation that an OBO is a tanker. In my opinion, this interpretation is erroneous, as will be seen later.

An OBO tanker is a cargo ship designed to carry liquid and solid goods in bulk. The principal idea is to reduce the ballast trips that oil tankers must make from the unloading terminal to the loading terminal, which increases the chartering costs.

This approach makes it necessary to consult what is stipulated by SOLAS in the chapter on *bulk carriers* (Chapter XII – Additional safety measures for *Bulk carriers* – Rule 1 – Definitions).

*“For the purpose of this chapter:*

*1 Bulk carrier means a ship which is intended primarily to carry dry cargo in bulk, including such types as ore carriers and combination carriers\*.”*

This chapter contains a specific mention that is included in the definition of the term *combination carriers*. Unfortunately, SOLAS does not include a definition of this type of vessel in particular.

The classification society *Det Norske Veritas* does define *combination carrier* for the purpose of making an objective and exhaustive classification of this type of vessel.

Combination carriers include:

- Carriers intended to carry crude and dry loads in bulk separately (Bulk carrier or Crude carrier).
- Carriers that transport crude and bulk iron ore separately. (*Ore Carrier* or Crude carrier).
- A combination of the above two types, also known as OBOs (*Oil/Bulk/Ore carrier*).

## 7.1. International Legislation

As seen above, the legislation affecting this type of tanker is the same as for bulk carriers with a few exceptions.

Since they are not only bulk carriers but also carry liquids in bulk, OBOs must also take into account the legislation that affects oil tankers.

### **SOLAS (Amended version of 1 January 2007)**

As is known, this code regulates the minimum standards regarding safety that must be complied with by all tankers with certain characteristics. Furthermore, it includes chapters that describe the needs to be met by certain types of ships. In the case of OBOs, considering the definition given in the above points, the rules of chapter XII of this code must be consulted.

#### **Chapter XII**

This chapter contains an Implementation Schedule that must be considered, since most OBOs are more than 20 years old. For the purpose of complying with rule XI-1/2 (inspections improvement programme), bulk carriers aged over 20 years or more on 1 July 1999 at the first intermediate inspection or regular inspection must comply with the provisions of rules 4 (Requirements regarding stability during breakdowns for bulk carriers) and 6 of the present chapter:

- Rule 4 (Requirements regarding stability during breakdowns for bulk carriers)
- Rule 6 (Structure and other requirements for bulk carriers)

The scope of both rules applies to ships with lengths of more than 150 metres and even more importantly, the density of the product to be carried.

Broadly speaking, the goods carried by an OBO are oil-based products with densities higher than 1,000 kg/cubic m and iron ore with a density of 7,874 kg/cubic m.

Rule 4 mentions the obligation of the entire cargo hold to withstand flooding under any loading conditions, no matter if the vessel has a single or a double hull.

Rule 6 requires the transversal screen located between both the holds that are nearest the bow to withstanding flooding throughout the entire hold, considering all unoccupied surface areas. To comply with this requirement, the distribution of the cargo in the different holds must also be considered, as well as the maximum deadweight tonnage permitted.

According to rule 10 of this chapter, the cargo to be carried must be accompanied by a certificate accrediting its density. That certificate must be issued by an accredited organisation.

In addition, the specifications of chap VII – Part B must be considered (*Carriage of cargoes – Special provisions for bulk cargoes and cargoes other than grain*), which specifically refers to the need to make a log of the following aspects on board, in an operations book:

- Stability data.
- Ballet operations.
- Maximum load permitted by unit of surface area in tanks.
- Maximum load permitted per hold.

### **MARPOL (amended in 1997 and amended to date)**

The International Convention for the Prevention of Marine Pollution from Ships (*MARPOL*) contains a definition of a combination carrier. Based on that definition, which is established in Annexe 1 – Chapter 1 – Rule 2 – Application:

*“...2 In ships other than oil tankers fitted with cargo spaces that have been built and used for carrying crude in bulk with a capacity of 200 cubic m or more, the requirements of rules 16, 26.4, 29, 30, 31, 32, 34 and 36 of Annexe I for oil tankers shall also apply to the building and operating of those spaces, except for spaces whose capacity is less than 1,000 cubic m, for which the requirements shall be those set forth in rule 34.6 instead of those of rules 29, 31, 32.”*