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An Overview of Pollution from Shipwrecks

Research dissertation presented for the approval of Senate in fulfilment of part of the requirements for the LLM in approved courses and a minor dissertation. The other part of the requirement for this qualification was the completion of a programme of courses.

I hereby declare that I have read and understood the regulations governing the submission of LLM dissertations, including those relating to length and plagiarism, as contained in the rules of this University, and that this dissertation conforms to those regulations.

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1. Introduction

Since seafaring began, the ocean has provided a risk for both materials and seafarers[1]. Persons who say, to cruise is no risk, have never been on the high seas[2]. In the past, the risk of having an accident at sea was even much higher. In those days vessels were small in size, and only a few tough people dared to travel using wind or oars as their mode of propulsion and endeavoured to remain close to the coastline[3]. In fact, those times were probably the most dangerous ever[4]. It was not only the bad sea and weather conditions which made seagoing so hazardous, piracy was also rife throughout the oceans. Furthermore, vessels were hard to sail and winds and waves could throw them about. Nevertheless, transport on the ocean was used to connect the continents with each other. Accordingly, the accidents of which bold navigators were victims were soon accepted as part of the natural course of things[5].

The chronicles of navigation since the early days show that the needs of safety came only gradually to the fore, in the awareness of accidents and disasters[6]. Therefore, the huge changes in the individual and collective behaviour happened only from last century until now. This essay shows that voyage is still a danger to life and the environment. In the first part it explains what shipwrecks in the usage of legal notions are, in which situations most sinking happen, what different types of shipwrecks exist and what kinds of damage these shipwrecks can determine. Part two describes the kind of pollution which can occur from a ship accident. The third part considers the different preventative approaches that have been adopted by international conventions, and part four describes the regime of the removal of shipwrecks. Part five focuses on the liability of the owner and master of the vessel and part six on the previous industrial liability schemes. Finally this study analyses the responsibility of states.

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[1] *The history of Safety at Sea* at: http://www.oceansatlas.com/unatlas/issues/safety/transport_telecomm/history_safety/history_safety.htm.
[2] *Ibid.*
[3] *Ibid.*
[4] *Ibid.*
[5] *Ibid.*
[6] *Ibid.*

2. What are shipwrecks?

2.1 Definition

Like the International Convention for the Prevention of Pollution from Ships 1973/1978 (MARPOL 73/78) the conventions which are relevant in the 'pollution from shipwrecks' context[7] contain similar definitions for ships. Accordingly 'ships' are defined as 'vessels of any type whatsoever operating in the marine environment and include hydrofoil boats, air-cushion vehicles, submersibles, floating craft and fixed or floating platforms'[8]. However, most International Conventions include no definition of 'wrecks', except the new Nairobi International Convention on the Removal of Wrecks 2007, which was successfully adopted by the diplomatic conference convened by the International Maritime Organization (IMO) at the Headquarters of the United Nations Office at Nairobi, from 14 to 18 May 2007. Thereafter wrecks, designated as maritime casualties were defined as:

> 'a sunken or stranded ship; or any part of a sunken or stranded ship, including any object that is or has been on board such a ship; or any object that is lost from a ship and that is stranded, sunken or adrift at sea; or a ship that is about, or may reasonably be expected, to sink or to strand, where effective measures to assist the ship or any property in danger are not already being taken[9]'.

In this context the 'maritime casualty' is defined as 'a collision of ships, stranding or other incident of navigation, or other occurrence on board a ship or external to it resulting in material damage or imminent threat of material damage to a ship or its cargo'[10].

2.2 Reasons for the sinking of ships

Ships sink for many reasons, inter alia:

- navigation and other human errors
- bad design or failure of the ship's gear

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[7] Inter alia, the Convention on the Law of the Sea (UNCLOS), Intervention Convention: Convention relating to Intervention on the High Seas in Cases of Oil Pollution Casualties, International Oil Pollution Compensation Funds 1971 and 1992 (IOPC), Civil Liability Convention: International Convention on Civil Liability for Oil Pollution Damage (CLC), International Convention on Civil Liability for Bunker Oil Pollution Damage, International Convention on Oil Pollution Preparedness, Response and Cooperation (OPRC), International Convention for the Safety of Life at Sea and the International Convention on the Removal of Wrecks 2007.
[8] Article 2 Paragraph 4 of MARPOL 73/78.
[9] Article 1 Paragraph 4 Nairobi International Convention on the Removal of Wrecks, 2007.
[10] *Ibid,* Article 1 Paragraph 3.

- instability, caused by bad design or incorrectly stored cargo
- mutiny, sabotage, wars or piracy
- deliberate sinking
- fire
- bad weather[11]

2.2.1 Navigation and other human errors

Many ships sink when they collided with rocks, reefs, icebergs, or other ships because of human error. Reasons for vague navigation include inter alia poor visibility in bad weather. Furthermore, vessels were grounded before modern navigation aids such as GPS, radar and sonar were available[12]. Until the twentieth century, the navigational tools and techniques were the magnetic compass, marine chronometer and ships logbook or celestial navigation using the marine chronometer and sextant[13]. These tools were exact enough for voyages across the seas but not precise enough to avoid collisions with reefs close to shore.

Even today, when highly precise navigational kits are available and used worldwide, there is still space for error. For instance, using the incorrect horizontal datum for the chart can mislead the navigator, especially as many charts have not been updated to use modern data[14]. Other maps are still significantly in error, especially on less frequented routes[15].

2.2.2 Bad design and failure of the ship's gear

Bad design like hulls which are too thin, or the use of single not double hulls, can lead to the sinking of a vessel. Even the hulls of large modern ships have broken in bad storms. Furthermore, defects in the equipment, such as engines, sails or ropes, can lead to the loss of a ship.

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[11] *Shipwreck* at: http://en.wikipedia.org/wiki/Shipwrecks.
[12] *Ibid.*
[13] *Ibid.*
[14] *Seenotfälle/Unfälle im Jahr 2005* at: http://www.janmaat.de/seenot05_1.htm.
[15] *Op cit,* note 11.

2.2.3 Instability

Instability is caused when the centre of the ship strays from the optimal position. This can lead to the capsizing of the ship. Reasons for this are bad design, poor building materials or incorrectly stored cargo. Thereby instability is more common in wooden ships rather than in metal vessels; in addition wood is faster to corrupt.

2.2.4 Mutiny, sabotage, wars, hijacking or piracy

Mutiny, sabotage, wars, hijacking and piracy are other grounds for a vessel sinking. Hijacking and piracy are still problems, notably off parts of south-east Asia, South America and Africa, in the Mediterranean and the Indian Ocean[16]. The International Maritime Organisation (IMO) and the international shipping industry have a centre in Kuala Lumpur to monitor incidents in piracy[17]. The difference between hijacking and piracy is that two ships are involved in a pirate attack and only one by hijacking. An example of hijacking is the incident which occurred to the Italian liner *Achille Lauro* in 1985[18].

2.2.5 Deliberate sinking

Deliberate sinking is also a cause for shipwrecks. Different motives for deliberate sinkings are to form an artificial reef, to create a barrier to close the port or waterway against enemies, to prevent vessels falling into enemy hands, to test new weapons, to commit insurance fraud or to destroy an unseaworthy ship which could be a danger to navigation.

2.2.6 Fire

Fire can be another reason for the loss of vessels as it was in the case of the liner *SS Normandie*[19]. Fire is most frequent in case of wooden ships. The explosion of cargo or ammunition can destroy a vessel. Furthermore, a fire can make a vessel un-

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[16] Churchill and Lowe *The law of the sea* (3.ed) Manchester 1999 page 209.
[17]. *Ibid.*
[18] *Ibid,* page 210.
[19] The *SS Normandie* launched in 1932. In 1942 the *SS Normandie* caught fire and sank. The French Line's Normandie was for five years the largest ship in the world.

manoeuvreable which can cause, in combination with bad weather, the sinking of a ship.

2.2.7 Bad weather

Poor weather like wind, low visibility and cold can be the cause of several problems. Wind is the source of waves which make navigation dangerous and difficult. Storms push the vessel in the wind direction and this can cause collisions with other ships or cliffs, especially for sailing vessels. Powered ships are usually able to resist the storm, but the force of the wind can damage parts of these ships as well. Waves can produce structural problems in the ships and damage materials. Furthermore, the weight of breaking waves on the material can motivate the captain to reduce speed or change the course of the voyage in the same direction as the waves[20]. Fog, mist and heavy rain cause low visibility which increases navigation problems. Cold can cause metal to become fragile and more like to fail and the accumulation of ice can cause instability[21].

2.3 Different kind of shipwrecks and their pollution risk

As mentioned earlier, throughout history ships have been lost for several reasons. Different types of ships cause different kinds of pollution. Also, different circumstances determine the amount of pollution caused at different times. These factors are, inter alia, the construction materials, the salinity of the water the shipwreck is in, the level of the damage when the ship broke up, the attempt to salvage the components or the cargo of the wreck, demolition of the wreck to clear a navigable channel, the depth of the water at the wreck site, the temperature and other weather conditions and the presence of marine animals that consume the vessel's structure. The estimated number of total submerged potentially oil-containing vessels (150 gt or greater for tank vessels and 400 gt or greater for non-tank vessels) is 8,569[22]. The estimated geographical distribution of wrecked is shown in Figure 1. Every black point represents a wrecked vessel is which with a potential oil pollution risk.

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[20] *Op cit,* note 11.
[21] *Ibid.*
[22] Status 2005: Michel, Gilbert, Schmidt Etkin, Urban, Waldron and Blocksidge *Potentially Polluting Wrecks in Marine Waters* page 10 at: http://www.iosc.org/docs/IOSC_Issue_2005.pdf.

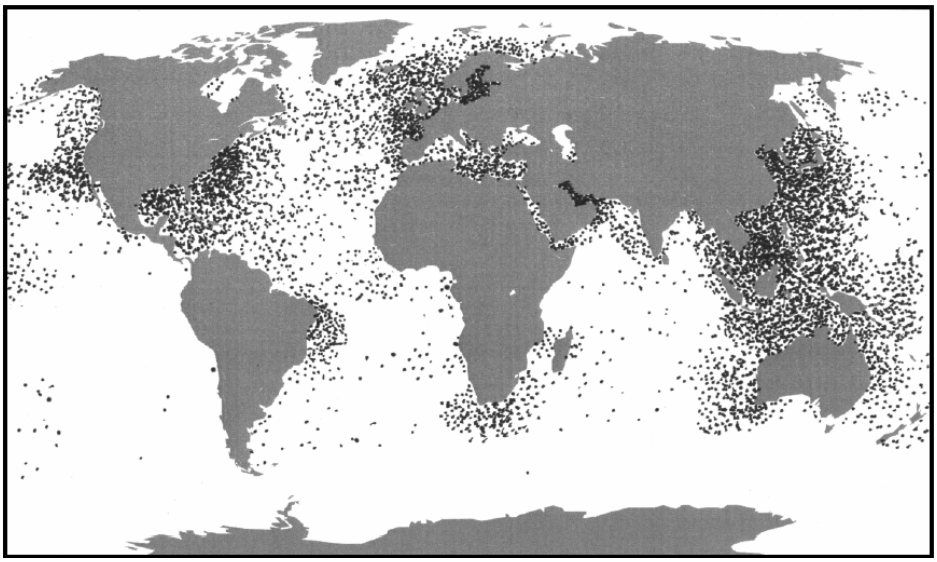

Figure 1: Approximate distribution of potentially polluting shipwrecks Source: Potentially Polluting Wrecks in Marine Waters at: http://www.iosc.org/docs/IOSC_Issue_2005.pdf

2.3.1 Vessel type and material decomposition

Wooden materials decay quickly. Usually the only parts made of wooden ships preserved after sinking are those that have been buried in silt or sand[23]. In contrast, vessels made of steel or iron, depending on their quality, thickness, and manufacture might preserve the ship's structure for decades. Things like propellers, condensers, hinges and port holes which are often made from non-ferrous metals such as brass and phosphor bronze, remain for centuries after the vessel sink because these materials do not corrode easily[24].

2.3.2 Historical shipwrecks

Most historical wrecks, except warships which shall be discussed later, are not really a pollution risk. In this context it is more the question of protecting these wrecks because of their historical value and the interest for maritime archaeologists. Vessels on the seabed of the southern tip of Africa could be used as examples. Since Portuguese explorers rounded Africa more than 500 years ago to find a sea-route to

[23] *Op cit,* note 11.
[24] *Ibid.*

the East, many other ships followed[25]. Not all reached their goal. Archival investigation has already recognized more than 2700 vessels known to have been lost around the South African coast since 1500, and signs are that further exploration will enhance the number of known maritime incidents in these waters to nearer 3000[26]. These wrecks comprise vessels from 37 different nations, and can give a variety of information about the Portuguese explorers, the Dutch, English and French East India Companies, the British Royal Navy, 19th century passenger and mail shipping services and World War I and II shipping[27].

2.3.3 War shipwrecks

During the last millennia many wars have left a legacy of thousands of sunken vessels across the oceans. The Second World War and the Iraq Wars in particular caused thousands of ships losses, which now are a threat to the environment.

2.3.3.1 Second World War shipwrecks

World War II was the single, largest loss of ships in a comparatively short period of time the world has ever witnessed[28]. The Sea Australia WWII shipwreck database presently holds information for over 8000 vessels globally[29]. This translates to a total tonnage of WWII shipwrecks worldwide of over 34 million tons of shipping[30]. This represents 75 per cent of all incidents during 1890 until 2004 worldwide[31]. This legacy of the war is an extreme risk to the marine and coastal environments and fisheries, vital to the standard of living and sustainable future of the people in these regions. As more than 60 years have passed since WWII, many of these sunken vessels are rapidly deteriorating.

The risk which arises from these grounded vessels can be demonstrated on the South Pacific Region. On the basis of the Geographic Information System (GIS) of the

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[25] *Historical Wrecks and Underwater Culture Heritage: South Africa's Maritime Heritage* at: http://www.sahra.org.za/shipwrecks.htm.
[26] *Ibid.*
[27] *Ibid.*
[28] *WWII Wrecks* at: http://www.seaaustralia.com/wwii_shipwrecks.htm.
[29] *Ibid.*
[30] Currently status sees at: *.Ibid.*
[31] Michel, Gilbert, Schmidt Etkin, Urban, Waldron and Blocksidge *Potentially Polluting Wrecks in Marine Waters* page 10 at: http://www.iosc.org/docs/IOSC_Issue_2005.pdf.

South Pacific Regional Environment Program (SPREP) it is known that there are at least 3800 shipwrecks strewn over the Pacific region which include aircraft carriers, battleships, merchant vessels and 333 tankers[32]. The tankers present the greatest risk. SPREP has recorded 168 – 148 of them Japanese – but the location of the remaining 165 is unknown[33]. These 3800 shipwrecks are in the internal waters, the territorial seas and also in the EEZ. Therefore, the SPREP statistic shows approximately 180 shipwrecks solely in the Papua New Guinea waters[34]. These wrecks contain oil, chemicals and unexploded weapons on board. Some of the vessels have already begun to leak fuel oil and cargo such as the oil tanker *USS Mississinewa* in Ulithi Lagoon, Federal States of Micronesia[35]. Others will follow to spill oil and cargo in the fragile environment, inter alia, of the Pacific atolls.

The *USS Mississinewa* was a navy tanker carrying 25,425 tons of aviation gasoline and fuel oil. In 1944 it became the first victim of Japan's new suicide weapon, the 'Kaiten' human submarine torpedo which was a one-man Japanese suicide submarine[36]. A cyclone hit in July 2001 the Federal State of Micronesia and disturbed the *USS Mississinewa* shipwreck[37]. For two months, oil and gasoline spilled from the rusting hull onto the beaches of Ulithi lagoon at a rate of more than 1,000 litres a day[38]. The impecunious Micronesia asked the U.S. for help and the latter sent a navy diving team to block the leak where the oil came out. This process cost the U.S. $ 4,000,000 and made the wreck into an environmental time bomb with approximately 18,000,000 litres of oil in it[39]. In the meantime the U.S. Government, who retain sovereignty over the wreck and its cargo, has off-loaded the residual oil to prevent further pollution of the lagoon[40].

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[32] Monfils; Gilbert and Nawadra: *Sunken WWII shipwrecks of the Pacific and East Asia: The need for regional collaboration to address the potential marine pollution threat* at Ocean & Coastal Management 2006, 779 (779).
[33] Levy *Sunken Japanese warships in Pacific an environmental disaster* at: http://www.news.vu/en/news/sunken-japanese-warships-.shtml.
[34] *Ibid.*
[35] Radway *Removes Oil From War Wreck Off Ulithi* at: http://www.chinfo.navy.mil/navpalib/.www/rhumblines/rhumblines236.doc
[36] *Op cit,* note 33.
[37] *Ibid.*
[38] *Oil Leak From A Sunken WWII Wreck Threatens the Fourth Largest Lagoon in the World* at: http://www.apasa.com.au/ulithi.html.
[39] *Op cit,* note 33.
[40] *Op cit,* note 33.

A threat similar to the *USS Mississinewa* was caused by the oil tanker *USS Neosho*, which sunk with the giant *USS Lexington* aircraft carrier and the destroyer *USS Sims* in 1942 during the Coral Sea battle, 200 nautical miles off Australia's Great Barrier Reef[41]. Just these two oil tankers alone contain the equivalent amount of oil that was leaked during the Exxon Valdez incident[42].

2.3.3.2 Russian nuclear powered Shipwrecks

The Soviet Union and its successor Russia built over 250 nuclear powered vessels - more than any other country[43]. Two-thirds are situated in the northern region[44]. These ships cotain more than 476 marine reactors in service or storage and have produced large quantities of spent nuclear fuel, high and low-level solid and liquid radioactive wastes that have not been processed or safely stored[45]. Only a small part of these fleet submarines have one reactor each, most of the submarines have two reactors each[46]. About 160 of these nuclear submarines have been taken out of service, ostensibly, to reduce the costs[47]. These submarines have overwhelmed possible dismantlement and de-fueling capabilities and as a result, many of the ships are moored for long periods of time waiting their final destination[48]. The Soviet Union recognized in the late 1970s that it would need a deactivation program for its nuclear-powered ships[49]. The question of how this deactivation would be done came up. Two possibilities were identified. One, using its current method and the other counter boring the entire de-fueled submarine and sinking it in the ocean. The former Soviet Union secretly disposed some 16 submarines by counter boring them in the northern oceans[50]. After the end of the Cold War, parked old submarines were kept in storage without any effort to remove the nuclear fuel or radioactive material[51]. One example of the current method is the *Rickover,* one submarine of the Russian

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[41] *World War Two wrecks haunt Pacific with oil spills* at: http://www.planetark.org/dailynewsstory.cfm/newsid/18431/story.htm.
[42] *Ibid.*
[43] *Environmental Security Threat Report Section II: Environmental Security Threats From Decommissioned Russian Marine Reactors, Spent Nuclear Fuel, Radioactive Waste, and Contamination* at: http://www.state.gov/p/eur/rls/rpt/2001/5883.htm.
[44] *Ibid.*
[45] *Ibid.*
[46] *Ibid.*
[47] *Ibid.*
[48] *Ibid.*
[49] *Ibid.*
[50] Dorsey: *Nuclear ships: Millions to build, and now millions to trash* at: http://content.hamptonroads.com/story.cfm?story=127851&ran=48578&tref=po.
[51] *Ibid.*

fleet, which became dismantled shortly before[52]. It has given millions of pounds of recyclable steel and lead, plus lesser bundles of aluminum, brass, bronze, copper and zinc[53]. But the radioactive reactor has to be shipped and then buried for at least the next 600 years beside 115 other nuclear core reactors[54]. The costs of dismantling amount to $ 30,000,000, whereas the costs to building each submarine were about $ 900,000,000[55]. These costs are becoming a burden to the Russian nation.

2.3.3.3 War wrecks on Iraq's coastline

Iraq's coastline consists of a 36 mile section along the Persian Gulf[56]. Umm Qasr port and the Port of Az Zubayr are Iraq's only deep-water ports and serve as a vital connection for the import and export of goods[57]. After three wars, the Iran-Iraq War 1980-1988, the 1991 Gulf War and the 2003 invasion of the U.S. military, many ships have been sunk in that area. This essay will focus on the latest two of the three wars. The sunken vessels restrict the passage and with it the full functioning of the ports[58]. An approximate 280 shipwrecks—many from the first Gulf War—continue to prevent the port's effective use[59]. These ships also contained petroleum products, unexploded ordnance, fuel, propellant and toxic chemicals[60]. Almost all of these ships are gradually trickling substances which are damaging people and marine life[61]. The reason for that is that even if the vessel was not transporting a dangerous cargo, the engine room will usually contain substances such as fuel oil, lubricating oil, battery acid, hydraulic fluid and asbestos[62].

The United Nation Development Program (UNDP) has specific projects in development which include the removal of 13 priority wrecks from Shatt Al-Arab to the value of US$75,000,000, including three particularly obstructive and dangerous large fuel tankers[63].

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[52] *Ibid.*
[53] *Ibid.*
[54] *Ibid.*
[55] *Ibid.*
[56] *UNDP in Iraq: Infrastructure and the Environment* at:www.iq.undp.org/Infra.html.
[57] *Ibid.*
[58] *Ibid.*
[59] *Ibid.*
[60] Brown *Warefare: Iraq's Toxic Shipwrecks* JSTOR Environmental Health Perspectives 2005, 230.
[61] *Op cit,* note 56.
[62] *Op cit,* note 50.
[63] *Op cit,* note 56.

2.3.4 Other shipwrecks

In the last century and even in this decade many ships have run aground. Several of these ships were oil tankers; for example, *Torrey Canyon* which went to ground in 1967 off Lands End in the UK, *Amoco Cadiz*[64] off the coast of Brittany in 1978, the *Castillo del Bellver* in 1983 off South Africa, *Exxon Valdez* in Alaska in 1989, the *Sea Empress*[65] off south-east Wales in 1996, *Erika*[66] in 1999 and the *Prestige* off France in 2002[67]. All of these ships, which sank, trickled thousands of tonnes of crude oil into the oceans. Accidents involving vessels aren't only oil tankers, other ship catastrophes can result in enormous amounts of fuel oil leaking into the sea, too, for example the *Apollo Sea*, an iron ore carrier which accidentally foundered of Cape Town in 1994[68]. Other vessels which carry a variety of dangerous and toxic materials across the oceans can also crash or explode. Such a crash could release these hazardous substances in one place with catastrophic effects. Also, accidents on rivers can cause shipwrecks with risk for the environment. For example the incident on the river Rhine in Germany in November 2001: almost 2,000 tons of nitric acid leaked into the Rhine river, when the motor tank barge *Stolt Rotterdam* sank during a catastrophic discharging operation[69]. The 1988-built chemical tanker was unloading the acid at *Erdoelchemie Uerdingen* when the crew became aware of smoke coming from the bottom of the barge[70]. An emergency call was initiated, but a store room caught fire, forcing the crew and everyone in the surrounding area to evacuate as the ship ran aground, emptying 1,895 tons of nitric acid into the river[71]. The following essay will concentrate on common shipwrecks in the ocean and will exclude hydrofoil boats, air-cushion vehicles, submersibles other than submarines, floating craft and fixed or floating platforms for space reasons.

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[64] Spilled an amount of 220,000 tons of oil.
[65] Quantity of oil spilt: 72,000 tons.
[66] Quantity of oil spilt: 19,800 tons.
[67] Sands *Principles of International Environmental Law* (2ed) page 394.
[68] Glazewski *Environmental Law in South Africa* Butterworth 2005 (2ed) page 636.
[69] *The Mariner Group – Oil Spill History* at: http://www.marinergroup.com/oil-spill-history.htm.
[70] *Ibid.*
[71] *Ibid.*

3. Which kind of pollution do shipwrecks cause?

3.1 In General

The ocean covers about 70 per cent of the earth's surface and is the home to millions of fish, crustaceans, mammals, microorganisms, and plants[72]. It is a vital source of food for animals and people. Thousands of species of birds depend on the sea for their daily food supply. Furthermore fishers all over the world catch over 90,000,000 tons of fish every year[73]. In many developing countries fish is very much part of the staple diet and an important source of protein. People are also reliant on the ocean for many of their medicine ingredients. Many marine animals and plants contain chemicals that are used to heal human afflictions[74]. Approximately 500 sea species produce chemicals that could help treat cancer[75].

As a result of the different cargos ships carry, different substances come into the seas when shipwrecks occur. The amount of materials which enter into the sea depends upon the conditions of the ships when they run to ground and the time between the loss and the salvage. Typical substances which get into the sea after an accident are different kind of oils. As an example the International Atomic Energy Agency - Marine Environment Studies Laboratory (IAEA-MESL) joint forces with the UNDP, the Regional Organisation for the Protection of the Marine Environment (ROPME) and the Department for International Development (DFID) analyzed the water next to shipwrecks in Kuwait and Iraq waters. Numerous metals and uranium isotopes were found in all samples[76]. Additionally, all tests were monitored for total oil content, expressed as both chrysene and ROPME oil equivalents[77]. 24 of the 198 collected samples were further subjected to detailed chemical analyses of petroleum hydrocarbons and chlorinated compounds, including Polychlorinated Biphenyls (PCBs) and several pesticides[78]. Beside possible pollution risks like oil in tankers, the wrecks may contain dangerous cargo and stores, as well as unexploded munitions

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[72] http://www.wwf.org.hk/eng/pdf/references/factsheets/factsheet30.PDF.
[73] *Ibid.*
[74] *Ibid.*
[75] *Ibid.*
[76] *Marine Pollution near Shipwrecks in Iraq* at:
http://www.naweb.iaea.org/naml/meslresshipwreckIraq.asp.
[77] *Ibid.*
[78] *Ibid.*

which make salvage operations dangerous. At the moment in these cases the UNDP has discovered that oil is the most harmful pollutant[79].

3.2 Types of Pollutants

As shown above, pollutants can be of all natures. Following are examples of some common pollutants.

3.2.1 Oil

Every year over 3,000,000 tons of oil leak into the oceans[80]. Much of these are produced by refineries, discharged or spilt at seas: About one-third of the oil discharged at sea is spilt as a result of accidents[81]. 1,100,000 tons of oil are deliberately pumped out by oil tankers cleaning their tanks before taking on new cargo[82]. Even though shipwrecks spill relatively little oil, they can do great damage, smothering beaches and killing seabirds. For example, the *Erika* accident which happened on 12 December 1999 spilled nearly 20,000 tons of heavy fuel oil[83]. This oil was by its nature, very persistent, slowly dissipating oil that is difficult to clean[84]. The *Erika* ran aground relatively circa 30 miles off the nearest coast, whereby the section affected by the pollution was very huge[85]. Furthermore the extreme winter storms hit the area in the immediate aftermath of the incident, gravely hindering any efforts to mitigate the damage at the ocean[86]. The result was that more than 400 kilometres of the French coast was contaminated by the oil[87]. The costs of the lost of *Erika* are the most expensive oil spill in the history of the International Oil Pollution Compensation (IOPC) Funds[88]. The report of the monitoring programme of the ecological and ecotoxicological consequences of the *Erika* oil spill[89] says: 'In the

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[79] *Op cit,* note 60.
[80] Ringbom *The Erika Accident and its Effects on EU Maritime Regulation* in: *Current Marine Environmental Issues and the International Tribunal for the Law of the Sea* The Hague/London/New York 2001, 265 (266).
[81] *Ibid.*
[82] *Op cit,* note 72.
[83] *Op cit,* note 80.
[84] *Ibid.*
[85] *Ibid.*
[86] *Ibid.*
[87] *Ibid.*
[88] I will come back to that later.
[89] *The monitoring programme of the ecological and ecotoxicological consequences of the 'Erika" oil spill* at: http://www.ifremer.fr/docelec/doc/2004/publication-1390.pdf.

most contaminated areas (the Loire Atlantique and Vendée coasts), the polycyclic aromatic hydrocarbons (PAH) concentrations measured in the soft tissues of bivalves led to a ban on shellfish collection and shellfish farming which remained in place until early 2001'. The examination further paid particular attention to the vanadium and nickel levels as traces of the *Erika* fuel oil and resulted in an abrupt rise in vanadium concentrations being noted in filter-feeding mussels and oysters, five months after the accident in May 2000[90]. However, most affected by the oil spill were the Marine birds wintering in the Bay of Biscay, whereby the common guillemot *Uria aalge* was the most impacted species: 'in the first month following the disaster, 64 000–125 000 guillemots died, of which one-third were less than one-year old'[91].

Oil comprises of several hydrocarbon compounds, inter alia benzene, propane, acetylene, naphtha and kerosene which can cause health effects such like dizziness, tremors, anemia and leukaemia[92].

The different kinds of oil which is spilled in the ocean every year cause many physical, chemical and biological degradation processes to start acting on them. These processes alter the properties and behaviour of the oil (as shown on figure 2)[93]. Some processes make the oil 'disappear' in its original form, but the fact that it is no longer visible on the water surface does not mean that it is vanished or environmentally harmless[94]. The break up and dissipation of an oil slick depends mainly on how persistent the oil is[95]. Light products called non-persistent oil, such as kerosene tend to evaporate and dissipate quickly and naturally and rarely need cleaning-up[96]. In contrast, the break up and dissipation of persistent oils, such as many crude oils, takes place much more slowly and usually require a clean-up response[97]. The dissipation time therefore depends on a series of factors, including

[90] *Ibid.*
[91] *Ibid.*
[92] *Op cit,* note 56.
[93] *What happens to oil in the water?* At: http://oils.gpa.unep.org/facts/fate.htm.
[94] *Ibid.*
[95] *Ibid.*
[96] *Ibid.*
[97] *Ibid.*

the amount and type of oil spill, the weather conditions and whether the oil stays at sea or is washed ashore[98].

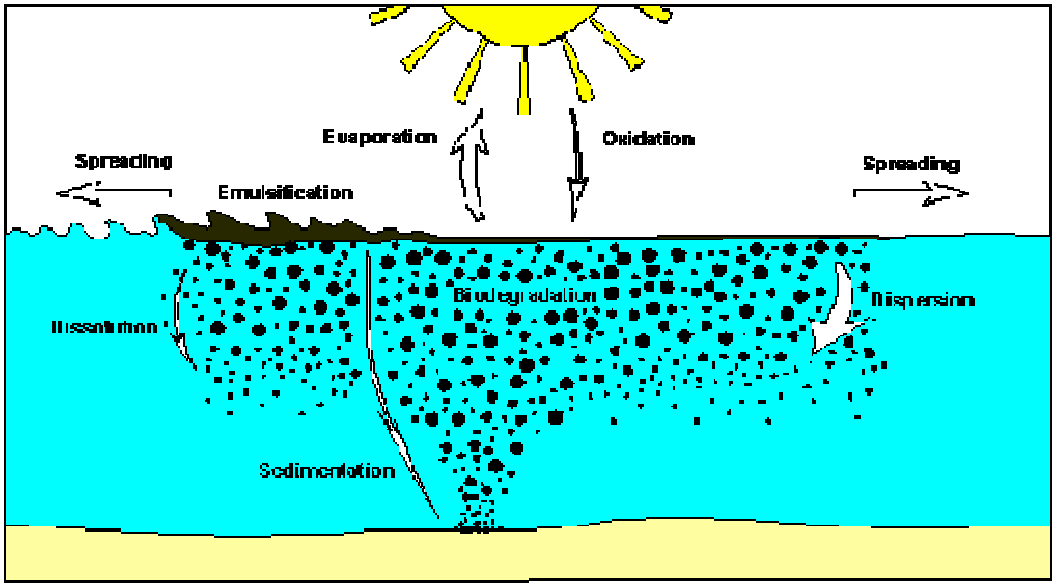

Figure 2: Main weathering processes of Oil in the sea water. source: www.oils.gpa.unep.org/facts/fate.htm

3.2.2 Toxins

Toxins are carried as cargo over the oceans. The name toxin is Greek '*toxikon*' and means poison for use on arrows[99]. It is a noxious matter produced by living cells or organisms[100]. Most toxins are proteins which are able to cause diseases on contact or absorption with body tissues[101]. Toxins differ very much in their severity, varying from usually minor and acute to directly deadly[102]. Accordingly, they are a health risk for animals and human beings as well. Toxins accumulate in food chains. When bigger fish eat smaller fish that are contaminated they both become poisoned[103]. These fish again may be eaten by other fish, mammals, birds or humans whereby the poison gets passed on[104]. The concentration of the contamination sometimes grows when the toxins pass up the chain, making some animals sterile and more susceptible

[98] *Ibid.*
[99] http://dictionary.reference.com/browse/toxic.
[100] *Toxin* at: http://www.answers.com/topic/toxin?cat=health.
[101] *Definition of Toxin* at: http://www.medterms.com/script /main/art.asp?articlekey=5828.
[102] *Chemical and Biological Terrorism Preparedness* at: http://www.ewashtenaw.org/government/departments/emergency_managment/em_bioterrorism.html.
[103] *Op cit,* note 72.
[104] *Op cit,* note 72.

to infection[105]. In 1988 for example, a virus took the lives of 18,000 seals in the North Sea and northeast Atlantic. Academic studies revealed that the seals were more vulnerable to the virus because that part of the Atlantic had such high PCB levels[106]. PCB was used in electrical equipment and other applications and is now banned in most countries.

3.2.3 Asbestos

The term 'asbestos' is used to describe any of several naturally occurring fibrous silicate minerals of the amphibole or serpentine groups[107]. All together there are six minerals which are described as asbestos, namely: chrysotile, crocidolite amosite tremolite, anthophyllite and actinolite [108] . Asbestos is resistant to heat and chemicals [109]. On this account asbestos has been used in the building industry including the shipbuilding industry. Many countries have in the meanwhile banned new uses of asbestos because of its bad health effect[110]. Asbestos is best known for causing pleural diseases and cancer of the bronchi and pleura[111]. Regardless of the banning for new uses it is still found in older vessels and shipwrecks[112]. This creates a problem for the recycling process as well as one for the salvage and removal aspect.

3.2.4 Plastic

Innumerable plastic containers and bands are found every year in the oceans. Although most of the plastic is tossed into the sea, some comes into the ocean as a result of ship accidents. Plastic does not decay quickly and sea creatures often eat or get entangled in it. Plastic results in the death of around a million seabirds and the combined death of a 100,000 or more of whales, seals, and dolphins every year[113].

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[105] *Op cit,* note 72.
[106] *Op cit,* note 72.
[107] *Asbestos* at http://www.healthline.com/galecontent/asbestos?utm_medium=google_contextual&utm_source=advair_test&utm_campain=gale&utm_term=asbestos.
[108] *Ibid.*
[109] *Ibid.*
[110] *Ibid.*
[111] *Ibid.*
[112] As an example see the *Catala* shipwreck: *States Sets Up Web Site For Catala Shipwreck* at: http://www.kirotv.com/news/9337020/details.html.
[113] *Features Oceans and Coasts* at: http://www.sanctuaryasia.com/features/detailfeaturescategory.php?id=465&catid=22.

3.2.5 Radioactive Materials

Pollution from dumping radioactive waste and spilling radioactive substances by nuclear submarine wrecks is found in Russian waters. This is primarily from the considerable military activities there during the cold war. For the Soviet Union the Arctic was the base of naval power and a part of the seabased nuclear deterrent[114]. As shown above[115] a part of this fleet was scuttled by the Russian navy itself. Also, as mentioned under section 3.1 water tests in Kuwait and Iraq waters have shown uranium isotopes in all examples.

In the areas with high concentration of radioactivity the mortality rate as a resulting from cancer, blood, skin and ancological diseases is higher than the average[116]. However, the long term effects and amount of nuclear substances in the water are more appalling. As containers break down and as submarines corrode, the substances within can pollute marine life and scatter radioactivity into the ecosystem[117]. Thereafter, strong drifts could carry this radioactive waste into fishing grounds and into the feeding areas of sea mammals and birds[118].

4. What can be done to combat pollution from shipwrecks? (Prevention and Emergency Response)

4.1 Historical Development

In the beginning of navigational safety strange efforts were made to combat damage from storms, for instance a vessel was bound round with ropes fore and aft to prevent it splitting apart and an anchor was dragged behind to slow down its progress[119].

One of the most successful preventive methods was a ban on seafaring in winter, during the worst weather period. Laying up during the cold and rainy season was justified generally by meteorological circumstances, particularly terrible rain- and

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[114] Gizewski, Peter *CARC – Northern Perspective: Military Activity and Environmental Security: The Case of Radioactivity in the Arctic* at: http://www.carc.org/pubs/v21no4/military.htm.
[115] See under 2.3.3.2.
[116] *Op cit,* note 114.
[117] *Ibid.*
[118] *Ibid.*
[119] *Op cit,* note 1.

snowstorms[120]. The prohibition on sailing was accompanied in Roman law by an administrative fine: no vessel could leave port unless it held a dimissorium (a kind of sailing permit issued by the right official)[121]. This prohibition of going to sea during the winter season was used in some countries until the end of the 18th century[122].

The first preventive rules on loading to further the safety of vessels came into being in the Middle Ages[123]. From the mid-13th century, the maritime authorities in large Mediterranean ports introduced very strict requirements on freeboard loading, in order to stop unscrupulous ship-owners and captains who overloaded their vessels, at the risk of losing them, with the intention to earn more from the cargo[124]. Some of the most complex regulations occurred in the 14th-century Genoese statutes[125]. The maritime authorities in Genoa laid down very precise rules for calculating the maximum draught of certain vessels as well as an inspection procedure that had a whole range of penalties for anyone contravening the rules[126]. Pursuant to the *Afficium Gazarie* the vessels had to be affixed with irons to the hull, the ancestors of loadlines[127]. On every voyage, the captain or owner had to select two of the merchants on board to keep look after these iron pointers[128]. A system of guarantee payments and fines ensured that the law was applied strictly[129].

4.2 The Precautionary Principle

The precautionary principle or precautionary approach is referred to in a number of treaties and other instruments outside as well as inside the field of maritime pollution to as provide guidance as to when action should be taken to handle actual or potential pollution[130]. The definitions of the precautionary principle vary from instrument to instrument; however the most widely used definition is the one in the Rio

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[120] *Ibid.*
[121] *Ibid.*
[122] *Ibid.*
[123] *Ibid.*
[124] *Ibid.*
[125] *Ibid.*
[126] Ibid.
[127] *Ibid.*
[128] *Ibid.*
[129] *Ibid.*
[130] Vanderzwaag *The Precautionary Principle and Marine Environmental Protection: Slippery Shores; Rough Seas, and Rising Normative Tides* Ocean Development & International Law 2002, 168.

Declaration. Pursuant to Principle 15 of the Rio Declaration 'precautionary principle' means:

> 'in order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainly shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation'.

This definition includes a lot of generalities and has a wide spectrum of available management measures[131]. There are the direct and extreme measures to encourage precaution including outright prohibitions on certain human activities, such as nuclear technology or new aquaculture developments; designation of protected areas; and 'reverse listing' for pollutants or wastes where only pollutants/wastes listed on a 'safe list' would be allowed to be used or discharged[132]. Furthermore, there is a direct but less extreme compromise requiring pollution prevention or waste minimization plans as a precondition to licensing industrial operations and mandating decision makers to apply the precautionary principle/approach without strict guidelines[133]. Beside this the precautionary principle contains indirect measures including requiring environmental impact assessments of proposed projects and proposed governmental programs, plans and policies to identify environmental impacts and mitigation options; ensuring strict or absolute liability regimes for pollution damage; and encouraging public participation in all aspects of decision making to provide 'common sense' perspectives[134]. The following Conventions include partially direct and indirect measures of this principle.

4.3 United Nations Convention on the Law of the Sea 1982

Part XII of the Law of the Sea Convention contains the protection and preservation of the marine environment. It is the framework of other international sea agreements and as such it defines the flag, coastal and port States, jurisdiction instead of prescribing detailed measures or technical standards. The Law of the Sea Convention was adopted on 30 April 1982 after nine years of negotiation and entered into force

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[131] *Ibid.*
[132] *Ibid.*
[133] Deville and Harding *Applying the Precautionary Principle* Sydney 1997 supra note 27, at 71.
[134] *Op cit,* note 130.

on 16 November 1994[135]. It has currently 155 parties[136].

4.3.1 Marine Environmental Rules

Under Article 194 of the Law of the Sea Convention States have to take all necessary measures to prevent, reduce and control pollution of the marine environment. This duty limits the State's right to exploit their natural resources[137]. In the context of the Law of the Sea Convention 'pollution of the marine environment' means pursuant to Article 1 (4):

> 'The introduction by man, directly or indirectly, of substances or energy into the marine environment, including estuaries, which results or is likely to result in such deleterious effects as harm to living resources and marine life, hazards to human health, hindrance to marine activities, including fishing and other legitimate uses of the sea, impairment of quality for use of seawater and reduction of amenities'.

The measures of the State are obligatory to make sure that they do not cause damage by pollution to other States and that the pollution does not spread beyond the areas where they exercise sovereign rights[138].

States are obliged to work together on an international or regional basis in drafting international rules, standards and recommended practices and procedures to protect and preserve the marine environment[139]. Article 198 rules that States have to notify other States and international organisations when they become aware of an imminent or an actual environmental risk for the oceans[140]. Furthermore, they have to develop contingency plans for responding to marine pollution incidents[141] and must co-operate on research and information exchange on pollution, and in establishment of scientific criteria for norms[142].

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[135] *United Nations Convention on the Law of the Sea* at: http://www.oceanlaw.net/texts/losc.htm.
[136] *Chronological lists of ratifications of, accessions and successions to the Convention and the related Agreements* at: http://www.un.org/Depts/los/reference_files/chronological_lists_of_ratifications.htm#The%20United%20Nations%20Convention%20on%20the%20Law%20of%20the%20Sea.
[137] Article 193 of the Law of the Sea Convention.
[138] *Ibid,* Article 194 (2).
[139] *Ibid,* Article 197.
[140] *Ibid,* Article 198.
[141] *Ibid,* Article 199.
[142] *Ibid,* Article 201.

Article 202 and 203 regulate the necessity of scientific and technical assistance to developing countries and to grant preferential treatment for developing countries by international organizations, inter alia, in funds and technical assistance. In addition States have to monitor the risks or effects of pollution and make environmental assessments of the potential effects of activities[143].

Article 211 contains specific regulations for pollution from vessels. In this sense the States shall establish international rules and standards to prevent, reduce and control pollution to minimize the threat of accidents. This applies to coastal States (Article 211 (1)) as well as flag States (Article 211 (2)). Thereby, coastal States have the right to develop such regulations which contain conditions for the entry of foreign vessels into their ports or internal waters to ensure the prevention, reduction and control of pollution, if they give due publicity to such conditions and notify the IMO of them[144]. Furthermore, the coastal State has the right to establish similar rules for the territorial sea, whereby these rules shall not hamper the right of innocent passage of foreign vessels[145]. Relating to the EEZ the coastal State can adopt laws and regulations to prevent, reduce or control pollution from ships which are 'accepted international rules or standards established by an international organization or a general diplomatic conference' [146]. Moreover, the coastal State can set its own rules under the authorization of the competent international organization to meet special circumstances[147].

Finally, Article 234 determines that for ice-covered regions, lying 'within the limits' of the EEZ the coastal State may adopt non-discriminatory pollution regulations. The difference between the regulation related to the EEZ in Article 211 and Article 234 is that in the latter there are no requirements that design, construction etc. standards must conform to generally accepted international rules. The only restriction is that the coastal State rule has to have 'due regard to navigation'.

[143] *Ibid,* Article 204-206.
[144] *Ibid,* Article 211 (3).
[145] *Ibid,* Article 211 (4).
[146] *Ibid,* Article 211(5).
[147] *Ibid,* Article 211 (6).

4.3.2 Enforcement

Coming now to the enforcement jurisdiction, Article 217 determines that flag States must enforce pollution laws applying to their vessels, regardless of where in the world the vessel is. To pursue this aim they must:

- lay down penalties adequate in severity to discourage violations[148],
- prohibit their ships from proceeding to sail unless they comply with the requirements of international rules and standards[149],
- inspect their vessels periodically and make sure that their ships carry the certificates required by the regulations[150], and
- investigate alleged violations of the regulations by their ships[151] for which they can request any other State to help.

An allegation of another State has to be told to the flag State and the IMO and also how the action of response was by the flag State.

One speculative academic question has grown because the Law of the Sea Convention does not deal with it directly: Is a flag State also allowed to arrest one of its vessels in the EEZ of another State or not?[152] Pursuant to Article 92 the flag State has exclusive jurisdiction over its vessels at high seas. Article 58 (2) rules that Article 92 applies in the EEZ to the extent that it is not incompatible with the coastal State's rights. But, as shown above, the coastal State has no general right to arrest foreign ships in its EEZ for breach of pollution rules. Accordingly, there is no right of a coastal State with which Article 92 is incompatible and hence a flag State can arrest one of its ships in the EEZ of another State[153].

The enforcement by a port State is regulated in Article 218. It determines that a port State can take legal proceedings against a ship, in one of its ports, that is alleged to have discharged polluting substances outside the port State's territorial sea or EEZ. A requirement for the port State to interfere is that the evidence warrants that the ship

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[148] *Ibid,* Article 217 (8).
[149] Article 217 (2).
[150] *Ibid,* Article 217 (3).
[151] *Ibid,* Article 217 (4).
[152] *Op cit,* note 16 page 348.
[153] *Ibid.*

has acted 'in violation of applicable international rules and standards'[154]. In relation to the discharge in the internal waters, the territorial sea or EEZ of another State the port State must not take legal proceedings unless that State or the flag State requests it[155]. In addition, Article 219 rules that the port State shall take, as far as practicable, administrative measures to prevent a vessel from sailing which is ascertained to have violated applicable international regulations and standards regarding seaworthiness of ships whereby they threaten the environment. The concerned port State may allow the ship to sail to the nearest appropriate repair yard and permit it to start the journey immediately after fixing. Therefore, Article 223 to 232 determines safeguards for arrests and proceedings against a foreign ship for alleged violation of pollution.

Coming to the enforcement by a coastal State, which applies when a foreign ship is suspected of having violated the coastal State's environmental regulations during its passage through the territorial sea or applicable international rules relating to the pollution from vessels[156]. The coastal State can undertake physical inspections of the vessel and if the evidence warrants, institute legal proceedings[157]. The coastal State is allowed to arrest within the framework of the rules of innocent passage in Part II section 3 of the Law of the Sea Convention. In this context the passage of a vessel is not innocent anymore, when the pollution of a foreign ship is 'wilful and serious'[158]. This implies that the coastal State has unrestricted enforcement jurisdiction. This legal consequence does not apply for a ship during the exercise of its right of transit passage through straits[159]. The coastal State has in that case only the power to arrest the ship if the violation causes or threatens 'major damage to the marine environment of the straits'[160]. If a ship fulfilled these violation requirements the affected State can take appropriate enforcement measures but has to respect *mutatis mutandis* of the provisions of safeguard section under the Law of the Sea Convention[161]. Therefore the problem is that the term 'major damage to the maritime environment' is not defined in the Law of the Sea Convention. Furthermore there is no explanation as to

[154] *Op cit,* note Article 218 (1).
[155] *Ibid,* Article 218 (2).
[156] *Ibid,* Article 220 (1).
[157] *Ibid,* Article 220 (2).
[158] *Op cit,* note 16, page 349.
[159] *Ibid.*
[160] *Op cit,* note 137, Article 233 (2).
[161] *Ibid,* Article 233.

how far the enforcement measures of the State can reach[162]. Nevertheless, the jurisdiction to arrest a vessel under these requirements is accepted in literature[163]. If a suspected violation takes place in the EEZ, the coastal State can oblige an offending ship that is within its territorial sea or EEZ to give special information[164]. If the information is incorrect or the ship refuses, the costal State can inspect the ship when the suspected violation has been a 'substantial discharge' which may cause a major damage[165].

The application area of the Law of the Sea Convention does not include the prescription and enforcement of pollution standards to warships and other Stated-owned vessels used only on government non-commercial service[166]. As arises from a general rule in the international legal system relating to sovereign immunity which will later be discussed in further detail.

4.4 International Convention for the Prevention of Pollution of the Sea by Oil, 1954 (OILPOL)

The first material for which international control standards were developed was oil[167]. Oil control processes were endorsed by the United Kingdom, based on a draft text from the 1926 Washington Conference[168]. OILPOL was settled on 12 May 1954 in London, and entered into force on 26 July 1958[169]. In 1969 OILPOL had been adopted by 71 parties, who controlled over 90 per cent of the world's shipping tonnage[170].

OILPOL imposed a duty on shipowners and masters to operate their ships so as to minimise the incidence of accidental and operational pollution. The OILPOL Convention was of limited effectiveness and is now mainly of historical interest, as MARPOL has replaced OILPOL. Even though, less than twenty parties to the

[162] *Op cit,* note 16, page 349.
[163] *Ibid.*
[164] *Op cit,* note 137, Article 220 (5).
[165] *Ibid,* Article 220 (5).
[166] *Ibid,* Article 236.
[167] *Op cit,* note 16, page 339.
[168] *International Convention for the Prevention of Pollution of the Sea by Oil, 1954, as amended (OILPOL) 1954* at: http://www.imo.org/safety/mainframe.asp?topic_id=830#01.
[169] Nelson *Pollution from Ships: a Global Perspective* at: http://www.aic.gov.au/publications/proceedings/26/nelson.pdf.
[170] *Op cit,* note 68, page 642.

OILPOL Convention have not (yet) become parties to MARPOL and are therefore still bound to OILPOL[171]. Combined their fleets account for only a small sum of the total world merchant shipping fleet[172].

4.5 International Convention for the Prevention of Pollution from Ships, 1973/1978 (MARPOL)

The purpose of the 1973 International Conference[173] was, inter alia, to bring OILPOL into conformity with modern tanker practices and operations and to eliminate intentional pollution of the marine environment[174]. The 1973 Convention required ratification by 15 States, with a combined merchant fleet of not less than 50 per cent of world shipping by gt, to enter into force[175]. MARPOL was open for signature from 15 January 1974 to 31 December 1974 at the Headquarters of the Organization[176]. In 1976 the 73 MARPOL Convention had only received three ratifications - Jordan, Kenya and Tunisia - representing less than one percent of the world's merchant shipping fleet[177]. This was in spite of the fact that States could become Party to the Convention by only ratifying Annexes I (oil) and II (chemicals). Annexes III to V, regulating harmful goods in packaged form, sewage and garbage were optional[178]. At this stage it seemed that MARPOL would never enter into force.

In February 1978 IMO held a Conference on Tanker Safety and Pollution Prevention in response to a spate of tanker accidents during 1976-1977[179]. The conference adopted measures influencing tanker design and operation, which were derived from both the Protocol of 1978 relating to the 1974 Convention on the Safety of Life at Sea (1978 SOLAS Protocol), and the Protocol of 1978 relating to the 1973 International Convention for the Prevention of Pollution from Ships (1978 MARPOL

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[171] *Op cit,* note 16, page 339.
[172] Status of affairs 1999, *ibid,* page 339.
[173] Which was held on 8 October 1973 in London.
[174] *International Convention for the Prevention of Pollution from Ships 1973 as modified by the Protocol of 1978 relating thereto (MARPOL 73/78)* at http://www.imo.org/Conventions.asp?doc_id=678&topic_id=258.
[175] Article 15 (1) MARPOL 73.
[176] *Ibid,* Article 13 (1).
[177] *Op cit,* note 174.
[178] *Op cit,* note 175, Article 14.
[179] *Op cit,* note 174.

Protocol)[180]. The Conference adopted these Protocols on 17 February 1978 in London[181].

The 1978 MARPOL Protocol allowed States to become Party to the Convention by first realizing the conditions in Annex I (oil); it was also decided that Annex II (chemicals) would only become binding three years after the Protocol entered into force[182]. This allowed States enough time to master the technical problems associated with Annex II. Accordingly, MARPOL 73/78 with Annex I and II entered into force on 2 October 1983. Currently there are 145 parties to the agreement[183]. In 1997 a new Annex VI, which is concerned with air pollution was added to MARPOL[184]. Pursuant to Article 3 (3) MARPOL does not apply to warships or other stated-owned vessels used only on government non-commercial service. In the context of pollution from shipwrecks the Annexes I-III are of most interest.

4.5.1 Annex I

Annex I lists regulations to reduce or prohibit the discharge of oil during the voyage. Furthermore, Annex I determines rules to prevent and reduce the oil spill during an incident. In October 2004 the Parties of the Convention decided to revise Annex I of MARPOL[185]. The revised Annex I for the prevention of pollution by oil incorporates in the various amendments adopted since MARPOL entered into force in 1983. It breaks up, in different chapters, the construction and equipment provisions from the operational requirements and makes clear the differences between the requirements for new ships and those for existing ships[186]. The revision presents a more user-friendly, simplified Annex I which entered into force on 1 January 2007.

To prevent an oil spill during a ship accident Annex I provides the amended regulation 13G (regulation 20 in the revised Annex) and regulation 13H (regulation

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[180] *Ibid.*
[181] *Ibid.*
[182] *Ibid.*
[183] *Status 31.01.2007*, see at:http://www.bsh.de/de/Meeresdaten/Umweltschutz/MARPOL%20Umweltuebereinkommen/Vertragsstaaten%20105.pdf.
[184] *Op cit,* note 174.
[185] *Revised MARPOL Annex I, Annex II and IBC Code adopted at environment meeting* at: http://www.imo.org/Safety/mainframe.asp?topic_id=848&doc_id=4405.
[186] *Op cit,* note 174.

21 in the revised Annex) on the phasing-in of double hull requirements for oil tankers. According to this regulation new oil tankers must be fitted with double hull tanks and existing tankers have to comply with the requirements for new tankers not later than 15 years after date of delivery. The reason for that is to phase out the single-hull tankers, which are a bigger risk for causing an oil spill throughout an incident. The latest time of the phase out is 2010. The given time depends on the delivery date of the ship and the size of the oil tanker and its cargo (exceptions are possible). However, the introduction of the double hull tanks has also a bad side: if a vessel sank then the salvage is more difficult and cost-intensive when the vessel has the double hull tanks[187]. Reason for that is that the salvor has to bore through two hulls. This fact should be considered and parallel to it the liability limits should be increased.

Moreover the revised Annex I includes new obligations for pump-room bottom protection for oil tankers which are constructed from 1 January 2007 onwards. Regulation 22 rules that oil tankers of 5,000 tons deadweight and above have to be fitted with double bottom in the pump-room. Furthermore, regulation 23 provides that all ships delivered on or after 1 August 2010 with an aggregate oil fuel capacity of 600 cubic metres and above can only carry a maximum capacity limit of 2,500 cubic metres per oil fuel tank.

4.5.2 Annex II

Annex II lays down regulations for discharge and measures for the control of pollution by noxious liquid substances in bulk. It describes and classifies substances and includes, inter alia, regulations in conjunction with the discharge of rests and unloading arrangements. Like Annex I, Annex II was also revised in October 2004 and entered into force on 1 January 2007.

The previous Annex II entered into force on 6 April 1987. The design, construction, equipment and operation of chemical tankers which were built before the revised Annex II entered into force had to be in accordance with the Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (BCH

[187] *Op cite,* note 22, page 41.

Code)[188]. The Code was originally adopted in 1971 and was modified by a series of amendments between 1972 and 1983 before this amended version was adopted by the Marine Environment Protection Committee (MEPC) in 1985 and by the Maritime Safety Committee (MSC) in 1986[189]. The International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (IBC Code) is statutory for ships built after 1 July 1986. The IBC Code gives international standards for the secure transport by sea in bulk of liquid dangerous chemicals, by setting down the design and construction standards of ships involved in such transport and the equipment they should carry so as to decrease the risks to the ship, its crew and to the environment, having regard to the nature of the products carried[190]. The main principle is that the Code covers the type of the ship in combination with the hazards of the products. Each of the products may have one or more hazard attributes which involve flammability, toxicity, corrosivity and reactivity[191].

The revised Annex II comprises a new four-category classification system for noxious and liquid substances which is classified in categories from 'major hazard' to either marine resources or human health to 'no harm' to marine resources, human health, amenities or other legitimate uses of the sea. It includes many changes in the discharge area. The changes of Annex II led to amendments to the IBC Code as well, to reflect the new regulations[192].

Aside from the revision of Annex II, the marine pollution hazards of thousands of chemicals have been processed by the Evaluation of Hazardous Substances Working Group, giving a resultant GESAMP [193] Hazard Profile [194]. It categorizes the substances according to its bio-accumulation; bio-degradation; acute toxicity; chronic toxicity; long-term health effects; and effects on marine wildlife and on benthic habitats[195]. As a consequence of the new classification vegetable oils which were previously categorized as being free will now be required to be carried in

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[188] *BCH Code 2005 IB772E* at: http://www.hansenautic.de/product_info.php/info/p10327_BCH-Code-2005-IB772E.html.
[189] *Ibid.*
[190] *Chemical Pollution* at: http://www.imo.org/Environment/mainframe.asp?topic_id=236.
[191] *Ibid.*
[192] *Op cit,* note 185.
[193] Joint Group of Experts on Scientific Aspects of Marine Environmental Protection (GESAMP).
[194] *Op cit,* note 185.
[195] *Op cit,* note 190.

chemical tankers[196]. Under regulation 4 there are exemptions, administration-provisions to exempt ships and rules on the location of the cargo tanks carrying the vegetable oil.

4.5.3 Annex III

Annex III entered into force on 1 July 1992 and currently has 128 Parties, which covers 94.50 per cent of the world ship's tonnage[197]. Therefore it is optional, that means, that every Party of MARPOL 73/78 Annexes I and II is not obliged to adopt this Annex at the same time. It gives a framework of general standards for preventing or reducing pollution of the marine environment by harmful substances in packaged form. Therefore it applies to all vessels carrying harmful substances in packaged form, or in freight containers, portable tanks or road and rail tank wagons[198]. The regulations deal with packaging, labelling, stowage, quantity limitations, documentation and related requirements[199]. The meaning of 'harmful substances' in Annex III is this identified as 'marine pollutants' in the International Maritime Dangerous Goods Code (IMDG Code)[200]. The IMDG Code was displayed as a uniform international code for the transport of dangerous goods by sea covering such matters as packing, container traffic and stowage, with particular reference to the segregation of incompatible substances[201]. The regulations were designed in order to identify marine pollutants so that they can be packed and stowed on board vessel in such a way as to decrease accidental pollution as well as to aid recovery by using clear marks to differentiate them from other (less harmful) cargos[202]. It includes consequently the details of the Annex III framework. All packages transporting marine pollutants have to be assigned with a standard marine pollutant mark. Substances (including mixtures and solutions) in this context are marked to one of nine classes according to the 'hazard' or the 'most predominant of the hazards' they

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[196] *Op cit,* note 185.
[197] *Summary of Conventions as at 31 August 2007* at:
http://www.imo.org/Conventions/mainframe.asp?topic_id=247.
[198] *MEPC adopts MARPOL amendments to delete tainting as pollutant criterion* at:
http://www.imo.org/Newsroom/contents.asp?topic_id=68&doc_id=555.
[199] *Op cit,* note 68, page 642.
[200] *Prevention of Pollution by Harmful Substances Carried by Sea in Packaged Form* at:
http://www.imo.org/Environment/mainframe.asp?topic_id=235.
[201] *Ibid.*
[202] *Ibid.*

present[203]. They include explosives; gases; flammable liquids; flammable solids; substances liable to spontaneous combustion; substances which, in contact with water, emit flammable gases; oxidizing substances and organic peroxides; toxic and infectious substances; radioactive material; corrosive substances and miscellaneous dangerous substances and articles[204].

4.6 International Convention on Oil Pollution Preparedness, Response and Co-operation, 1990 (OPRC Convention)

The OPRC Convention was adopted on 30 November 1990 at a diplomatic Conference convened by IMO[205]. It entered into force on 13 May 1995 and has been ratified by 88 States[206].

Pursuant to Article 1 (3) the area of application excludes any warship, naval auxiliary or other ship owned or operated by a State and used, for the time being, only on government non-commercial service. The objectives of the OPRC Convention are the preparing for and responding to oil pollution incidents, not only from vessels but also from offshore oil exploration and production platforms, sea ports and oil handling facilities[207]. This shall take place pursuant to the Preamble of the Convention in the way of

> 'mutual assistance and international co-operation relating to matters including the exchange of information respecting the capabilities of States to respond to oil pollution incidents, the preparation of oil pollution contingency plans, the exchange of reports of incidents of significance which may affect the marine environment or the coastline and related interests of States, and research and development respecting means of combating oil pollution in the marine environment'.

For these reasons the Convention requires in Article 3 the availability of oil pollution emergency plans on ships and offshore installations, and at ports and oil handling facilities. Furthermore, Article 4 determines that masters of ships, port authorities

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[203] *Ibid.*
[204] *International Maritime Dangerous Goods (IMDG) Code* at: http://www.imo.org/Safety/index.asp?topic_id=158.
[205] *International Convention on Oil Pollution Preparedness, Response and Co-operation (OPRC Convention), 1990* at: http://merrac.nowpap.org/html/k_2_center.html.
[206] *Op cit,* note 197.
[207] Preamble of OPRC Convention.

and others will be required to report pollution incidents without delay and Article 5 defines the actions to be taken when a report is received. Therefore, the States which could be affected must be informed and details must also be given to IMO. Article 6 obliges the establishment of national and regional systems for preparedness and response, which includes the designation of responsible authorities, preparation of contingency plans, stockpiling equipment to combat oil spills and holding practice exercises. As a key feature of the Convention Article 7 requires that Parties have to cooperate and provide advisory services, technical support and equipment at the request of other Parties. The financing of the costs involved is dealt with in an Annex to the Convention. The Parties also should cooperate in research and development (Article 8) and in the provision of technical support (Article 9). IMO itself is responsible for receiving and disseminating information, the provision of education, training programmes and cooperation in research and development.

In addition to the Convention, the Conference adopted the Protocol on Preparedness, Response and Co-operation to Pollution Incidents by Hazardous and Noxious Substances (HNS), 2000, other than oil. It entered into force on 14 June 2007. The OPRC-HNS Protocol was adopted to expand the scope of the OPRC-Convention[208].

4.7 International Convention relating to Intervention on the High Seas in Cases of Oil Pollution Casualties, 1969 (Intervention Convention)

The Intervention Convention was drafted after the *Torrey Canyon* accident in 1967, which was the world's first major oil spill[209]. After the attempt to refloat the ship the *Torrey Canyon* broke into three pieces and the British Government gave the order to destroy the wreck by naval aircraft with the aim to burn the rest 40,000 tons of oil which was still in it[210]. This handling raised misgivings about the rights of coastal States under customary international law to engage with a foreign ship on the high seas to protect their area from pollution after an oil spill caused by an accident[211]. The Intervention Convention was adopted in Brussels on 2 November 1969 and

[208] *OPRC-HNS Protocol* at: http://www.imo.org/includes/blastDataOnly.asp/data_id%3D18886/12605OPRC-HNS.pdf.
[209] De La Rue and Anderson *Shipping and the Environment,* London. Hong Kong 1998, 816.
[210] *Ibid.*
[211] *Ibid.*

entered into force on 6 May 1975. It has currently 84 members[212]. It allows coastal States to

> 'take such measures on the high seas as may be necessary to prevent, mitigate or eliminate grave and imminent danger to their coastline or related interests from pollution or threat of pollution of the sea by oil, following upon a maritime casualty or acts related to such a casualty, which may reasonably be expected to result in major harmful consequences[213]'.

Pursuant to Article I (2) the Convention does not apply to warships or other State vessels on government non-commercial service. Action by a coastal State is only allowed if there occurs pollution or the threat of pollution which poses a grave and imminent danger to the coastline or related interests of the coastal State. This is defined in Article II (4) and indicates that the threatened interests of the coastal State need not be confined to its shoreline or adjacent areas. It also includes the interest, for instance, in offshore fish stocks[214].

However, the coastal State must first consult with the flag State and any other person who could have interest, for example, neighbouring countries unless there is a case of extreme urgency (Article III). Furthermore, they must report the measures they have taken and look for an expert on an IMO maintained list. Pursuant to Article V, the measures taken have to be on a relative scale to the pollution or threat. If the intervention of the coastal State is too excessive and this excess causes any further damage, then Article VI requires that the coastal State has to be responsible for that and has to pay compensation.

A Protocol adopted in London on 2 November 1973 extends the Convention to substances other than oil[215]. It entered into force on 30 March 1983 and includes an annexed list of bulk oils, hazardous substances, liquefied gases, radioactive materials and other substances which are liable to endanger human health, living resources or marine life or damage amenities or interfere with other legitimate uses of the sea[216]. The list has been amended by the Marine Environment Protection Committee of

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[212] *Op cit,* note 197.
[213] Article I (1) of Intervention Convention.
[214] *Op cit,* note 209, page 819.
[215] *International Convention relating to Intervention on the High Seas in Cases of Oil Pollution Casualties, 1969* at: http://www.imo.org/Conventions/contents.asp?topic_id=258&doc_id=680.
[216] *Ibid.*

IMO in 1991, 1996 and 2002[217]. After the *Amoco Cadiz* disaster in 1978 the power of the coastal States for intervention was extended, whereby the Intervention Convention is still unchanged, the text of Article 221 of the 1982 UNCLOS was changed during the negotiations to skip any reference to 'grave and imminent danger'[218]. Accordingly, the right of intervention occurs even if there is merely a

> 'actual or threatened damage to protect their coastline or related interests, including fishing, from pollution or threat of pollution following upon a maritime casualty or acts relating to such a casualty, which may reasonably be expected to result in major harmful consequences[219]'.

4.8 International Convention on Load Lines, 1966

The International Convention on Load Lines was adopted on 5 April 1966 by IMO, came into force on 21 July 1968 and has 158 Parties[220]. Its regulations are based on an acknowledgement that loading limits can play an important role in shipping safety. The main objectives of the Convention are external weathertight and watertight integrity as well as the freeboards[221]. It applies to all ships, except warships, yachts, fishing vessels and other ships of small size[222]. The Convention contains three Annexes. Annex I is divided in four Chapters, whereby Chapter I rules general norms, Chapter II the conditions of assignment of freeboard, Chapter III the freeboards and Chapter IV special requirements for ships assigned timber freeboards. Annex II deals with the possible hazards existing in different zones, area and seasonal periods. Annex III regulates certificates, including the International Load Line Certificate.

Annex I determines the watertight integrity of the hulls below the freeboard deck by numerous additional safety measures such as doors, freeing ports and hatchways. Moreover all assigned load lines must be marked amidships on each side of the vessel together with the deck line[223]. Timber deck cargo vessels are required to have a smaller freeboard to protect the deck cargo against the crash of waves[224].

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[217] *Ibid.*
[218] Birnie and Boyle *International Law and the Environment* (2ed) Oxford 2002, 380.
[219] Article 221 (1) of UNCLOS.
[220] *Op cit,* note 197.
[221] *International Convention on Load Lines, 1966* at:
http://www.imo.org/Conventions/mainframe .asp?topic_id=254.
[222] Therefore the size is ruled in Article 5 (1) (b) and (c).
[223] *Op cit,* note 221.
[224] *Ibid.*

To avoid overlapping certification rules with MARPOL and SOLAS there was the 1988 Protocol adopted on 11 November 1988[225]. It entered into force on 3 February 2000 and has currently 83 Parties[226]. The synchronized arrangement eases the problems caused by survey dates and intervals between surveys which do not coincide, so that a vessel should no longer have to go into port or repair yard for a survey obliged by one Convention shortly after doing the same thing in connection with another instrument[227]. Furthermore, the 1988 Protocol contains inter alia in its Annex B regulations to the strength and intact stability of ships, superstructure and bulkheads, doors, position of hatchways, doorways and ventilator, hatchway coamings, hatch covers, machinery space openings, miscellaneous openings in freeboard and superstructure decks, cargo ports and other similar openings, spurling pipes and cable lockers, side scuttles, windows and skylights, calculation of freeing ports; calculation of freeboard, sheer minimum bow height and reserve buoyancy[228]. But, these Protocol regulations apply only to the Parties of the 1988 Protocol and do not have an effect on the Parties to the 1966 Load Line Convention[229]. At least the 1988 Protocol has in its young age since entering into force seven years ago more than half of the Parties of the 1966 Load Line Convention as its own Parties. Hopefully the others will follow soon.

4.9 The regulations on safe transport for radioactive material, 2005 (IAEA regulations)

In 1991, experts convened by the IAEA started a revised version of the Safety Series No. 6, namely the regulations on safe transport for radioactive material (IAEA regulations)[230]. The IAEA regulations were approved by the Board of Governors in September 1996 and replaced all editions of the Regulations issued under Safety Serious No. 6[231]. The first IAEA Safety Serious No. 6 was available in 1961. It applied to the domestic and global transport of radioactive material by all forms of transport. This was revised by four reviews published in 1964, 1967, 1973 and

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[225] *Ibid.*
[226] *Op cit,* note 197.
[227] *Op cit,* note 221.
[228] *Ibid.*
[229] *Ibid.*
[230] *IAEA Safety Standards Series Regulations for the Safe Transport of Radioactive Material 1996 edition (revised) foreword* at: www_pub.iaea.org/MTCD/publications/PDF/Pub1225_web.pdf
[231] *Ibid.*

1985[232]. It was further amended in 2003 and revised another time by the IAEA regulation 2005.

The regulations establish safety standards which determine a tolerable level of control of the radiation, criticality and thermal risks to individuals, property and the environment that are associated with the transport of radioactive materials[233]. To reach that aim the regulations define, among others, package and radioactive material. Furthermore, it governs radiation protection, emergency response, quality assurance, compliance assurance and special arrangements in its general provisions under section III. Section IV contains activity limits and material restrictions such as basic radionuclide values, determination of basic radionuclide values and contents limits for packages. Section V sets requirements and controls for transport which includes requirements for the first and other for each shipment, transport of other goods, contamination and leaking packages, controls for expected package, and so on. Section VI lists the requirements for radioactive materials and for packagings and packages, whereas section VII regulates the test procedures and section VIII which contains the approval and administrative requirements. Moreover, different schedules detail requirements for the transport of specified types of radioactive material consignments and two Annexes specify the summary of approval and prior notification requirements in addition to the conversion factors and prefixes.

4.10 Convention on the International Regulations for Preventing Collisions at Sea, 1972 (COLREGs)

The 1972 Convention was evolved to update and replace the 1960 Collision Regulations. COLREGs is not directly related to marine pollution, but its rules are indirectly relevant as it tries to prevent accidents at seas. It entered into force on 15 July 1977 and has 151 Parties[234]. It applies to all vessels however exemptions are possible for warships[235].

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[232] *Ibid.*
[233] *Ibid,* background.
[234] *Op cit,* note 197.
[235] Rule 1 (c).

COLREGs is divided into five Parts: Part A - General; Part B - Steering and Sailing; Part C - Lights and Shapes; Part D - Sound and Light signals; and Part E - Exemptions. It includes also three Attachments and four Annexes. These Annexes enclose technical requirements concerning lights and shapes and their positioning; sound signalling appliances; additional signals for fishing vessels when operating in close proximity, and international distress signals.

One of the most important innovations in the 1972 COLREGs was Rule 10, the traffic separation schemes[236]. It institutes safe speed limits to minimize the risk of collisions and regulates the conduct of vessels operating in or near traffic separation schemes. Therefore the first traffic separation scheme was the Dover Strait in 1967[237]. Reason for establishing the Dover Strait as a traffic separation scheme was that 60 collisions happened in that Strait between 1956 and 1960. After implementation of the traffic separating schemes the total collisions were cut back to 16 in the following 20 years[238]. Other accident prevention rules regulate the conduct throughout overtaking process and the light duty during sunset until sunrise to prevent collisions.

4.11 International Convention for the Safety of Life at Sea, 1974 (SOLAS)

The International Convention for the Safety of Life at Sea (SOLAS) 1974 is the fifth edition of a worldwide agreement dealing with the safety of merchant ships. It entered into force on 25 May 1980 and has at the time of writing 158 Contracting Members[239]. The first version was adopted in 1914, in response to the *Titanic* disaster, the second in 1929, the third in 1948, and the fourth in 1960. It applies in general to all vessels on international voyages[240].

SOLAS lists minimum standards for the construction, equipment and operation of ships to secure their safety. SOLAS consists of general provisions followed by a detailed Annex divided into 12 chapters. Chapter I states that flag States are

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[236] *Convention on the International Regulations for Preventing Collisions at Sea, 1972 (COLREGs)* at: http://www.imo.org/Conventions/contents.asp?doc_id=649&topic_id=257.
[237] *Ibid.*
[238] *Ibid.*
[239] *Op cit,* note 197.
[240] Annex, Chapter 1, Regulation 1, whereas the extent of the application is shown in each Chapter.

responsible for ensuring that vessels under their flag fulfil the safety requirements under that Convention[241]. For that reason, a number of certificates are set in the Convention as evidence that this has been done. Furthermore, it allows port States to inspect the ships of other Contracting States if there are clear grounds for believing that the ship and its equipment do not substantially meet the requirements of the Convention[242]. Chapter II is divided into two Parts, whereby Part A regulates the generals and Part B rules the construction, stability machinery and electrical installation, fire protection, the fire detection and the fire extinction. This includes the floodable length[243], permeability[244], permissible length of compartments[245], special rules concerning subdivision[246], stability of ships in damaged condition[247], ballasting[248], peak and machinery space bulkheads and shaft tunnels[249], double bottoms[250], load lines[251] and many more. Chapter III controls life saving appliances and arrangements. Chapter IV stipulates radio communications. In this manner all passenger ships and all cargo ships of 300 gt and above are obliged to carry equipment designed to advance the possibility of rescue after an accident on international voyages[252]. This includes emergency position indicating radio bacons and search and rescue transponders for locating the vessel. Chapter V governs the navigational safety, which covers the maintenance of meteorological services for ships; the ice patrol service; routeing of ships; and the maintenance of search and rescue services. Beside this, it includes a general duty for masters to proceed to the assistance of those in distress and for Contracting Governments to ensure that all ships shall be sufficiently and efficiently manned from a safety point of view[253]. Chapter VI and VII regulate the carriage of cargos and dangerous goods. The normal cargos carriage includes the conditions for stowage and securing of cargo or cargo units[254]. The carriage of dangerous goods contains furthermore the classification,

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[241] *International Convention for the Safety of Life at Sea (SOLAS), 1974* at: http://www.imo.org/Conventions/contents.asp?topic_id=257&doc_id=647.
[242] *Ibid.*
[243] Regulation 3.
[244] Regulation 4.
[245] Regulation 5.
[246] Regulation 6.
[247] Regulation 7.
[248] Regulation 8.
[249] Regulation 9.
[250] Regulation 10.
[251] Regulation 11.
[252] *Op cit,* note 241.
[253] *Ibid.*
[254] *Ibid.*

packing, marking, labelling and placarding as well as the documentation of the hazardous goods and the construction and equipment of the vessel[255]. Chapter VIII contains requirements for nuclear ships, especially for dangerous radiation. Chapter IX demands the management for the safe operation of ships, while Chapter X rules the safety measures for high speed crafts. Chapter IX was adopted on 24 May 1994 and came into force on 1 July 1998[256]. It includes the International Safety Management (ISM) Code, which requires a safety management system to be established by the shipowner or any person who has assumed responsibility for the ship (the 'Company')[257]. This includes, inter alia, a safety and environmental protection policy and instructions and procedures to ensure safe operation of vessels and protection in compliance with relevant international and flag State legislation. Chapter XI contains special measures to enhance maritime safety and security. In the special interest of control of vessels in ports this chapter includes measures such as detention, restriction of operations including movement within the port or expulsion of a vessel from the port and the special responsibility of the Companies. Last but not least, Chapter XII obliges additional safety measures are taken for bulk carriers over 150 meters in length.

A Protocol on tanker safety and pollution prevention was adopted in 1978[258]. It enhances essential equipment of tankers, allows unscheduled inspections and increases the rules on Port State control.

4.12 International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978 (STCW)

The International Convention on Standards of Training, Certification and Watchkeeping for Seafarers was adopted on 7 July 1978 and entered into force in April 1984. It has 151 Parties[259]. It was amended several times and completely

[255] *Ibid.*
[256] *Ibid.*
[257] *Ibid.*
[258] *Ibid.*
[259] *Op cit,* note 197.

revised by the Convention in 1995[260]. These amendments entered into force on 1 February 1997[261].

STCW establishes qualification criteria for masters, officers and watch personnel on seagoing merchant vessels. A significant element of the Convention is the principle that it applies to ships of non-party States as well when visiting ports of States which are Parties to the Convention[262]. Article X obliges Parties to apply the control measures to ships of all flags[263]. This is necessary to make sure that no preferential treatment is given to ships entitled to fly the flag of a State which is not a Party to avoid the qualification criteria.

One of the major aspect of the 1995 amendments was the separation of the technical annex into norms, divided into Chapters as before[264]. Chapter I covers general provisions, Chapter II master and desk department, Chapter III engine department, Chapter IV radiocommunication and radio personnel, Chapter V special training requirements for personnel on certain types of ships Chapter VI emergency, occupational safety, medical care and survival functions, Chapter VII alternative certifications and Chapter VIII watchkeeping.

The new Chapter I comprises, inter alia, port State control. Regulation I/4 allows port States to intervene in the case of deficiencies deemed to pose danger to persons, property or the environment. The intervention can occur for instance if certificates are not in order or the vessel has participated in an accident or sinking or if the vessel manoeuvred in an unpredictable or dangerous manner. Furthermore it includes measures to prevent watchkeeping staff from suffering from tiredness. Parties are also obliged to investigate acts by people to whom they have issued certificates that endanger safety or the environment[265]. Disciplinary measures and sentences have to be set and imposed if the regulations of the Convention are not adhered to. Pursuant to regulation I/8 parties have to make sure that training, certification and other courses of action are constantly monitored by means of a quality standard system.

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[260] *International Convention on Standards of Training, Certification and Watching for Seafarers, 1978* at: http://www.imo.org/Conventions/contents.asp?doc_id=651&topic_id=257.
[261] *Ibid.*
[262] *Ibid.*
[263] *Ibid.*
[264] *Ibid.*
[265] *Ibid.*

Moreover, it determines in regulation I/12 that simulators are necessary for radar training. Besides, regulation I/11 requires that every master, officer and radio operator has to meet in intervals, not more than five years apart, the fitness standards and the levels of professional competence.

Chapter V includes special requirements for the crew of tankers and by reason of the running aground of the *Estonia* in September 1994 also for ro-ro ferries[266]. Since the 1997 amendments the crews of other passenger ships are now also included in regulation V/3[267]. Accordingly officers of tankers must have special duties relating to the cargo and cargo equipment[268]. They have to complete, inter alia, a shore-based fire-fighting course and either a period of shipboard service or an approved familiarization course. Chapter VI includes mandatory minimum requirements for: familiarization, basic safety training and instruction for all seafarers; issue of certificates of proficiency in survival craft, rescue boats and fast rescue boats, training in advanced firefighting and mandatory minimum requirements related to medical first aid and medical care. Chapter VII contains the standard regarding alternative certification (also known as the functional approach). Thereby it tries to make sure that safety and environment are not threatened in any way.

The STCW Code which is divided into Part A (which is mandatory) and B (which is optional) explains and amends the general condition in the Convention[269]. Part A includes the minimum standards of competence necessary for seagoing personnel which are contained in detailed series of tables[270]. Therefore new regulations under section A-II/1 und A-II/2 which were amended 1998 covers minimum standards of competence of crews, in particular relating to cargo securing, loading and unloading on bulk carriers[271]. Part B comprises recommended guidance to help Parties with the implementation of the Convention.

The so called ‘White List’ of countries shall contain the name of these countries which keep the conditions of the STCW Convention. The first List was published by

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[266] *Ibid.*
[267] *Ibid.*
[268] *Ibid.*
[269] *Ibid.*
[270] *Ibid.*
[271] *Ibid.*

IMO in 2000[272]. According to it 71 countries and one Associate Member of IMO had met the criteria for inclusion on the list[273]. It is expected that vessels flying flags of States which are not on the List will be increasingly subjected to port State Control inspections[274]. By it Non-Parties are forced to make a move to keep the conditions of the StCW Convention themselves. The latest List of confirmed States contains 118 States[275].

4.13 International Convention on Maritime Search and Rescue, 1979 (SAR)

The International Convention on Maritime Search and Rescue (SAR) was adopted on 27 April 1979 at a Conference in Hamburg, Germany, entered into force on 22 June 1985 and has currently 91 Parties[276]. The aim was to develop an international search and rescue plan to rescue people in danger after an accident at sea. Hence the rescue is co-ordinated by a SAR organization[277]. Before the Convention was adopted there was a traditional and international (SOLAS) duty of vessels to help ships in distress, but no international system to cover search and rescue operations[278]. The 1998 amendments of the SAR Convention were adopted in May 1998 and entered into force 1 January 2000[279]. These revised the technical requirements which are contained in an Annex. In the foreground of the SAR Convention however, is the rescuing of people. In this context, for easier search and rescue measures IMO's Maritime Safety Committee divided the world's oceans into 13 search and rescue areas[280]. Nevertheless, the regulations of SAR can indirectly reduce pollution after an incident. For example in the 'uncertainly phase'[281], that is, when a vessel is reported as missing, is overdue or has failed to make an expected position or safety report the necessary institutions can be alerted to give them time to prepare for duty to reduce

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[272] *Ibid.*
[273] *71 countries makes IMO's initial STCW White List* at:
http://www.imo.org/Newsroom/contents.asp?topic_id=68&doc_id=513.
[274] *Op cit,* note 260.
[275] Status of 24 April 2007 *International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978 as amended* at:
http://www.imo.org/includes/blastDataOnly.asp/data_id%3D18788/1163-Rev-2.pdf.
[276] *Op cit,* note 197.
[277] *International Convention on Maritime Search and Rescue, 1979* at:
http://www.imo.org/Conventions/contents.asp?doc_id=653&topic_id=257.
[278] *Ibid.*
[279] *Ibid.*
[280] *Ibid.*
[281] Chapter 1 Paragraph 1.3 Subparagraph 11 of the Annex of the SAR Convention.

for instance the leaking of hazardous substances or other environmental impacts. Thereby they can also support the information measures by the OPRC-Convention.

4.14 Places of refuge

As shown above (4.13) States have obligation to search and rescue when persons are in distress at sea. In the case that there is no risk for human life, the SAR Convention does not apply, but the possibility still present exists of a pollution threat. In this aspect the problem is that vessels with damages, especially ones carrying hazardous substances, are not the most welcomed visitors of any coastal State. There exists no legal obligation on a coastal State to permit such a ship to enter their internal waters or ports. On one side the best and easiest way to prevent a pollution incident after a vessel suffers damage is in most cases to unload the cargo and the fuel from the vessel and try to repair the damage when the ship is in the port. On the other side it can lead to a greater pollution menace. These points have to take into account in the political decision. To assist politicians in making the right decision at the right time the IMO Assembly adopted in November 2003 two resolutions addressing the issue of place of refuge for ships in distress[282]. The need for a place of refuge was considered as a response to the *Erika* incident of December 1999, the *Castor* incident in December 2000 and the sinking of the *Prestige* in November 2002[283].

Resolution A.949(23) *Guidelines on places of refuge for ships in need of assistance* contains advisory principles which have no binding effect. It recommends procedures to prevent the loss of the vessel or the occurrence of an environmental incident[284]. Masters and salvors shall thereafter assume the risk if the ship remains in the same position, continues its voyage, reaches a place of refuge or is taken out to sea[285]. They must notify the coastal State of their decision. Then the coastal State has to make contingency plans, based on an objective analysis of the situation, and has to weigh the advantages and disadvantages of the different possibilities, particular allowing of the use of a place of refuge[286].

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[282] *"Place of refuge" – addressing the problem of providing places of refuge to vessels in distress* at: http://www.imo.org/Safety/mainframe.asp?topic_id=746.
[283] *Ibid.*
[284] *Ibid.*
[285] *Ibid.*
[286] *Ibid.*

The second resolution, A950(23) *Maritime Assistance Services (MAS)* recommends that coastal States shall create a maritime assistance service to receive various reports, consultations and notifications required in a number of IMO instruments[287]. If the situation is not a distress situation but nevertheless requires exchanges of information between ship and coastal State it shall serve as a point of contact[288].

4.15 Convention for the Suppression of Unlawful Act Against the Safety of Maritime Navigation, 1988 (SUA)

The Convention for the Suppression of Unlawful Act Against the Safety of Maritime Navigation was adopted on 10 March 1988 and entered into force on 1 March 1992. The main purpose of the Convention is to ensure that unlawful acts which threaten the safety of ships and the security of their passengers and crews stop. The reason for drafting the Convention and its Protocol was the sum of reports during the 1980s of incidents involving piracy and armed robbery and hijacking. SUA regulates, inter alia, the delivery of the offenders to the authorities of any State Party which have taken them into custody[289]. According to the regulations of SUA the cross-national prosecution of these offenders shall deter the delinquents and with it indirectly save the decline of vessels and hence the pollution of the ocean.

4.16 Ship Recycling, disposal of vessels at sea or what to do with the discarded vessels?

As shown above under 4.5.3. IMO regulated the phase out for single-hull tanker latest in 2010. This protects the marine flora and fauna from the sinking of vessels and oil spills. But automatically the question arises on the other hand: What to do with all these discarded vessels? Surely, some of these vessels can be shown in museums and some can be disposed at sea under special requirements - but what to do with the rest of them? An appraised number of a minimum of 800 single-hulled tankers will need to be scrapped[290]. This aspect has to be seen in the direct coherence with Annex I of the MARPOL Convention because of the phase out of the single-

[287] *Ibid.*
[288] *Ibid.*
[289] *Convention for the Suppression of Unlawful Act Against the Safety of Maritime Navigation, 1988* at: http://www.imo.org/Conventions/mainframe.asp?topic_id=259&doc_id=686.
[290] *Green Paper* at: http://ec.europa.eu/environment/waste/ships/pdf/com_2007_269_en.pdf, page 2.

hull tankers which should not lead to an environmental disaster in sinking the vessels. But not only single-hull tankers have to be discarded. The general sailing life of a vessel is 25-30 years[291]. Accordingly there are constantly ships which could be a threat to the environment when they are going to be ranged out.

4.16.1 Convention for the Prevention of Marine Pollution by Dumping of Wastes and other Matter 1972

The Convention for the Prevention of Marine Pollution by Dumping of Wastes and other Matter 1972 (London Convention) and the 1996 Protocol of the London Convention deal with the recycling of ships. The London Convention entered into force in August 1975 and currently has 82 Contracting Parties[292]. The 1996 Protocol to the London Convention 1972 was developed to modernize the London Convention itself and possibly replace it. It entered into force on 24 March 2006[293]. Currently, 31 States are Contracting Parties to this Protocol[294]. Therefore, both the Convention and the Protocol allow the disposal at sea of a decommissioned vessel. In accordance with the *Specific Guidelines for Assessment of Vessels* the Convention and the Protocol assess any proposal for disposal at sea and require that recycling is considered as one of the alternatives[295]. Accordant to Article III (1) (ii) London Convention dumping means: 'any deliberate disposal at sea of vessels'. Therefore disposal of ships is a well-planned action and results from a thorough consideration of all abolishment options available, including recycling. In Article (III) (3) 'sea' is described as: 'all marine waters other than the internal waters of States'. Accordingly the act of abandonment of a vessel in the internal waters of a State is not covered by the London Convention and should be addressed by national laws of the State concerned[296]. However not all vessels can be disposed of. Moreover as stated in Article III of the London Convention as well, this is only a special solution and cannot be the general handling.

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[291] *Ship Breaking in India: Environmental Occupational Hazard* at: http://www.sspconline.org/article_details.asp?artid=art71.
[292] *London Convention 1972* at: http://www.imo.org/home.asp?topic_id=1488.
[293] *Ibid.*
[294] *Ibid.*
[295] *Specific Guidelines for Assessment of Vessels* at: http://www.imo.org/includes/blastDataOnly.asp/data_id%3D17023/4-Vessels.pdf.
[296] *Abandonment of ships* at: http://www.basel.int/meetings/oewg/oewg4/documents/i03e.pdf.

4.16.2 The Basel Convention on the Control of Transboundary Movements of Hazardous Waste and their Disposal

The export of hazardous substances in vessels planned for dismantling is a topic of the 1989 Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal. The Basel Convention currently has 179 Parties[297]. The main objective of this Convention is to protect human health and the environment against adverse effects caused by the generation, improper management and transboundary movements of hazardous wastes. One of the main aims of the Basel Convention is to ensure that hazardous and other wastes are managed in an environmentally sound manner[298]. In order to assist States that have or wish to establish recycling possibilities the Conference of the Parties of the Basel Convention adopted in December 2002 the *Technical Guidelines for the Environmentally Sound Management and Full and Partial Dismantling of Ships*[299]. These guidelines have been prepared with the intention of providing guidance to countries which have or wish to start facilities for ship dismantling[300]. The guidelines give information and recommendations of procedures, processes and practice that should be realized to confirm with the environmentally sound management requirements under the Convention[301].

4.16.3 New IMO Ship Recycling Convention

The IMO is presently working on a convention to control the breaking up of old ships. A main aspect is that a ship consists about 95 per cent of steel, this steel and some other materials can be recycled. This saves raw material and energy, and it is good for the environment. On the other side of this matter there are environmental, health and safety risks related to some materials. In the 1970s most scrapping took place in Europe[302]. It was a highly mechanised technical operation. But the health environment and safety criteria caused costs to escalate[303]. Accordingly the scrapping industry moved to cheaper working countries. 90 per cent of the global scrapping

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[297] *Parties to the Basel Convention* at: http://www.basel.int/ratif/convention.htm.
[298] *Technical Guidelines for the Environmentally Sound Management and Full and Partial Dismantling of Ships* at: http://www.basel.int/meetings/cop/cop6/cop6_23e.pdf#annex page 7
[299] *Ibid.*
[300] *Ibid.*
[301] *Ibid.*
[302] *Shipbreaking* at: http://www.greenpeaceweb.org/shipbreak/whatis.asp.
[303] *Ibid.*

now occurs in Asia, mostly at yards or on beaches in India, Pakistan and Bangladesh[304].

The new convention will regulate the design, construction, operation and preparation of ships so as to facilitate safe and environmentally sound recycling, without compromising the safety and operational efficiency of ships[305]. Furthermore, it will govern the operation of ship recycling facilities in a safe and environmentally sound manner and the establishment of an appropriate enforcement mechanism for ship recycling, incorporating certification and reporting requirements[306].

The IMO convention will apply to new ships and such in service. In the case of new vessels, the necessary information can be included during the building of the ship[307]. Producers have to deliver shipyards with necessary information on their products. The number of different materials to be recorded is greater for new vessels than for existing ships[308]. As for ship rebuilding and repairs, any kit or material added to a vessel has to be recorded just as detailed as for new ships[309].

The convention to regulate the breaking up of old ships IMO is drafting at the moment is expected to be adopted in 2008-2009[310]. However, implementation is not expected before 2013[311]. This is too late for the remaining single-bottom tankers that are up for scrapping. Accordingly for the next couple of years until the IMO ship recycling convention will enter into force it is a challenge for the ship owners and the recycling yards. They can follow the non-binding guidelines which exist (see 4.15.3) and can adjust to the regulations of the upcoming convention before it enters into force. Thereby ship operator's can show and prove their stance on environmental protection which will influence its public image.

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[304] *Ibid.*
[305] *Recycling of ships* at: http://www.imo.org/Environment/mainframe.asp?topic_id=818.
[306] *Recycling of ships* at:
http://www.imo.org/Newsroom/mainframe.asp?topic_id=1472&doc_id=8207.
[307] *Ibid.*
[308] *Ibid.*
[309] *Ship recycling Tankers on the Beach* at:
http://www.dmkn.de/1779/technologie.nsf/AttachShow!OpenFrameset&attachfile=/1779/technologie.nsf/EC826F3A4A0E3D37C125731C003E3771/$File/6-7_Ship_Recycling.pdf.
[310] *Op cit,* note 305.
[311] *Op cit,* note 309.

4.16.4 The Guidelines on Ship Recycling

In December 2003, IMO adopted a non-binding Guideline on Ship Recycling, which was amended two years later[312]. This Guideline provides the model of a 'Green Passport' for vessels, regulates shipbreaking and requires the documentation of potentially hazardous substances used in the vessel structure and equipment[313]. This means that shipowners have to amass a list of dangerous materials and their exact location onboard for each of their ships. This list must be kept up to date during the operating life of the ship[314]. The only substances that need to be listed only once – just before the ship is recycled – are garbage and supplies[315]. This list shall enable recycling yards to organize their work better[316]. Based on this information, they can plan their operations and be ready for the particular requirements of each ship before dismantling it[317]. A general requirement for all vessels in this context is the obligation of 'gas-free for hot work' on board the vessels when being sorted out at the recycling facility[318]. This means that rooms and tanks have to be free of flammable gases before dismantling work can begin. Turkey requires all vessels brought to a Turkish yard for shipbreaking to be 'gas-free for hot work'[319]. Although it is labour and time intensive, getting rid of remaining gases does not raise technical problems since tankers usually carry gas-freeing equipment on board[320]. Unfortunately these are only Guidelines and not binding conditions. But as shown above this is the chance of the oil shipping industry to work on their image and fulfil these guidelines.

5. Salvage and Removal from shipwrecks

Marine salvage attitudes were based on the idea that those who assists in saving possessions are allowed to get a proportionate payment for their effort and their expenses[321]. On the other hand those who have profited from such endeavours should

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[312] *Ibid.*
[313] *Ibid.*
[314] *Ibid.*
[315] *Ibid.*
[316] *Ibid.*
[317] *Ibid.*
[318] *Ibid.*
[319] *Ibid.*
[320] *Ibid.*
[321] Gold *Marine Salvage: Towards a New Regime* in Journal of Maritime Law and Commerce, 1989, 487.

contribute to the prize in proportion to the value of their property or interest saved[322]. These rules became customary law and were codified in the 1910 Salvage Convention[323]. After big tanker incidents like the *Torrey Canyon* accident and the *Amoco Cadiz* disaster which spilled thousands of tons of crude oil on the coasts of Britain and France it has been realized that these coastal States also have an interest in the salvage and removal of vessels[324].

However, to salvage and/or remove a vessel an important factor is the level of destruction at the time of the loss or shortly afterwards due to the nature of the loss, salvage or later demolition. Several kinds of destruction like collision with another ship, destruction in warfare or being blown onto a beach, reef or rocks during a storm make the salvage and removal even more difficult. The same applies when after a loss the owners of the ship try to recover valuable parts of the ship or its cargo. Furthermore, wrecks in low water near frequented shipping lanes are often demolished to reduce the danger to other vessels[325]. These aspects have to be seen during salvage and removal, which makes these actions more difficult and cost-intensive.

5.1 International Convention on Salvage, 1989

The International Conference on Salvage was held in London in April 1989 for the purpose of establishing uniform international rules regarding salvage operations and resulted in the adoption of the International Convention on Salvage, 1989[326]. The International Convention on Salvage entered into force on 14 July 1996 and currently has 56 Parties[327].

Pursuant to Article 1 Paragraph (a) of the Convention salvage means 'any act or activity undertaken to assist a vessel or any other property in danger in navigable waters or in any other waters whatsoever'. This Convention does not apply to platforms, drilling units, warships and other non-commercial vessels owned or

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[322] *Ibid.*
[323] *Ibid.*
[324] *Ibid.*
[325] *Ibid.*
[326] *International Convention on Salvage, 1989*
at:http://www.imo.org/Conventions/mainframe.asp?topic_id=259&doc_id=687.
[327] *Op cit,* note 197.

operated by a State as long as the State hasn't decided that this kind of ship also falls under these rules[328]. Article 6 regulates the freedom of salvage contracts, which preserve the basis of general commercial negotiation. Admittedly, the flexibility is restricted in terms of 'the duty to prevent or minimize damage to the environment'. Therefore the term 'damage to the environment' is defined in Article 1 (d) and means 'substantial physical damage to human health or to marine life or resources in coastal or inland waters or areas adjacent thereto, caused by pollution, contamination, fire, explosion or similar major incidents'. According to Article 8 all parties who are involved in the salvage operation have to exercise due care to prevent or minimize damage to the environment. Besides, the coastal State has the right to protect its coastline from pollution or threats of pollution within the principles of international law. Article 12 contains the traditional principle of 'no cure – no pay'. Thereafter, a payment to a salvor only takes place if the salvage operation has had a useful result, which is the case when damage to the environment is prevented or minimized. Article 13 describes the conditions to be taken into account in fixing the salvors' reward for successful salvage operations. This incorporates 'the skill and efforts of salvors in preventing or minimizing damage to the environment[329]'. Article 14 governs 'special compensation'. It applies in cases where environmental damage has been prevented or minimized but the ship nonetheless sunk. The reason for including this Article was to persuade salvors to undertake specifically difficult savage operations where the possibility of success was slim but the risk of environmental damage substantial[330]. Accordingly, if the salvor has prevented or minimized damage to the environment the special compensation payable by the owner shall be up to a maximum of 30 per cent of the costs brought upon by the salvor himself[331]. The payment can rise up to 100 per cent of the costs if the tribunal or arbitrator thinks it is fair and just[332]. However, in the *Nagasaki Spirit* Case the Lords came to the result that a rate is fairl when it includes the total expense for equipment and personnel and exclude any element of profit[333]. This result can be explained with the roots of salvage. As shown above salvage based on the 'no cure – no pay' principle in respect

[328] Article 2-4.
[329] Article 13.
[330] *Op cite,* note 321, page 499.
[331] Article 14 (2).
[332] Article 14 (2).
[333] *House of Lords – Semco Salvage & Marine Pte. Ltd. v. Lancer Navigation* at: http://www.publications.parliament.uk/pa/ld199697/ldjudgmt/jd970206/semco01.htm.

of successfully preserving the ship, cargo and associated interests[334]. Based on that principle the environmental aspects are now included but will not be handled differently (in the exemption the law includes itself). Accordingly the salvors' payment now contains an additional element to reflect the risk to the environment, but will not include a profit for just a rescue attempt.

5.2 The Nairobi International Convention on the Removal of Wrecks, 2007

The new International Convention on the Removal of Wrecks has been adopted in Kenya on 18 May 2007, after a five day Conference - held in the United Nations Office at Nairobi (UNON) under the auspices of the IMO[335]. The Convention will be open for signature from 19 November 2007 until 18 November 2008 and, thereafter, will be open for ratification, accession or acceptance[336]. Pursuant to Article 18 it will enter into force 12 months after the date on which 10 States have either signed it without reservation as to ratification, acceptance or approval or have deposited instruments of ratification, acceptance, approval or accession with the Secretary General.

The new Convention will determine the basis for a State to remove shipwrecks that may have the potential to harm the safety of lives, goods and property at sea, as well as the marine environment[337]. Hence, it will fill a gap in the international framework by making sure of the prompt and effective remove of foundered vessels. The implementation area of the Convention is defined in Article 1 (1) as the EEZ of a State. If a State does not have an EEZ then the implementation area is a zone beyond and adjacent to the territorial sea extending not more than 200 nautical miles from the baseline from which the breath of the territorial sea is measured. In that aspect the new convention is special because law 'normally is made for application in jurisdiction rather in international waters. As a result this convention's provisions, insofar as they relate to the EEZ, apply only when both flag State and coastal State

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[334] *Ibid.*
[335] *Wreck Removal Convention 2007* at: http://www.simsl.com/Wreck0607.html.
[336] Article 17 (1).
[337] *Op cit,* note 335.

are Parties to the new convention'[338]. It also gives the possibility to Parties to apply certain provisions to their territory, including their territorial sea. The convention does not apply to warships or State vessels on governmental non-commercial service, unless the State determines otherwise[339]. Furthermore it does not apply to measures taken under the Intervention Convention 1969 and its Protocol[340]. Despite its relatively small application area between the territorial sea and the EEZ, the number of abandoned wrecks in this area is estimated at almost 1,300 worldwide[341] The *SS Jacob Luckenbach*, a C-3 freighter fully laden with 1950 tonnes of fuel oil, sank in 56 m of water on 24 July 1953 as a result of a collision[342]. It ran aground 27 km southwest of the entrance to San Francisco Bay, United States[343]. It spilled oil during 1992 - 2002 before a salvor hired by the US Coast Guard successfully removed all accessible oil[344]. The oil removal was difficult because of the sensitive area, the adverse weather and poor underwater visibility[345]. Also the aggregate state of some oil was a removal obstacle. It needed to be hot-tapped and heated to be able to pump out the oil[346]. The costs for all salvage and spill-response work was US$ 19,200,000[347]. Another current example is the *Tricolor.* It collided in December 2002 with a container ship 22 miles off Dunkirk in the Dover Strait and sunk[348]. In the following month it was hit twice by other ships although at least the vessel *Vicky* was warned about the *Tricolor*[349].

Pursuant to Article 1 (7) of the new convention 'removal' means 'any form of prevention, mitigation or elimination of the hazard created by wrecks'. Article 5 requires that the master and the operator of a vessel have to report and locate the wreck. The report has to include the casualty to the nearest coastal State, and among other things, the precise location of the wreck, the size, type, and construction of the

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[338] ISU Legal Adviser Archie Bishop in: *Salvors Welcome New Nairobi Wreck Removal Convention* at: http://www.marinelink .com/Story/Salvors+Welcome+New+Nairobi+Wreck+Removal+Convention-207311.html.
[339] Article 4 (2) and (3).
[340] Article 4 (1).
[341] *Conference to adopt new international treaty on wreck removal opens in Nairobi* at: http://www.helcom.fi/press_ofice/news_baltic/en_GB/IMO_briefing_11/.
[342] *Op cit,* note 22.
[343] *Ibid.*
[344] *Ibid.*
[345] *Ibid.*
[346] *Ibid.*
[347] *Ibid.*
[348] *Tanker held for checks after hitting shipwreck* at: http://findarticles.com/p/articles/mi_qn4158/is_20030103/ai_n9675762.
[349] *Ibid.*

wreck, the nature of the damage, the amount and type of cargo and oil on board the vessel and the damage likely to result should the cargo or oil be released into the environment[350]. Article 6 determines conditions that pose a hazard by wrecks, including depth of water above the wreck, proximity of shipping routes, traffic density and frequency, type of traffic and vulnerability of port facilities, as well as environmental conditions such as damage likely to result from the release into the marine environment of cargo or oil. Obligations for the coastal State are regulated in Article 7 and 8. Therefore the coastal State has to warn of hazardous wrecks as good as possible, provide their precise location and has to ensure that all practicable steps are taken to mark those wrecks.

Article 9 (1) provides that a coastal State must inform the flag State and the registered owner of the vessel, when it notices that the ship is a hazard. Together with the flag State and other involved States the coastal State has to find measures to be taken in relation to the wreck. Furthermore it contains measures to facilitate the removal of wrecks, including rights and obligations to remove hazardous ships and wrecks. These measures set out when the shipowner is responsible for removing the wreck and when a State can intervene. The owner may contract with any salvor [351].

6. Liability of the owner or master or operator of the ships

6.1 History

In the past at least one man was responsible for the safety of a journey: the captain. He was liable for the technical equipment and the choice of the safest route and ports where they anchored[352]. The captain's decisions were regulated by the ship-owners who wanted to make the maximum profit by going to sea even when the weather didn't allow for it or by overloading the ship[353].

[350] Article 5 (2).
[351] Article 9 (4).
[352] *Op cit,* note 1.
[353] *Ibid.*

6.2 Polluter Pays Principle

The idea behind liability is the 'polluter pays principle'. This means that the costs of pollution should be borne by the originator of the pollution rather than society at large[354]. It is summarized in Principle 16 of the Rio Declaration which provides:

> 'National authorities should endeavour to promote the internalisation of environmental costs and the use of economic instruments, taking into account the approach that the polluter should therefore in principle, bear the costs of pollution, with due regard to the public interests, and without distorting international trade and investment'.

This principle is explicitly contained in many maritime conventions, but it is not completely developed in them. For the element of 'taking liability' one problem is that there are different kinds of potential payers namely persons, companies, industries and insurances. But are these the right polluters? Finding the right candidate seems to be a problem. Possibly polluters include, the operator of an oil or chemical tanker, the owner of the cargo or the shipowner himself[355]. From time to time vessels also sink because of a mistake made by a harbour pilot or another navigation authority. The question which arises is who among these potential candidates is the polluter who should be made responsible for the pollution? This question is not answered by the polluter pays principle[356]. At the moment, as will be shown later, usually the shipowner and the cargo owner are usually responsible for paying for the pollution, while the liability of the other possible defendants is excluded, to make it easier for the claimants[357].

Furthermore the question arises of whether it is necessary, for only one payer to bear the whole amount of the damage and if it is really possible for him to pay all on its own? In general there is no need to pay on one's own. Moreover, in the shipping industry insurance usually contributes for damages. However, all of the liability agreements are limited[358]. Apart from limitations on the amount payable, there are also losses which are not covered by the treaties because of the location of the incident. In those cases no damage compensation is paid. The 1992 Oil Pollution Fund Convention as well as the Wreck Removal Convention are examples of thesis

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[354] *Op cit,* note 68, page 19.
[355] Birnie und Boyle *International Law and the Environment* (2ed) Oxford 2002, 384.
[356] *Ibid.*
[357] *Ibid.*
[358] Most by the Convention on Limitation of Liability for Maritime Claims, 1976 (LLMC 76).

limitations. Both exclude the area beyond the EEZ[359]. The Salvage Convention is also limited in most cases as mentioned above[360]. Of course the reason for the limitation is money. But is this really compatible with the polluters pay principle as well as the principle of sustainable development? Sustainable development is defined as: 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains two key concepts: the concept of "need"… and the idea of limitations'[361]. The idea of limitation relates to the need of this generation to sustain the environment for the following generations. On the other hand the limitation idea has to be seen as a possible incentive for more States to become Parties to the liability conventions. Without limitations, the main countries would not have adopted the conventions because it would cut down trade, and with it the economy. This would be the case because no insurance company would incur the risk of insuring the full amount of a ship accident. On the other hand no shipowner could handle the risk on its own. Accordingly there would be no trade by shipping, or no or even less compensation if an accident occurs. This is even worse than the situation at the moment, and this scenario would be a violation against the polluter pays principle which prohibits 'distorting international trade and investigation'. Therefore it is consistent with the principles.

6.3 International Convention on Civil Liability for Oil Pollution Damage 1969/1992 (CLC)

The International Convention on Civil Liability for Oil Pollution Damage (CLC) was adopted on 29 November 1969, entered into force on 19 June 1975 and had 39 Parties[362]. The reason for the adoption of the Convention was that the 1967 *Torrey Canyon* disaster has shown the need for an international agreement on a regime of civil liability for such accidents. It has been replaced by the 1992 Protocol and was further amended in 2000[363]. The Protocol entered into force on 30 May 1996 and

[359] Article 1 Wreck Removal Convention and Article 3 Oil Pollution Fund Convention.
[360] See under 5.1.
[361] UN Commission on Environment & Development (Brundtland) Report 1987.
[362] *Op cit,* note 197.
[363] *International Convention on Civil Liability for Oil Pollution Damage (CLC), 1969* at: http://www.imo.org/Conventions/contents.asp?doc_id=660&topic_id=256.

currently has 117 Parties[364]. The negotiators of the Convention tried to contain the liability of the shipowner who was traditionally responsible for the loss of the vessel including the consequential charges and share the burden with the cargo owner[365]. The allocation of liability in the Protocol is different from the original Convention. Here, pursuant to Article 4 of the Protocol, no claim for compensation may be made against the ship's manager, operator, charterer, crew, pilot, salvor, or their servants or agents, unless damage resulted from their personal act or omission 'committed with intent to cause such damage, or recklessly and with knowledge that such damage would probably result'. It also includes the cost of preventive measures. If the accident occurred as a result of war, hostilities, insurrection, civil war or natural phenomena, such as hurricanes, of an exceptional, inevitable and irresistible character or was wholly caused intentionally by a third party or by the negligence of those responsible for navigation aids it arises that the owner has no liability[366]. According to Article 6 of the Protocol compensation is limited to the following amounts:

- For a ship not exceeding 5,000 gt, liability is limited to 3,000,000 Special Drawing Rights (SDR) (about US$ 3,800,000)
- For a ship 5,000 to 140,000 gt: liability is limited to 3,000,000 SDR plus 420 SDR (about US$ 538) for each additional unit of tons
- For a ship over 140,000 gt: liability is limited to 59,700,000 SDR (about US$ 76,500,000).

These limits were increased at the beginning of November 2003 to SDR 89,700,000 instead of SDR 59,700,000 under the amendments in 2000[367]. If the damage is higher than the owner's liability, the International Oil Pollution Compensation Fund (IOPC) is liable to compensate it up to a total of SDR 203,000,000[368]. Pursuant to Article 6 Paragraph 2 of the Protocol, the owner shall not be allowed to limit his liability 'if it is proved that the pollution damage resulted from his personal act or omission, committed with the intent to cause such damage, or recklessly and with knowledge that such damage would probably result'. This is the only case of compensation where the polluter pays principle is completely transferred into the Protocol.

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[364] *Op cit,* note 197.
[365] *Op cit,* note 355, page 385.
[366] *Op cit,* note 355, page 386.
[367] *Op cit,* note 363.
[368] *Ibid.*

The Protocol applies to damage arising from oil pollution from vessels in the Party's territory, the territorial sea and the EEZ or an equivalent area, of a party to the Protocol[369]. Furthermore, the Protocol does not apply to warships or other ships owned or operated by a State and used for the time being for Government non-commercial service[370]. The Protocol, however, applies in respect of the liability and jurisdiction provisions, to vessels owned by a State and used for commercial purposes[371]. The only exemption as relates to such vessels is that they are not obliged to carry insurance[372]. In its place they must carry a certificate issued by the authority of the State of their registry which certifies that the vessel's liability under the Convention is covered.

If it is necessary that the victim of the oil pollution makes a claim for damages, the CLC provides that the victim can only claim in the courts of the State Party where the damage occurred, regardless of where the vessel which caused the accident is registered[373]. In most cases, the State with jurisdiction is the state where the victim lives; therefore, it is a wise regulation which makes a claim for him easier and saddles the victim with less costs to claim.

6.4 International Convention on the Establishment of an International Fund for Oil Pollution Damage, 1971/1992 (1971/1992 Fund Convention)

The International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage was adopted on 18 December 1971 and entered into force on 16 October 1978[374]. In combination with the 1969 Civil Liability Convention the 1971 Fund Convention tries to resolve the problems suffered by the victims of oil pollution. The reason to establish the Fund Convention 1971 and combine it with the Civil Liability Convention 1969 was that the latter one

[369] Article 2 of the Protocol.
[370] *Op cit,* note 363.
[371] *Ibid.*
[372] *Ibid.*
[373] *Op cit,* note 16, page 360.
[374] *International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage (Fund), 1971* at:
http://www.imo.org/Conventions/mainframe.asp?topic_id=256&doc_id=661.

did not fulfil the concerns of all States[375]. Moreover some States wanted to increase the liability whereas others wanted to reduce the liability of the shipowner for unforeseeable harm[376]. The Fund Convention 1971 was developed to achieve a compromise by the cargo interests, which would be available for the dual purpose of, on the one hand, relieving the shipowner of the burden by the requirements of the new convention and, on the other hand, providing additional compensation to the victims of pollution damage in cases where compensation under the 1969 Civil Liability Convention was either inadequate or unobtainable[377]. The 1971 Fund Convention was replaced by the 1992 Fund Protocol, which was adopted on 27 November 1992, entered into force on the 30 May 1996 and currently has 101 Parties[378]. However, two of the three purposes in the Fund Convention 1971 and 1992 are still the same namely:

- to provide compensation for pollution damage,
- to give effect to the related purposes set out in the Convention[379].

The first purpose of the Fund is to establish the obligation to pay compensation to States and persons who suffer pollution damage, if such persons are unable to obtain compensation from the owner of the ship from which the oil escaped or if the compensation due from such owner is not sufficient to cover the damage suffered[380].

The Fund's obligations are limited under the 1992 Protocol, to the maximum amount of 135,000,000 SDR (about US$ 173,000,000). These funds are for compensation for a single incident, including the limit established under the 1992 CLC Protocol[381]. However, if three States contributing to the Fund receive more than 600,000,000 tons of oil per annum, the maximum sum is raised pursuant to Article 6 Paragraph 4 Subparagraph c) up to 200,000,000 SDR (about US$ 256,000,000). According to the Amendments 2000 which entered into force on 1 November 2003, the maximum amount of compensation payable from the Fund for a single incident, including the limit established under the 2000 CLC amendments, is increased to 203,000,000 SDR (US$ 260,000,000) unless three States contributing to the Fund receive more than 600,000,000 tons of oil per annum, the maximum amount is raised to 300,740,000

[375] *Ibid.*
[376] *Ibid.*
[377] *Ibid.*
[378] *Op cit,* note 197.
[379] Article 2 of the Fund Convention 1971 and Article 3 of the Fund Convention 1992.
[380] *Op cit,* note 374.
[381] Article 6.

SDR (US$ 386,000,000)[382]. Nonetheless, if there is no owner responsible, or he is responsible but unable to meet his liability, the Fund will be required to pay compensation for the whole amount of damages, whereby this can be limited to a maximum payment per each incident[383].

Thereby the Fund only applies:

> '(a) to pollution damage caused:
> (i) in the territory, including the territorial sea, of a Contracting State, and
> (ii) in the exclusive economic zone of a Contracting State, established in accordance with international law, or, if a Contracting State has not established such a zone, in an area beyond and adjacent to the territorial sea of that State determined by that State in accordance with international law and extending not more than 200 nautical miles from the baselines from which the breadth of its territorial sea is measured;
> (b) to preventive measures, wherever taken, to prevent or minimize such damage'[384].

Furthermore the Fund can provide assistance to its parties which are threatened or affected by pollution and wish to take measures against it. These measures can be personnel, material, credit facilities or other aid[385]. The Fund is not required to indemnify the owner if damage is caused by his intentional misbehaviour or if the accident was caused, even partially, because the ship did not comply with certain international conventions[386].

On 16 May 2003 a diplomatic conference adopted an International Oil Pollution Compensation Supplementary Fund at IMO Headquarters in London. It entered into force on 3 March 2005 and currently has 21 members[387]. This Fund shall complement the compensation available under the 1992 Civil Liability and Fund Conventions with an additional, third rank of compensation. Thereby, Parties of the 1992 Fund have the option to sign. The payable compensation is limited to a total of 750,000,000 SDR (approximately US$1,000,000,000) for an incident including the amount of compensation paid under the existing CLC/Fund Convention[388]. To finance the Supplementary Fund every company registered under the jurisdiction of a Party which, in any calendar year, has received total quantities of oil exceeding

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[382] *Op cit,* note 374.
[383] Article 4 of the Fund Convention 1971 and Article 5 and 6 of the Fund Convention 1992.
[384] Article 4 of the Fund Convention 1992.
[385] Article 4 Paragraph 7 Fund Convention 1971.
[386] *Op cit,* note 374.
[387] *Facts and Figures* at: http://www.iopcfund.org/facts.htm.
[388] *Op cit,* note 374.

150,000 tons must pay an annual contribution to the fund[389]. The same payment requirements for contributions apply to the 1992 Fund Conventions, which together make up the IOPC. The IOPC was set up by the Fund Convention 1971 and is based in London.

6.5 Convention on Civil Liability for Bunker Oil Pollution Damage, 2001 (Bunker Convention 2001)

The Bunker Convention 2001 was adopted on 23 March 2001. Pursuant to Article 12 it was open for signature from 1 October 2001 until 30 September 2002. It will enter into force one year after 18 States, including five States each with ships whose combined gt is not less than 1,000,000 gt, have either signed it without reservation as to ratification, acceptance or approval or have deposited instruments of ratification, acceptance, approval or accession with the IMO Secretary-General[390]. Currently, sixteen States, namely, Bulgaria, Croatia, Cyprus, Estonia, Germany, Greece, Jamaica, Latvia, Luxembourg, Poland, Samoa, Slovenia, Singapore, Slovenia, Spain, Tonga and the UK have signed it[391]. The Convention was developed to make sure that adequate, prompt, and effective compensation for incidents caused by spills of oil or fuel carried in ship bunkers will occur[392]. It also includes preventive measures, and is modelled on the 1992 CLC Convention[393]. Accordingly, it will apply to damage caused in the territory of a Party, including the territorial sea, and in the EEZ. If a State Party has not established an EEZ the Convention will apply to a zone in an adequate region to this, which means the area 200 nautical miles from the baselines from which the breadth of its territorial sea is measured[394]. As with the 1992 CLC, a key requirement in the present Convention is the necessity for the registered owner of a vessel over 1,000 gt to maintain compulsory insurance to cover liability for pollution damage, with liability limits attached to the Convention on Limitation of Liability for Maritime Claims, 1976 (LLMC 76)[395] and its 1996 Protocol. Hence, the compensation for harm to the environment is limited to loss of profit and the costs of

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[389] *Ibid.*
[390] Article 14 of the Bunkers Convention 2001.
[391] *Op cit,* note 197.
[392] *New Releases* at: http://www.mpa.gov.sg/infocentre/newsreleases/2006/nr060330.htm.
[393] *Ibid.*
[394] Article 2 of the Bunker Convention 2001.
[395] Article 7 of the Bunker Convention 2001.

reasonable restoration. This demonstrates that the polluter pays principle will be limited in amount and application area another time.

6.6 The International Convention on Liability and Compensation for Damage in Connection with the Carriage of Hazardous and Noxious Substances at Sea, 1996 (HNS Convention)

The Hazardous and Noxious Substances Convention (HNS Convention) was adopted by IMO on 3 May 1996[396]. It will, when it enters into force, provide compensation for damages resulting from the maritime transport of hazardous and noxious substances[397]. Pursuant to Article 46, the HNS Convention will enter into force 18 months after the date on which at least 12 States (including four States each with not less than 2,000,000 units of gt), have signed it. Currently it has 8 members[398], namely Angola, Cyprus, Morocco, the Russian Federation, Saint Kitts and Nevis, Samoa, Slovenia and Tonga.

The HNS Convention defines HNS not by name, but referenced in a list of individual substances that have been previously identified in a number of IMO Conventions and Codes intended to ensure maritime safety and prevention of pollution[399]. Therefore HNS include over 6,000 substances of packaged goods and bulk cargos[400]. Bulk cargo means solids, liquids, which contain both persistent and non-persistent oil, or liquefied gases[401]. Other bulk solids such as coal and iron ore are excluded because of the low hazards they present[402]. The number of materials integrated is very large: IMDG Code, for instance, lists hundreds of items which can be dangerous when shipped in packaged form[403].

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[396] *The HNS Convention* at:http://www.hnsconvention.org/en/theconvention.html.
[397] *Ibid.*
[398] *Op cit,* note 197.
[399] *HNS brochure* at: http://www.hnsconvention.org/en/HNS%20brochure%20English.pdf.
[400] *An Overview of the HNS Convention* at:http://www.oceansatlas.com/unatlas/isues/pollutiondegradation/liability_andcompens/hns_convention.htm.
[401] *Op cit,* note 399.
[402] *Ibid.*
[403] *Ibid.*

The HNS Convention was also modelled on the CLC and its fund. The coverage is detailed in Article 3 and will include any damage caused in the territory, including the territorial sea, contamination damage in the EEZ or, if a State Party has not established such a zone, in an area beyond and adjacent to the territorial sea extending not more than 200 nautical miles from the baselines from which the breadth of its territorial sea is measured. Furthermore it will apply to preventive measures wherever they have been taken and to damage, other than contamination, caused

> 'outside the territory, including the territorial sea, of any State, if this damage has been caused by a substance carried on board a ship registered in a State Party or, in the case of an unregistered ship, on board a ship entitled to fly the flag of a State Party'.

It excludes damage as defined in the CLC, or which results from radioactive substances[404]. Nor does it extend to warships or government non-commercial vessels, except if the State has chosen to include them[405]. Parties can exclude small vessels carrying packaged goods on domestic voyages from the field of application of the Convention[406]. This however, may expand their own susceptibility. Damage in the sense of the convention includes loss of life or personal injury on board or outside the ship carrying HNS, loss of or damage to property outside the ship, loss or damage caused by contamination of the environment, loss of income in fishing and tourism, and the costs of preventive measures and further loss or damage caused by such measures[407].

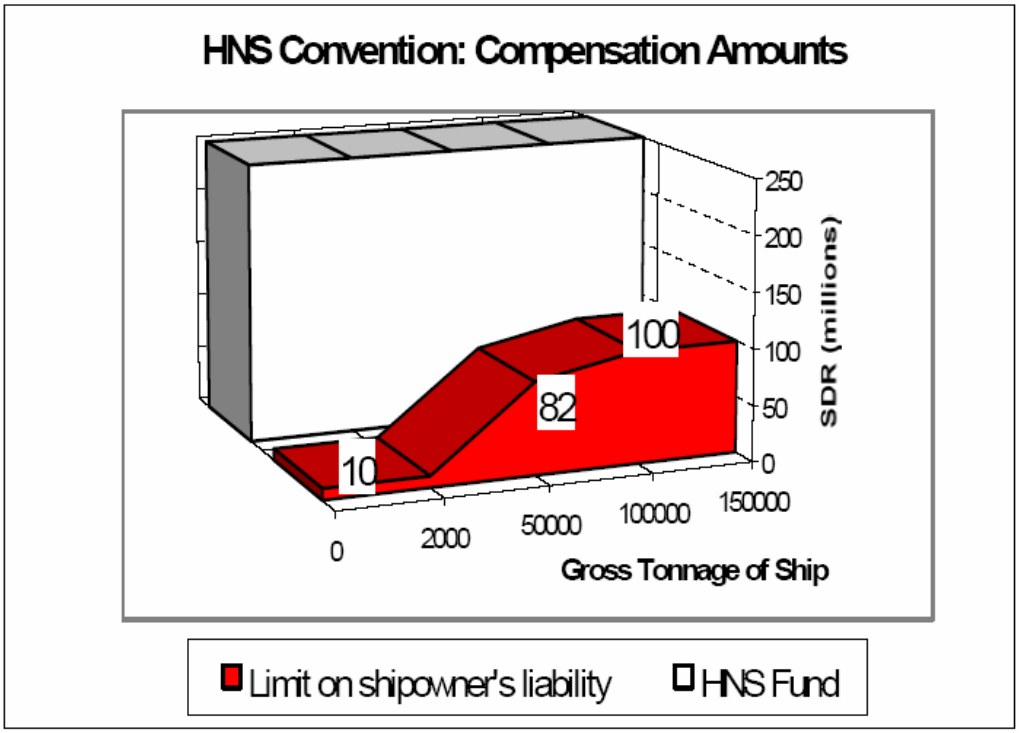
The HNS Convention establishes a two-tier system of liability and compensation. The first tier is paid by the individual shipowner or insurer, and the second by the HNS Fund[408]. 1st Tier - Liability of the shipowner is regulated in Article 7 which imposes strict liability on the shipowner following an incident involving HNS. This means that the shipowner is liable even in the absence of fault. The fact that damage has occurred is enough to make the shipowner liable; the satisfactory point for his liability is the causal link between the damage and the HNS carried on board the ship. Liability is only barred if the owner proves that the damage was due to an act of war, hostilities, civil war, insurrection or a natural phenomenon of an exceptional,

[404] Article 4.
[405] Article 4 (5).
[406] Article 5.
[407] *Op cit,* note 400.
[408] *Op cit,* note 399

inevitable and irresistible character, was intentionally caused by a third party, was due to the failure of an authority to maintain lights or navigational aids, or was attributable to a failure of a shipper to disclose the nature of the cargo.

The amount of the shipowner's liabilitiy for each incident is connected to the tonnage of the ship, with a maximum of SDR 100,000,000 (as shown in figure 3.), with the exception of damage resulting from the personal act or omission of the owner committed with intent to cause, it or recklessly with knowledge that it would possibly result[409]. Claims of death or injuries have priority for up to two-thirds of the available compensation amount[410].

Figure 1. Compensation amounts under the HNS Convention, 1996.



source: An Overview of the HNS Convention at:
http://www.imo.org/includes/blastDataOnly.asp/data_id%3D6505/HNSconventionoverview.pdf

Under Article 12 shipowners are required to have insurance or other financial security equal to the limit of their liability. A compulsory insurance certificate must be carried to demonstrate this coverage.

[409] Article 9.
[410] Article 11.

The establishment of the International Hazardous and Noxious Substances Fund (HNS Fund) is the second tier of coverage. It is regulated in Article 13 and determines compensation payable when the shipowner is not liable or is unable to discharge his liability, or the damage exceeds the limited amount. The maximum compensation under the HNS Fund cannot exceed SDR 250,000,000[411]. Under Article 16 (1) a general account for the Fund, which shall be divided into sectors is established. Furthermore, there shall be separate accounts for oil, liquefied natural gases (LNG) and liquefied petroleum gases (LPG)[412]. The contributions to the Fund will be paid annually on the basis of the quantity of relevant substances received in the territory of each Party during the previous year[413]. The amount of the contribution will be calculated to meet the duty of the Fund for its payment[414]. In this context a contributor is the person who has received above a special limit of the contributing substances[415]. To find the right contributor the Parties must report them to the HNS Fund[416]. However, if the State fails to report the potential contributor the State will be responsible for any lost contribution.

The HNS Convention further determines a procedure to escalate the maximum amount payable under the Convention in the future[417]. That amount and the procedure must be examined critically. Pursuant to Article 48 (2) the request for the change of the amount needs at least six Parties and 'no amendment of the limits … may be considered less than five years from the date this Convention was opened for signature nor less than five years from the date of entry into force of a previous amendment under this Article[418]'. Hence the maximum limit of the Convention is still the same 11 years later, as was acceptable in 1996. This amount will continue to stay the same for at least the next five years, whereas the costs for the clean up of HNS accidents will increase. Accordingly it is deterioration and should therefore be reconsidered. Nevertheless, this scheme is a beginning and better than one without any compensation.

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[411] Article 14.
[412] Article 16 (2).
[413] Article 17.
[414] Article 17 (2).
[415] Aritcle 18 for the general account and Article 19 for the special account.
[416] Article 21.
[417] *Op cit,* note 400.
[418] Article 47 (7) (a).

6.7 The Vienna Convention on Civil Liability for Nuclear Damage of 1963

The Vienna Convention on Civil Liability for Nuclear Damage was adopted in May 1963 and entered into force in November 1977. Some Eastern States only became members after the Chernobyl accident. The Convention is an instrument to which all States may belong regardless of whether they are Parties to any existing nuclear liability conventions or have nuclear installations in their territories[419]. It was amended through a Protocol in 1997 during a Diplomatic Conference. The Protocol enlarged the meaning of 'nuclear damage'[420]. It thereafter includes the concept of environmental damage and preventive measures. It determines that the operator of the nuclear installation is the person exclusively liable for damage caused by a nuclear incident occurring in the course of the maritime carriage of nuclear material[421]. The Protocol extended the possible limit of the operator's liability up to 300,000,000 SDR (around US $ 400,000,000)[422]. The amended 1997 Convention on Supplementary Compensation for Nuclear Damage defines extra amounts to be given through contributions by Parties on the basis of installed nuclear capacity under the United Nations rate of assessment[423].

6.8 The Convention relating to Civil Liability in the Field of Maritime Carriage of Nuclear Material of 1971 (NUCLEAR Convention 1971)

In Association with the International Atomic Energy Agency (IAEA) and the European Nuclear Energy Agency of the Organization for Economic Co-operation and Development (OECD) IMO adopted the Convention to Civil Liability in the Field of Maritime Carriage of Nuclear Material in December 1971 and entered into force on 15 July 1975[424]. It has currently 17 Parties.

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[419] *Publications: Vienna Convention on Civil Liability for Nuclear Damage* at: http://www.iaea.org/Publications/Documents/Conventions/liability.html.
[420] *Ibid.*
[421] *Op cit,* note 16, page 362.
[422] *Op cit,* note 419.
[423] *Ibid.*
[424] *Convention relating to Civil Liability in the Field of Maritime Carriage of Nuclear Material (NUCLEAR), 1971* at: http://www.imo.org/Conventions/mainframe.asp?topic_id=256&doc_id=662.

The aim of the Convention is to sort out difficulties and conflicts which arise from the simultaneous application to nuclear damage of certain maritime conventions dealing with shipowners' liability, as well as other conventions which place liability arising from nuclear incidents on the operators of the nuclear installations from which or to which the material in question was being transported[425]. To achieve this purpose the Convention determines that a person otherwise liable for damage caused in a nuclear incident shall be exonerated for liability if the operator of the nuclear installation is also liable for such damage by virtue of the Paris Convention of 29 July 1960 on Third Party Liability in the Field of Nuclear Energy (a regional agreement); or the Vienna Convention of 21 May 1963 on Civil Liability for Nuclear Damage; or national law which is similar in the scope of protection given to the persons who suffer damage[426].

6.9 The Brussels Convention on the Liability of Operators of Nuclear Ships of 1962

The Brussels Convention on the Liability of Operators of Nuclear Ships was drafted in 1962, but it never entered into force. Some features of the Convention especially the inclusion of warships were not liked by the USA and the former UDSSR, which were the only countries operating nuclear ships at that time[427]. However, apart from military nuclear-powered ships there are very few civilian nuclear powered ships at present[428]. The convention should determine that the operator of a nuclear ship is to be strictly liable for damage caused by a nuclear accident up to a maximum of 1,500,000,000 Poicaré francs[429].

However, at the moment, if an accident involving a naval nuclear-powered ship were to occur, this vessel would enjoy sovereign immunity before the court of a foreign country[430]. The liability of civilian nuclear-powered vessels is governed by bilateral

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[425] *Ibid.*
[426] Article 1 of the NUCLEAR Convention 1971.
[427] *Op cit,* note 16, page 362.
[428] Footnote 3 of *IAEA The 1997 Vienna Convention Civil Liability for Nuclear Damage and the 1997 Convention on Supplementary Compensation for Nuclear Damage* at: http://www.iaea.org/About/Policy/GC/GC48/Documents/gc48inf-5expltext.pdf
[429] *Op cit,* note 16, page 362.
[430] *Ibid.*

agreements, for example the United States entered into agreements[431] with those States whose territorial waters or ports were visited by N.S. *Savannah.* Under these agreements the USA assumed strict liability for all damages arising out of a nuclear accident involving the *Savannah* up to a limit of US $ 500,000,000[432]. The Federal Republic of Germany had similar agreements[433] concerning N.S. *Otto Hahn*: there the maximum limit of liability was DM 400,000,000[434]. Despite these bilateral agreements it is desirable to have a uniform regulation in all countries, although it is not necessary.

6.10 Antarctic Treaty and the Protocol on Environmental Protection to the Antarctic Treaty, 1991

The Antarctic continent covers over 14,000,000 square kilometres and comprises 26 per cent of the world's wilderness area, representing 90 per cent of all terrestrial ice and 70 per cent of planetary freshwater[435]. The Antarctic Treaty System is the entire complex of agreements made for the purpose of regulating relations among states in the Antarctic, inter alia, the Antarctic Treaty itself as its heart[436]. The original Parties to the Treaty were the 12 nations active in the Antarctic during the International Geophysical Year of 1957-58, namely Argentina, Australia, Belgium, Chile, the French Republic, Japan, New Zealand, Norway, the Union of South Africa, the Union of Soviet Socialist Republics, the United Kingdom of Great Britain and Northern Ireland, and the United States of America. The Treaty was adopted on 1 December 1959 in Washington and entered into force on 23 June 1961[437]. The Consultative Parties include the original Parties an additional sixteen States that have become Consultative Parties by agreeing to the Treaty[438].

The major aim of the Antarctic Treaty is to make sure 'in the interests of all mankind that Antarctica shall continue forever to be used exclusively for peaceful purposes

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[431] E.g., UK-USA Agreement relating to the Use of United Kingdom Ports and Territorial Waters by the N.S. *Savannah,* 1964.
[432] *Op cit,* note 16, page 363.
[433] E.g., Federal Rebulic of Germany-Liberia Treaty on the Use of Liberian Waters and Ports by N.S. *Otto Hahn*, 1970.
[434] *Op cit,* note 16, page 363.
[435] *Op cit,* page 68, page 339.
[436] *SCAR Antarctic Treaty* at: http://www.scar.org/treaty/.
[437] *Ibid.*
[438] *Ibid.*

and shall not become the scene or object of international discord[439]'. To that goal it forbids military activity, except in support of science; prohibits nuclear explosions and the disposal of nuclear waste; supports scientific research and the exchange of data; and holds all territorial claims in abeyance. It applies to the area south of 60° South Latitude, including the ice shelves and islands[440].

The Protocol on Environmental Protection to the Antarctic Treaty (Environmental Protocol or Madrid Protocol) was agreed to on 4 October 1991 and came into force on 14 January 1998. The Environmental Protocol commits the Parties to the 'comprehensive protection of the Antarctic environment [441] '. Furthermore it designates Antarctica as a 'natural reserve, devoted to peace and science[442]'. Article 3 contains principles for environmental protection, and pursuant to Article 7 all commercial mineral resource activity is prohibited. Article 8 of the Protocol requires an Environmental Impact Assessment (EIA) for all activities before they are allowed to proceed. The Protocol contains six Annexes. Annex I is concerned the Environmental Impact Assessment, Annex II with the Conservation of Antarctic flora and fauna, Annex III with Waste disposal and waste management, Annex IV with the Prevention of marine pollution, Annex V with the Area protection and management and Annex VI with Liability arising from Environmental Emergencies[443].

Annex VI was developed in furtherance of Article 16 of the Madrid Protocol. Thereafter the Parties 'undertake to elaborate rules and procedures relating to liability for damage arising from activities taking place in the Antarctic Treaty area'. Pursuant to Article 1 the Annex applies only for 'environmental emergencies' which are defined as 'any accidental event that has occurred, having taken place after the entry into force and that result in, or imminently threatens to result in, any significant and harmful impact on the Antarctic environment[444]'. Accordingly the goal of the

[439] Preamble of the Antarctic Treaty.
[440] Article 6 of the Antarctic Treaty.
[441] Article 2 of the Madrid Protocol.
[442] *Ibid.*
[443] Therefore Annexes I-IV which complement the Protocol were negotiated at the Madrid meetings in October 1991. At the 16th Antarctic Treaty Consultative Meeting, held in Bonn in October 1991, Annex V was agreed. Annex VI was decided at the 28th consultative meeting, held in Stockholm in June 2005. Annex VI will enter into force when all 28 Antarctic Treaty Consultative Parties have ratified it.
[444] Article 2 (b) of Annex VI.

Annex is to stipulate – before anything goes wrong – who could be held responsible for cleaning up after an environmental emergency, and the legal avenues to respond to disaster[445]. Annex VI will apply to State as well as non-State operators. It will not apply to ships which are registered in non-Party States unless they are controlled by an operator belonging to a Party. However, it only applies to such environmental emergencies which 'relate to scientific research programmes, tourism or … activities' for which advance notice is required under Antarctic Treaty[446]. This includes tourist vessels, but not any kind of fishing vessel. Article 5 provides that each Party must oblige its operators to take prompt and effective response action to deal with environmental emergencies arising from their activities. Although priority is given to the Party of the operator except in the most urgent situations, if an operator does not obey all Parties are encouraged to take such action themselves. Pursuant to Article 6 an operator who fails to respond action shall be strictly liable to pay costs incurred by the other Parties; therefore, the operator must pay in every case. This money goes into a fund established under Article 12, which may be used to provide compensation in special cases, for incidents when the insurance does not want to pay or the operator cannot be identified. An operator does not have an obligation to pay, if he can prove that the environmental emergency was necessary to protect human life and safety, was an exceptional natural disaster, or was the result of an act of terrorism or belligerency[447]. Article 9 regulates that liability is limited to 3,000,000 SDR for environmental emergencies that do not involve a vessel[448]. If a vessel is involved the maximum amount payable is 1,000,000 SDR for a ship up to 2,000 tons, plus an additional amount between 200 SDR and 400 SDR for each ton above that size[449]. In the case that the operator caused the environmental emergency purposely or recklessly the liability limit does not apply. Operators must maintain insurance or financial guarantees to cover their liability up to the maximum amount[450].

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[445] *Australian Antarctic Division – Introduction Madrid Protocol* at: http://www.aad.gov.au/default.asp?casid=825.
[446] Article 1.
[447] Article 8 of Annex VI.
[448] Article 9 Paragraph 1 (b) of Annex VI.
[449] Article 9 Paragraph 1 (a) of Annex VI.
[450] Article 11 of Annex VI.

6.11 The Nairobi International Convention on the Removal of Wrecks, 2007

As discussed earlier[451] the International Convention on the Removal of Wrecks authorizes coastal States to take proportionate measures for the removal of wrecks that pose risks in their EEZ. It is the duty of the owner to remove a hazardous wreck[452]. To ensure this obligation is met, Article 10 allocates liability to the owner for the costs to locate, mark and remove ships and wrecks. Exemptions are possible for example, among other things, when the owner can prove that the incident which caused the wreck resulted from a war, hostilities or insurrection[453]. The liability of the owner can be limited under the Convention on Limitation of Liability for Maritime Claims, 1976 or any other applicable national regime[454]. Pursuant to Article 12 the owner of a vessel of 300 gt and above shall be required to have compulsory insurance or other financial security to cover his liability under this Convention. When the owner meets the requirements he will receive an attesting certification[455]. If the CLC Convention, the Bunker Convention, the HNS Convention or the Convention on Third Party in the Field of Nuclear Energy or the Vienna Convention on Civil Liability of Nuclear Damage applies, then no liability of the owner is apportioned under the Wreck Removal Convention[456]. The liability is further restricted by time limitations. Pursuant to Article 13 an action under the convention must be brought to court within three years after the date when the hazard was determined, or within six years after the date of the accident.

7. Industry liability schemes

The global leading tanker and oil companies established two schemes for liability: the Tanker Owners' Voluntary Agreement concerning Liability for Oil Pollution (TOVLOP) and the Contract regarding an Interim Supplement to Tanker Liability for Oil Pollution (CRISTAL). The TOVLOP entered into force in October 1969 and the CRISTAL in April 1971[457]. Together, these agreements reflect the regulations

[451] See under 5.2.
[452] Article 9 (2)
[453] Article 10 (1) (a).
[454] Article 10 (2).
[455] Article 12 (2).
[456] Article 11.
[457] *Op cit,* note 16, page 361.

contained in the Civil Liability and Fund Conventions. These industrial liability schemes were important at the time when the Civil Liability and Fund Conventions had not yet come into force[458]. Furthermore, they helped victims of oil pollution damage in States who are not a Party to the CLC and its Fund, especially since TOVALOP covered over 95 per cent of global oil tankers[459]. A further advantage was that CRISTAL could operate in combination with the CLC in cases where the Fund Convention was not applicable, thus providing additional compensation and relieving the shipowner from part of his liability[460]. This was especially helpful at the time when only two-thirds of the State parties to the CLC were parties to the Fund Convention[461].

However, in 1995 the boards which administered TOVALOP and CRISTAL decided that the two schemes should end in February 1997[462]. The reason for this decision was that more and more States had become Parties to the CLC and its Fund, and because of suspicions that with the continued existence of the schemes, further ratifications of the CLC and Fund would not be completed.

8. State responsibility

8.1 State responsibility under the 1982 United Nations Law of the Sea Convention

Article 235 of the Law of the Sea Convention regulates the responsibility and liability of States. It contains the customary international law rules in relation to State responsibility to protect and preserve the marine environment[463]. Furthermore, the State shall be liable in accordance with international law. But what does this mean? It seems that the State's responsibility is attached to a specific behaviour accordingly:

- first, the State is theoretically the subject and recipient of the international obligations, so it must be seen as the actor, and

[458] *Ibid.*
[459] *Ibid.*
[460] *Ibid.*
[461] *Ibid.*
[462] *Ibid.*
[463] *Op cit,* note 218, page 382.

- second, the behaviour itself has to be in violation of the State's international duties[464].

These two elements are the 'objective' (breach of a conduct) and 'subjective' (state as actor) element of State responsibility[465]. Therefore, the objective conduct may have a positive or negative character, namely an action taken or an omission[466]. But what is the legal consequence of the breach of these requirements? It could mean that the flag State is strictly liable to pay compensation for pollution caused by its ships (vessels shipping under the flag of the State) because of the ultra-hazardous activities at sea[467]. This has not applied to State liability for deep-seabed operations[468]. In its place Article 139 of the Law of the Sea Convention determines that with respect to damage resulting from deep-seabed operations, states are liable only for a failure to carry out their responsibilities, and shall not be liable for damage caused by national operators 'if the State Party has taken all necessary and appropriate measures to secure effective compliance' with the conditions of the Convention[469]. Nothing else has to apply for the responsibility and liability of States under Article 235. Both cases deal with responsibility and liability of a State and there is no apparent reason why these are treated differently. Accordingly, they have only a due diligence standard of liability[470]. This result becomes underlined by the state practice. Only in a few cases have flag States, inter alia Canada, paid compensation for pollution resulting from oil tankers[471]. On the other hand, it has been common that pollution from vessels have not been the subject of interstate claims, even in situations as crucial as the *Amoco Cadiz*. Instead these situations have been dealt with under national law or civil liability and compensation schemes[472]. However, it is indisputable that responsibility extends to flag States in respect of their ships, and to coastal States in respect of activities which they permit within their jurisdiction.

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[464] Smith *State Responsibility and the Marine Environment* Oxford 1988, page 6.
[465] *Ibid.*
[466] *Ibid,* page 10.
[467] *Op cit,* note 218, page 382.
[468] *Ibid.*
[469] *Ibid.*
[470] *Ibid.*
[471] *Ibid,* page 383.
[472] *Ibid.*

8.2 Responsibility of States for their warships

8.2.1 In General

Under Article 236 of the Law of the Sea Convention it states - like in most other Conventions mentioned in this essay - that state-owned vessels enjoy sovereign immunity, regardless of their location and the period of time elapsed since they were wrecked[473]. In the 1949 Geneva Conventions and in the earlier Hague Conventions, whose provisions were held declaratory of customary law by the Nuremberg Tribunal, some protection is provided by restraints on methods of warfare and the infliction of unnecessary suffering[474]. Hostile use of environmental modification techniques having 'widespread, long-lasting or severe effects' are prohibited under the 1977 Environmental Modification Convention[475]. The Convention entered into force on 5 October 1978 and has been ratified by major military powers[476]. Furthermore, violation of the United Nation Charter will cause responsibility for reparation under international law[477]. Similarly to the Environmental Modification Convention, the Additional Protocol I to the 1949 Geneva Conventions which was adopted in 1977, forbids methods of warfare intended or expected to cause 'widespread, long-term and severe damage to the natural environment', or to prejudice the health or survival of the civilian population[478]. This terminology was used to limit or eliminate the use of unhealthy and risky weapons such as chemicals, herbicides or nuclear weapons[479]. Failed attempts were made for the adoption of the fifth Geneva Convention, proposed to cover protection of the environment in times of armed conflict[480]. The ILC's Code of Offences Against the Peace and Security of Mankind and the 1998 Statute of the International Criminal Court further discuss certain acts of serious and intentional harm to the environment as war crimes, and allow for individual responsibility[481]. Some rules of customary international law also

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[473] It covers only state-owned ships and no civil merchant vessels, because the state-owned ones are these ships which sink mostly during a war.
[474] *Op cit,* note 218,page 148.
[475] *Ibid.*
[476] *CONVENTION ON THE PROHIBITION OF MILITARY OR ANY OTHER HOSTILE USE OF ENVIRONMENTAL MODIFICATION TECHNIQUES* at: http://www.fas.org/nuke/control/enmod/text/environ2.htm.
[477] *Op cit,* note 218, page 148.
[478] Article 35 Protocol I of the Geneva Conventions.
[479] *Op cit,* note 218, page 148.
[480] *Ibid.*
[481] *Ibid.*

protect the environment in times of armed conflict[482]. Principle 24 of the 1992 Rio Declaration determines that 'States shall…respect international law providing protection for the environment in times of armed conflict and cooperate in its further development, as necessary'. UN General Assembly Resolution 47/37 (1992) also says 'destruction of the environment not justified by military necessity and carried out wantonly, is clearly contrary to existing international law'[483]. However, despite future developments to protect the environmental the law of the war is still considered as lex specialis to law protecting the environment[484].

In the *Nuclear Weapons Case*, the International Court of Justice determined as a general law that:

> 'States must take environmental considerations into account when assessing what is necessary and proportionate in the pursuit of legitimate military objectives. Respect for the environment is one of the elements that go to assessing whether an action is in conformity with the principles of necessity and proportionality[485]'.

8.2.2 World War II wrecks[486]

Coming back to the example discussed earlier under 2.3.3.1: the WWII shipwrecks in the Pacific with the two main flag States: Japan (86.3 per cent) and the US (10. per cent)[487]. Both flag States have published their policy concerning the protection and responsibility for sunken WWII ships. The former US President Bill Clinton declared the US policy on the Protection of Sunken Warships, Military Aircraft and Other Sunken Government Property in 2001:

> '(…) In addition to deserving treatment as gravesites, these sunken Statecraft may contain objects of sensitive notional security, archaeological or historical nature. They often also contain unexploded ordinance that could pose a danger to human health and the marine environment if disturbed, or other substances, including fuel oil and other hazardous liquids that likewise pose a serious threat to human health and the marine released. (…) Pursuant to the property clause of Article IV of the Constitution, the United States retains indefinitely to its sunken

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[482] *Ibid*, page 149.
[483] *Ibid.*
[484] Vöneky *Peacetime Environmental Law as a Basis of State Responsibility* in: J.E. Austin and C.E. Bruch *The Environmental Consequences of War: Legal, Economic and Scientific Perspectives* Cambridge 2000 page 207.
[485] ICJ Report (1996), 266, paras.30-2.
[486] During WWII, all warships and most merchant vessels were under state control: *Op cit,* note 32 page 784.
[487] *Ibid,* page 785.

> Statecraft unless title has been abandoned or transferred in the manner Congress authorized or directed. The United States recognizes the rule of international law that title to foreign sunken Statecraft may be transferred or abandoned only in accordance with the law of foreign flag State.
> Further, the United States recognizes that title to a United States or foreign sunken Statecraft, wherever located, is not extinguished by passage of time, regardless of when such sunken Statecraft was lost at sea.(…)
> Those who would engage in unauthorized activities directed at sunken Statecraft are advised that such disturbance or recovery should not occur without the express permission of the sovereign, and should only be conducted in accordance with professional scientific standards and with the utmost respect for any human remains.
> The United States will use its authority to protect and preserve sunken Statecraft of the United States and other nations, whether located in the waters of the United States, a foreign nation, or in international waters[488],.

According to that statement, state-owned vessels are covered by this policy as heritage sites and as graves, as such they cannot be salvaged by other nations[489]. On the other hand States have the duty not to commit environmental pollution at any time. Furthermore, public pressure and State honour give States the obligation to avoid environmental damage through their possession. Therefore they can choose the affordable alternative they like, even if it is more expensive in perpetuity as they have practiced in the *USS Mississinewa* incident.

The Japanese government stated its policy on maintaining its sovereignty over sunken WWII shipwrecks as follows:

> 'According to international law, sunken State vessels, such as warships and vessels on government service, regardless of location or of the time elapsed remain the property of the State owning them at the time of their sinking unless it explicitly and formally relinquishes its ownership. Such sunken vessels should be respected as maritime graves. They should not be salvaged without the express consent of the Japanese Government'[490].

The result is the same. They have the obligation to avoid environmental damage.

8.2.3 Iraq's shipwrecks

Concerned with the 1991 Iraqi invasion of Kuwait in Gulf War I the Security Council established a United Nation Compensation Commission (UNCC) to process

[488] *Ibid,* page 786.
[489] *Ibid,* page 787.
[490] *Ibid.*

claims and pay compensation for losses resulting from the invasion[491]. In Resolution 687 the Security Council held that:

> 'Iraq (…) is liable under international law for any direct loss, damage, including environmental damage and the depletion of natural resources, or injury to foreign Governments, nationals and corporations, as a result of Iraq's unlawful invasion and occupation of Kuwait'[492].

This decision was unprecedented because it was made by a political organization, applied the legal principles of State responsibility, and held one State liable for *all* direct damage resulting from an aggressive war[493]. The liability of Iraq was based on its breach of the *jus ad bellum*, in form of the breach of Article 2(4) of the UN Charter, which prohibits the use of force[494]. This was enough to make Iraq liable for all damage caused by the war, regardless of whether there was a breach of the *jus in bello*[495]. According to the resolution which includes direct environmental damages Iraq is responsible for the costs of the clean up of the Persian Gulf from pollution caused by that war, when an international organization or governments claimed it and the prior liabilities like claims of individuals and corporations for private injury and loss are finished[496].

In relation to the US invasion into Iraq the Resolution 1483 of 22 May 2003 confirms that the UNCC will continue to exist and be funded, albeit with only 5 per cent of the proceeds of Iraq's petroleum exports[497]. The Commission has already done much of the preparation for the environmental claims[498].

9. Conclusion

This essay has outlined what shipwrecks are under international law and determined what the different possible reasons for sinking could be. It then discussed how the

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[491] Bunker *Protection of the Environment During Armed Conflict: One Gulf, Two Wars* in RECIEL 2004, 201 (208).
[492] Security Council Resolution 697 (3 April 1991), reprinted in 30 ILM (1991), 846, para. 16.
[493] *Op cit,* note 491.
[494] *Ibid.*
[495] Low and Hodgkinson *Compensation for Wartime Environmental Damage: Challenges to International Law After the Gulf War Virginia Journal of International Law* 1995, 405, 412.
[496] *Op cit,* note 491, page 209.
[497] Bunker *Protection of the Environment During Armed Conflict: One Gulf, Two Wars* in RECIEL 2004, 201 (209).
[498] *Ibid.*.

international conventions try to minimise the risk of shipwrecks in the first place[499], but also in protecting the ocean and the maritime flora and fauna should such accidents occur[500]. It has focused in particular on the growth of the international legal system for the control of marine pollution from shipwrecks in the last few decades. As an example, the development of the MARPOL Convention 1973/78 and its new regulations – Annex I which specifies double hull regulations and Annex II which strengthens the reduction of hazardous substances – have filled many gaps in the risk of pollution from ship accidents. As mentioned earlier, oil is the highest potential environmental risk when an accident occurs. Furthermore every vessel needs oil inter alia as petrol and usually carries some thousand tons with it. As shown in the accident spillage statistic (Figure 4) the amount of oil spills has been reduced as a result of IMO and its Conventions. However, the question still arises: Why not transport oil and other dangerous and hazardous substances in large double hulled containers? This would make the departure quicker as the container could be filled easily before loading onto the ship. Furthermore it would be unproblematic to remove them should an incident occur. In addition, the ship would be able to carry different cargos which would make trade more flexible by exploiting the full capacity of the vessel. Nonetheless, as mentioned above the Conventions are certainly on the right track as the reduction in oil spillage incidents reflects (Figure 4).

[499] Like COLREGs, Solas; Load Line; StWC and the Ship Recycling Conventions.
[500] Like OILPOL, MARPOL, OPRC, Intervention Convention, IAEA, SAR and the Place of refuge Guidelines.

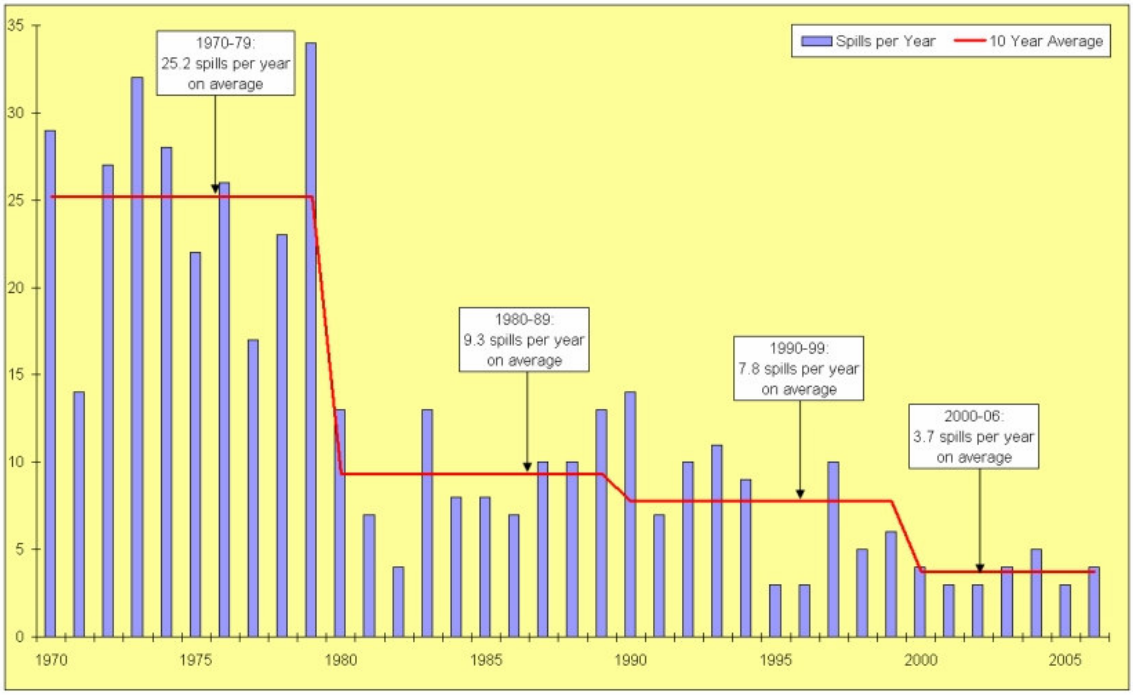

Figure 4: Source: ITOPF Past Spill Statistics: Number of spills over 700 tons at: http://www.itopf.com/stats.html.

The system of enforcement under the 1982 Law of the Sea Convention has also been improved. The previous Law of the Sea Conventions ruled that the flag State has the exclusive right to enforce shipping. In the current Law of the Sea Convention the flag State still has more rights to exercise enforcement but the convention provides for the coastal State to at least proceed with legal action against a ship, in one of its ports, should it be alleged to have discharged polluting substances within its territorial sea or EEZ. It is suggested that port and coastal State enforcement should be enlarged because it increases the control of a vessel and reduces the problematic protection and prevention measures that were contained in earlier versions of the Law of the Sea Convention. This is due to the fact that a flag State may not catch sight of all illegal activities by vessels under their jurisdiction.

The salvage and removal conventions are good but the jurisdiction is too limited for effective control. The new removal convention should include the high seas, instead of just the EEZ, as it is technically possible to remove a shipwreck or its hazardous cargo from there. This is, as always a question of money. In relation to the liability and compensation conventions it is also hard to accept that most conventions exclude damage beyond the EEZ, in particular to the high seas. Article 3 of the 1992 Oil

Pollution Fund Convention is expressly confined to pollution damage in the territory, territorial sea, EEZ or the section within 200 miles of a state which has not claimed the EEZ. The 1989 Salvage Convention is similarly limited, but determines a special compensation for salvage which can prevent or minimize 'damage to the environment'. This phrase is nice; however, it only includes salvage on the high seas if it poses a risk of pollution. But as discussed above, most of the oil in wrecks will be released and it is only a question of time when it will happen. The consequences of these are clear – terrible oil pollution will occur in our oceans. To avoid this the most hazardous vessels have to be found and oil removal efforts have to be prioritized to these ships especially referred to the limited amount per vessel in the funds and the limited sum in the funds itself in relation to the high amount of vessels which may leak next. After lighting this point (here and under 6.2.) it is clear that removal, salvage and funds are restricted in their application to the EEZ. It is truly desirable to increase the jurisdiction in order to protect the environment, our health and the flora and fauna from pollution. It is also understandable that States have only due diligence standard of liability. However, States which were involved in WWII and lost ships there shall start to create reserves to avoid an environmental disaster or rather a financial disaster for themselves.

According to that it is necessary to ensure the entry into force of the Nairobi International Convention on the Removal of Wrecks, 2007 and other liability and compensation conventions, namely the International Convention on Liability and Compensation for Damage in Connection with the Carriage of Hazardous and Noxious Substances by Sea, 1996 and the International Convention on Civil Liability for Bunker Oil Pollution Damage, 2001 to make sure that our maritime environment receives the further protection and it needs to survive.

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