

GLOBAL TRENDS IN SHIP-SOURCED MARINE POLLUTION

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Abstract

ITOPF is a not for profit organisation, established and funded by the world's ship owners to advise on and promote an effective response to spills of oil and hazardous and noxious substances (HNS) worldwide. ITOPF has collected data on oil spills over the past 40 years. Statistics based on this data shows that the number of large spills from tankers (> 700 MT) has significantly declined since the 1970's from an average of 25 per year to just over three incidents in the last few years, even though the volume of oil transported around the world continues to increase. However, the average number of incidents attended by ITOPF remains largely the same (around 20-25 incidents per year from both tankers and non tankers). In terms of the total volume of oil spilled on a yearly basis, one or two incidents can contribute significantly, for example the ABT SUMMER spill in 1991, resulted in a release of 260,000 MT of the total 700,000 MT spilled that year. For larger tanker spills > 700 MT the main causes are groundings and collisions, whilst small spills (< 7MT) are usually the result of operational problems occurring during bunkering and loading/discharging. A review of the trends over the past 10 years shows that Asia and Europe are the regions where ITOPF attended oil spills most often. China in particular is a hot spot, being the country in which ITOPF has attended oil spills most frequently in the past 10 years. This is likely a reflection of the recent economic growth, resulting in increased import and export activities. Although there has been a significant reduction in large ship-sourced spills, accidents will and do occur. Prevention of spills should have the highest priority, however there clearly remains a need to develop preparedness and in particular contingency plans. Spill response preparedness and regular exercises are indeed the best strategies to maintain readiness to respond efficiently when an incident occurs.

Introduction

The International Tanker Owners Pollution Federation (ITOPF) is a not for profit organisation established on behalf of the world's ship owners to advise on and promote an effective response to spills of oil and hazardous and noxious substances (HNS) in the marine environment, worldwide. During ITOPF's 43 year history, its staff has responded to approximately 700 incidents in 99 countries, including high profile incidents such as EXXON VALDEZ (1989), ERIKA (1999), PRESTIGE (2002), and HEBEI SPIRIT (2007).

Response to incidents is ITOPF's core activity. In addition, ITOPF provides other services such as advice on contingency planning, spill response exercises, damage assessments and claims analysis. ITOPF has also observer status at the International Maritime Organisation (IMO) and participates in technical working groups on spill response matters. ITOPF has a comprehensive in house library and maintains various databases in order to provide information on all aspects of spill response and potential environmental impacts of oil and HNS.

As part of our information service, ITOPF has collected data on oil spills over the past 40 years. The statistics are collated from various published sources such as the shipping press and other specialist publications and from information provided by ship owners and their insurers. The statistics clearly show a downward trend in the number of large spills (> 700 MT) from tankers, from over 25 per year in the 1970's to around 3 per year in the last 10 years. Despite this positive trend, incidents continue to occur and therefore the need remains to be prepared for and able to respond to oil spills.

Trends in oil spills

For historic reasons the size of oil spills have been categorized into three categories, small (< 7 MT/ < 50 bbls), medium (7 – 700 MT/ 50 – 5,000 bbls) and large (> 700 MT/ > 5,000 bbls). It is interesting to note that sea borne trade continues to increase from 1985, which may imply an increased risk. However, the number of spills from tankers over 7 MT shows a steady decline (Fig 1). Interestingly Fig 1 shows that prior to 1985 the trends in spills seemingly follow the fluctuations in seaborne traded. The divergence after 1985, is possibly related to increased awareness, the international conventions and the joint industry, government efforts through the International Maritime Organisation (IMO). The number of large incidents (> 700 MT) has dropped significantly from an average of 25 per year in the 1970's to just over three incidents per year in the past 10 years (Fig 2).

Fig 1: Seaborne oil trade and number of spills

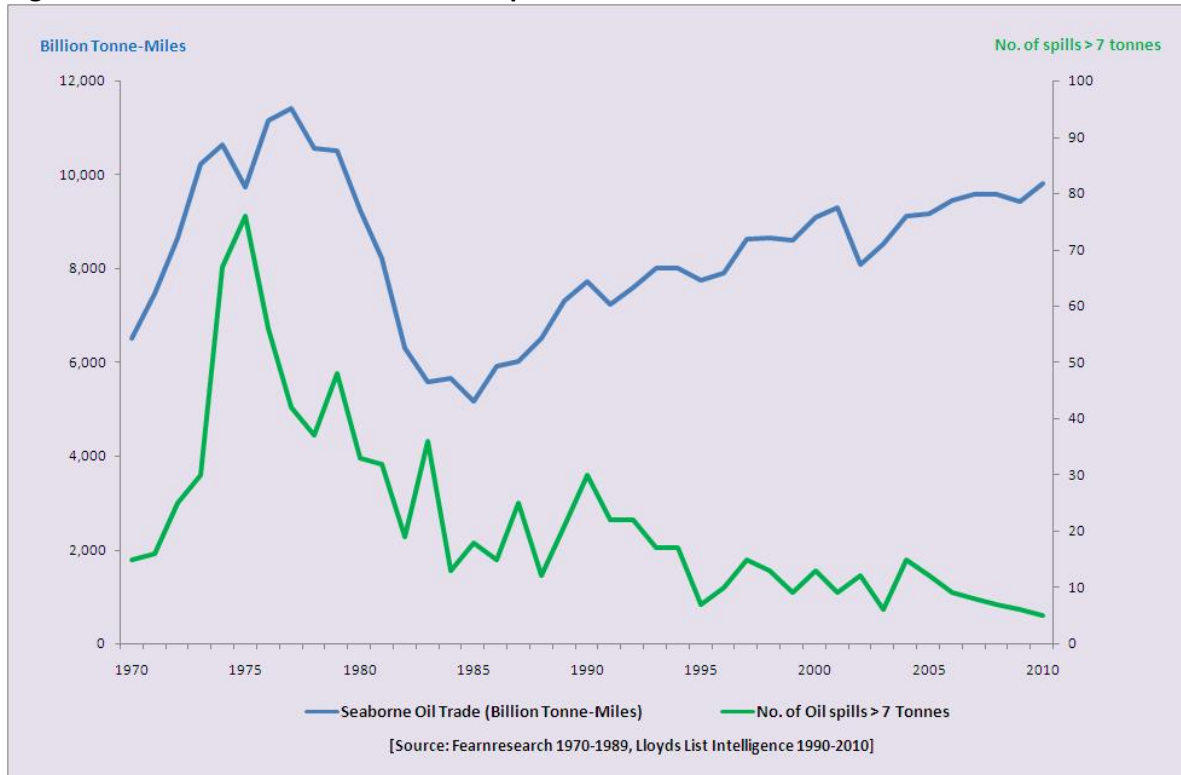
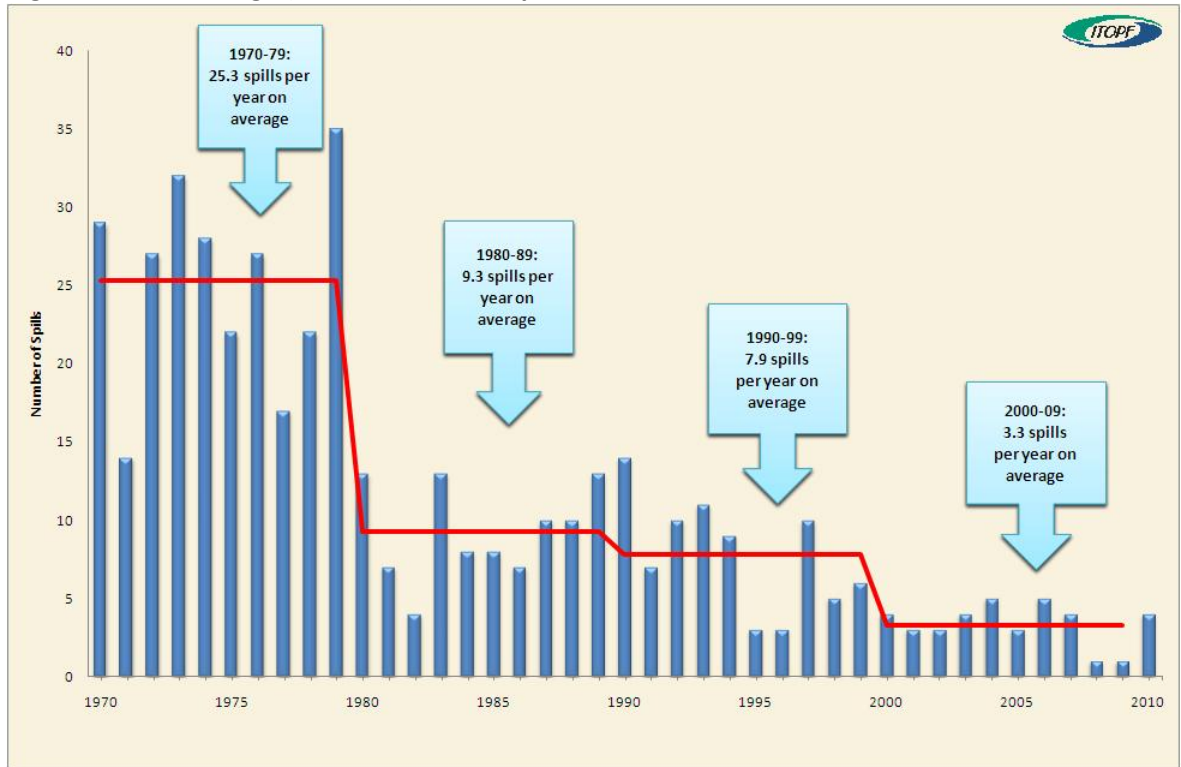
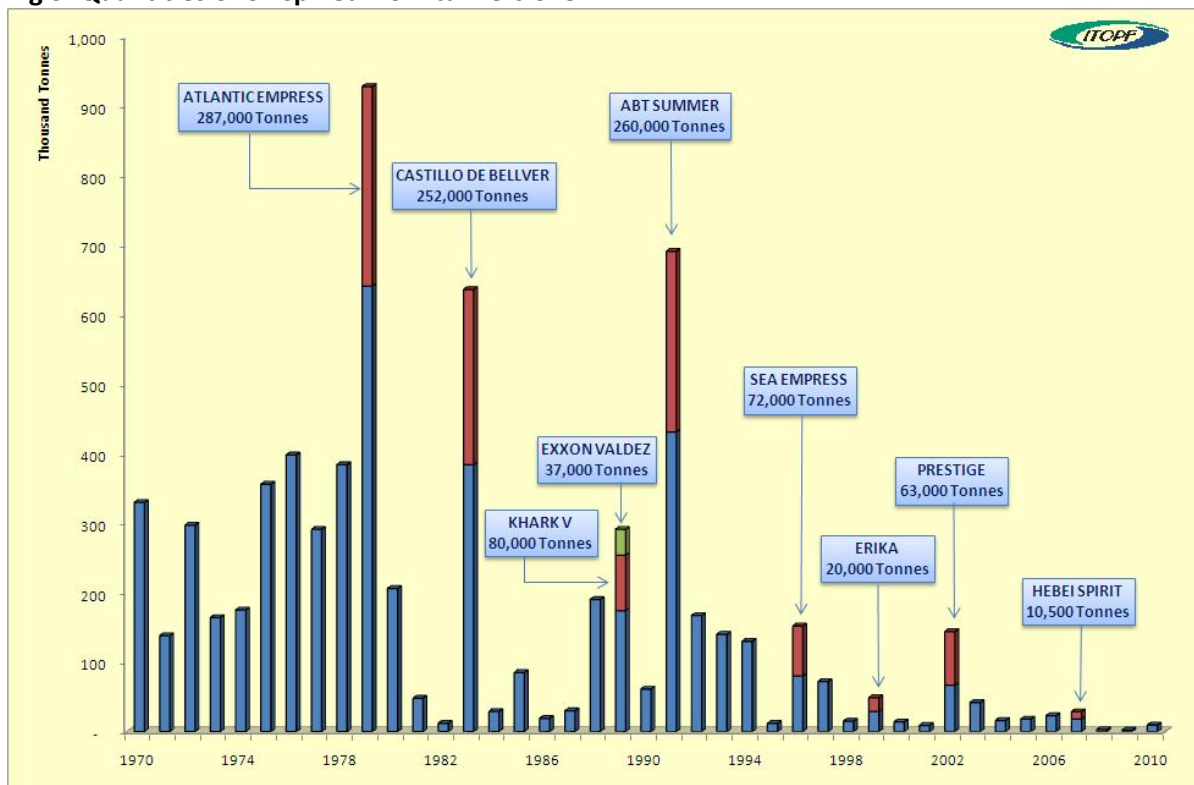


Fig 2: Number of large (> 700 MT) tanker spills since 1970



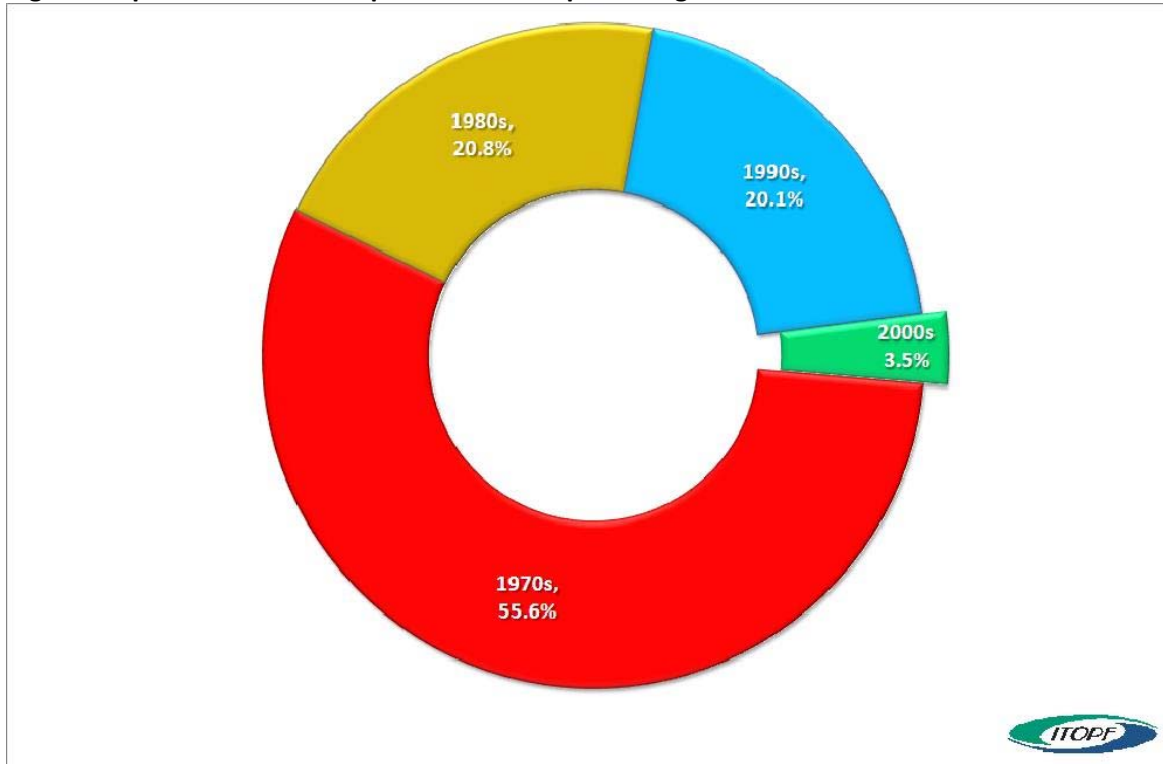
The largest ever spill on ITOPF's records was the ATLANTIC EMPRESS (287,000 MT) in 1979 (Fig. 3). The incident occurred in the Atlantic Ocean about 10 miles off the coast of Tobago. It is the only recorded collision between two fully laden Very Large Crude Carriers (VLCC). Figure 3 provides an overview of the total volume of oil spilled from tankers since 1970. It clearly demonstrates that one large incident can contribute significantly to the total volume of oil spilled in one year and therefore this may not be the best indicator of trends. For example, the ABT SUMMER incident in 1991 contributed 260,000 MT (37%) of the total of 700,000 MT spilled that year.

Fig 3: Quantities of oil spilled from tankers over 7 MT



The total volume of oil spilled has reduced dramatically from the 1970's until 2010. Fig 4 provides a breakdown of the quantities of oil spilled per decade. It shows that just over 55% of the total quantity spilled was in the 1970's compared with only 3.5% in the period 2000 - 2009. Some likely reasons behind this reduction are the implementation of international conventions such as the International Convention for the prevention of pollution from ships (MARPOL 1973, amended 1978) and the International Convention for the safety of life at sea (SOLAS 1974), both adopted by the IMO. In the United States the Oil Pollution Act (OPA 90) was quickly adopted following the EXXON VALDEZ (1989) incident. These conventions have led to many improvements in safety management as well as ship design amongst others.

Fig 4: Oil spilled from tankers per decade as a percentage of the total



Causes of oil spills

Incidents usually involve a series of events, ultimately leading to the final outcomes identified in Table 1. Table 1 provides an overview of causes of spills in each spill size category. The causes are subdivided into two categories, operational (identifying incidents occurring mainly in ports and harbours) and accidental (identifying incidents occurring whilst the vessel is en route). Clearly the results show that the majority of small spills (<7 MT) are due to operational activities, accounting for a total of 63.1% of these incidents. Collisions and groundings are the major causes of large spills, accounting for 47.9% of these incidents in the 7 – 700 MT size category and 65.4% in the > 700 MT size category respectively. Groundings make up the largest percentage (36.3%) as the primary cause for large spills. The other/unknown category represents incidents where the cause is not known or no information was available.

Table 1: Percentage of tanker spills in three size categories by cause

Categories	% of spills		
	<7 MT	7 – 700 MT	> 700 MT
Operational			
Bunkering	7.2	2.6	0
Loading/discharging	40.3	30.7	8.1
Other operations	15.6	5	1.1
Accidental			
Collision	2.2	26.7	29.1
Grounding	3	21.2	36.3
Hull failure	2.6	4.6	12.4
Equipment failure	2.6	3.1	0.9
Fire & explosion	1.1	2.6	7.2
Other/unknown	25.3	3.5	5

Trends in ITOPF attended oil spills 2000 - 2010

The total number of spills ITOPF attended for the period 2000 – 2010 was 221. The number of tanker incidents were 83 (32%) and non tanker incidents 129 (68%). Clearly the majority of incidents ITOPF currently attends are from non tankers, however this should not be interpreted as an indication of performance of the non tanker sector. Some factors that contribute to this trend are that the non-tankers comprise the largest share of seaborne trade, and all spills from any ship have become increasingly high profile events. Recognising increased public awareness of the environmental and economic impacts of spills from ships bunkers and cargo.

Figure 5 shows a breakdown of the spilled products in the past ten years from incidents ITOPF attended. Evidently bunkers are the major product spilled, which is reflected in the trend that the majority of incidents ITOPF attends are non tankers such as container vessels, bulk carriers and reefer ships. These ships can be very large in size and carry substantial amounts of bunkers (1000's MT). Such incidents can involve the loss of both bunkers and cargo. The category labelled 'none' represents ITOPF attended incidents where there was a significant threat of a spill, but no actual spillage, whilst the category labelled 'other' represents any other spilled substance such as non-HNS cargo.

Fig 5: Spilled product 2000 – 2010

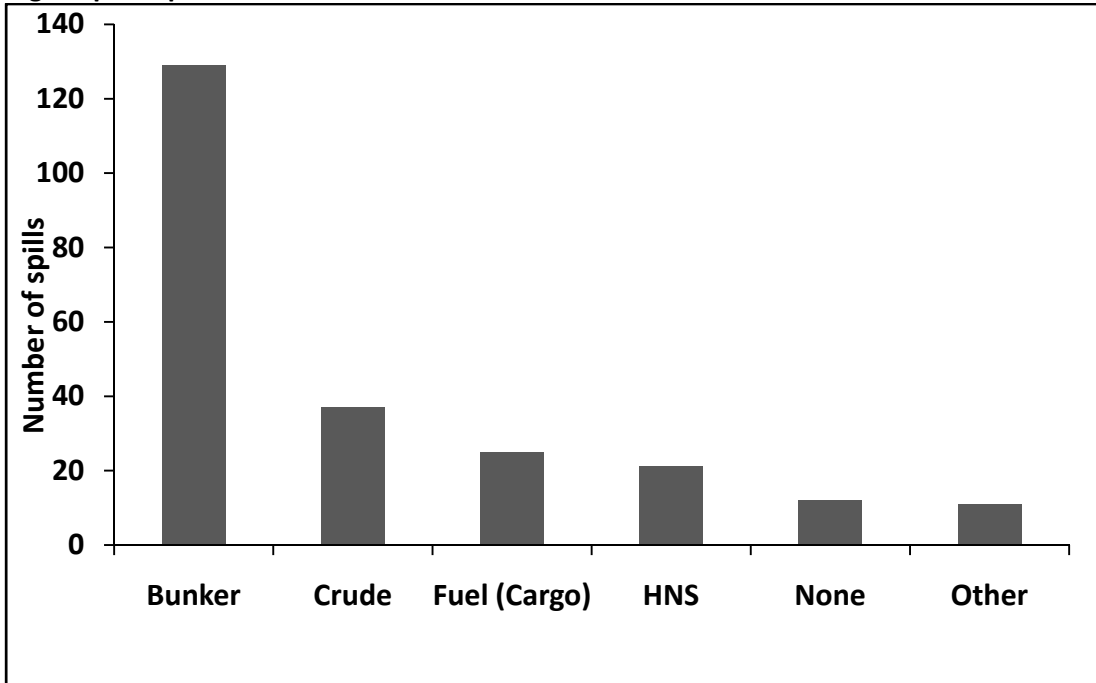


Figure 6 provides an overview of spills attended by ITOPF by geographical regions. Clearly it demonstrates that Asia and Europe are the most frequently visited regions by ITOPF technical advisers for incident response. This could be, in part, due to the location of some of the world's busiest shipping lanes in these regions, such as the Malacca Straights and the English Channel, and therefore contributing to the likelihood of incidents occurring. Although a very remote area, with limited maritime activity, we have been involved with two incidents in Antarctica, in recent years involving tourist vessels.

Fig 6: Number of spills in regions of the world for the period 2000 - 2010

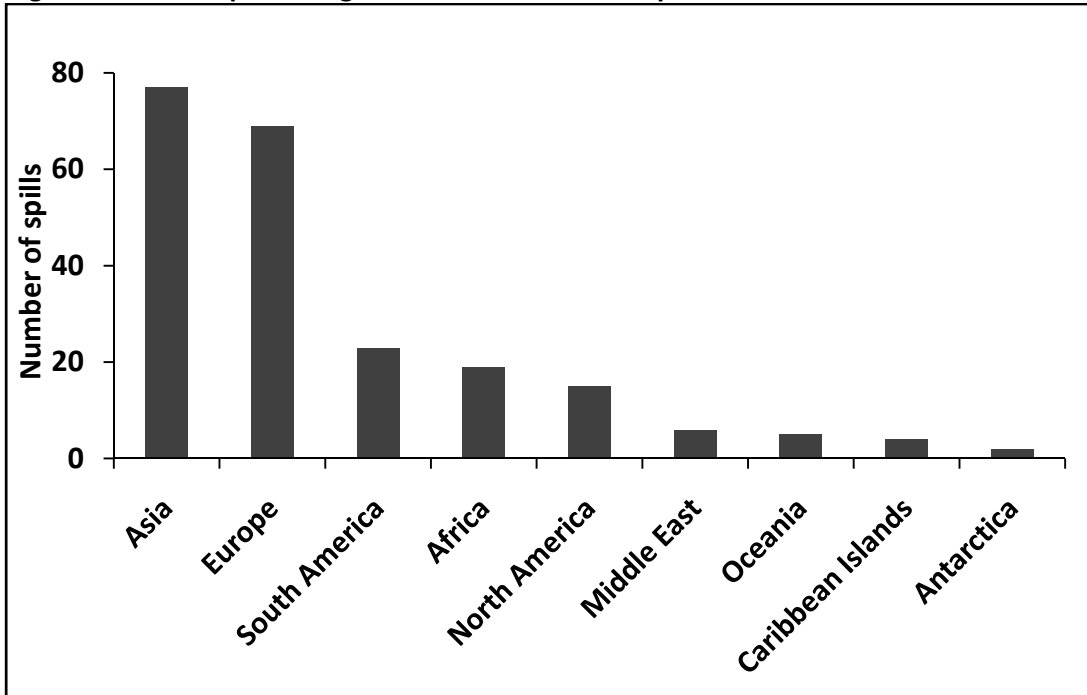


Table 2 lists the ten countries where ITOPF has attended spills most frequently in the past ten years. China is where ITOPF have attended most spills, because of the vast coastline, busy shipping and many busy ports and harbours. In addition, China has experienced substantial economic growth resulting in increased export and imports of oil and consumer goods. Japan and the UK are island nations and have a large maritime import and export sectors, with many ships trading, contributing to the increased risk of an incident occurring.

Table 2: Top ten countries of ITOPF attended spills in the period 2000 - 2010

Country	# Incidents
China	23
Japan	12
United Kingdom	12
South Korea	11
USA	10
Spain	9
France	9
Egypt	8
Brazil	7
Greece	6

Conclusions

The downward trend in oil spills is a very positive sign that both governments and the shipping industry have taken significant steps in improving safety and reducing the risk of an incident occurring. However, there is no room for complacency and incidents will continue to occur in the future. Whilst prevention of spills should be of the highest priority, there needs to remain a high level of preparedness. When dealing with incidents actual past experience of managing such complex situations is invaluable. However, with the decline in the number of incidents worldwide, inevitably means that those responsible for oil spill response gain less hands on experience. Consequently it remains vital that contingency plans are kept up to date and regular exercises are held to train responders and test emergency procedures. This, in turn, will identify areas in the contingency plan that requires improvements and updating.