



PROMOTING EFFECTIVE
SPILL RESPONSE

Oil Tanker Spill Statistics 2018



January 2019

Introduction

ITOPF's annual statistics publication reports on accidental spills of persistent and non-persistent oil from tankers, except those resulting from acts of war. It provides information on oil spills recorded in the last year and an overview of the number and size of tanker oil spills since 1970.

ITOPF maintains a database of oil spills from tank vessels, including combined carriers, FPSOs and barges. The data held includes the location and cause of the incident, the vessel involved, the type of oil spilt and the spill amount. For historical reasons, spills are generally categorised by size, <7 tonnes, 7–700 tonnes and >700 tonnes (<50 bbls, 50–5,000 bbls, >5,000 bbls), although the actual amount spilt is also recorded. Information is now held on over 10,000 incidents, the vast majority of which fall into the smallest category i.e. <7 tonnes.

Information is gathered from published sources, such as the shipping press and other specialist publications, as well as from vessel owners, their insurers and from

ITOPF's own experience at incidents. Unsurprisingly, information from published sources generally relates to large spills, often resulting from collisions, groundings, structural damage, fires or explosions.

It should be noted that the figures for the amount of oil spilt in an incident include all oil lost to the environment, including that which burnt or remained in a sunken vessel. There is considerable annual variation in both the number of oil spills and the amounts of oil lost. While we strive to maintain precise records for all spill information, we cannot guarantee that the information taken from the shipping press and other sources is complete or accurate. The number of incidents and volumes of oil spilt are recorded based on the most up to date information. From time to time, data is received after publication and, in which case, adjustment to previous entries may be made. Consequently, the figures in the following tables, and any averages derived from them, should be viewed with a degree of caution.

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Major Oil Spills in History

A summary of the top 20 major spills that have occurred since the TORREY CANYON in 1967 is given in Table 1 and their geographical locations are shown in Figure 1. It is of note that 19 of the 20 largest spills recorded occurred before the year 2000. SANCHI, the latest addition to the top 20 major spills, is the only major spill of non-persistent oil featured here and it resulted in significantly lower environmental impacts compared

to some crude oil spills listed. A number of the incidents in Table 1, despite their large size, necessitated little or no response as the oil was spilt some distance offshore and did not impact coastlines. For this reason, some of the names listed may be unfamiliar. EXXON VALDEZ and HEBEI SPIRIT are included for comparison although these incidents are further down the list. PRESTIGE is also included for comparison.

Position	Shipname	Year	Location	Spill size (tonnes)
1	ATLANTIC EMPRESS	1979	Off Tobago, West Indies	287,000
2	ABT SUMMER	1991	700 nautical miles off Angola	260,000
3	CASTILLO DE BELLVER	1983	Off Saldanha Bay, South Africa	252,000
4	AMOCO CADIZ	1978	Off Brittany, France	223,000
5	HAVEN	1991	Genoa, Italy	144,000
6	ODYSSEY	1988	700 nautical miles off Nova Scotia, Canada	132,000
7	TORREY CANYON	1967	Scilly Isles, UK	119,000
8	SEA STAR	1972	Gulf of Oman	115,000
9	SANCHI*	2018	Off Shanghai, China	113,000
10	IRENES SERENADE	1980	Navarino Bay, Greece	100,000
11	URQUIOLA	1976	La Coruna, Spain	100,000
12	HAWAIIAN PATRIOT	1977	300 nautical miles off Honolulu	95,000
13	INDEPENDENTA	1979	Bosphorus, Turkey	95,000
14	JAKOB MAERSK	1975	Oporto, Portugal	88,000
15	BRAER	1993	Shetland Islands, UK	85,000
16	AEGEAN SEA	1992	La Coruna, Spain	74,000
17	SEA EMPRESS	1996	Milford Haven, UK	72,000
18	KHARK 5	1989	120 nautical miles off Atlantic coast of Morocco	70,000
19	NOVA	1985	Off Kharg Island, Gulf of Iran	70,000
20	KATINA P	1992	Off Maputo, Mozambique	67,000
21	PRESTIGE ⁺	2002	Off Galicia, Spain	63,000
36	EXXON VALDEZ ⁺	1989	Prince William Sound, Alaska, USA	37,000
132	HEBEI SPIRIT ⁺	2007	South Korea	11,000

Table 1: Major oil spills since 1967 (quantities have been rounded to nearest thousand)

* The only spill of non-persistent oil
⁺ Included for comparison



Figure 1: Location of top 20 major spills (All rights reserved © ITOPF)

Global Oil Spill Trend

Over the last 49 years, statistics for the frequency of spills greater than 7 tonnes from tankers show a marked downward trend as illustrated below.

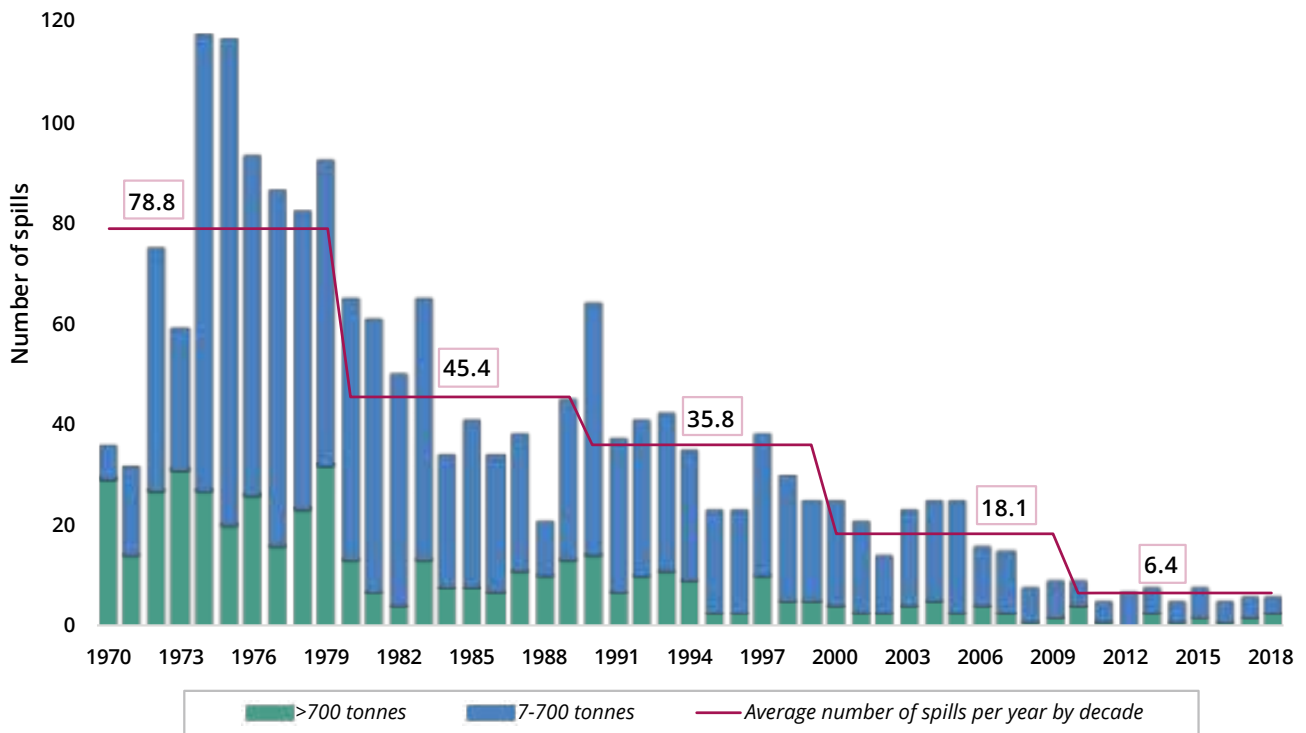


Figure 2: Number of spills (>7 tonnes) from 1970–2018

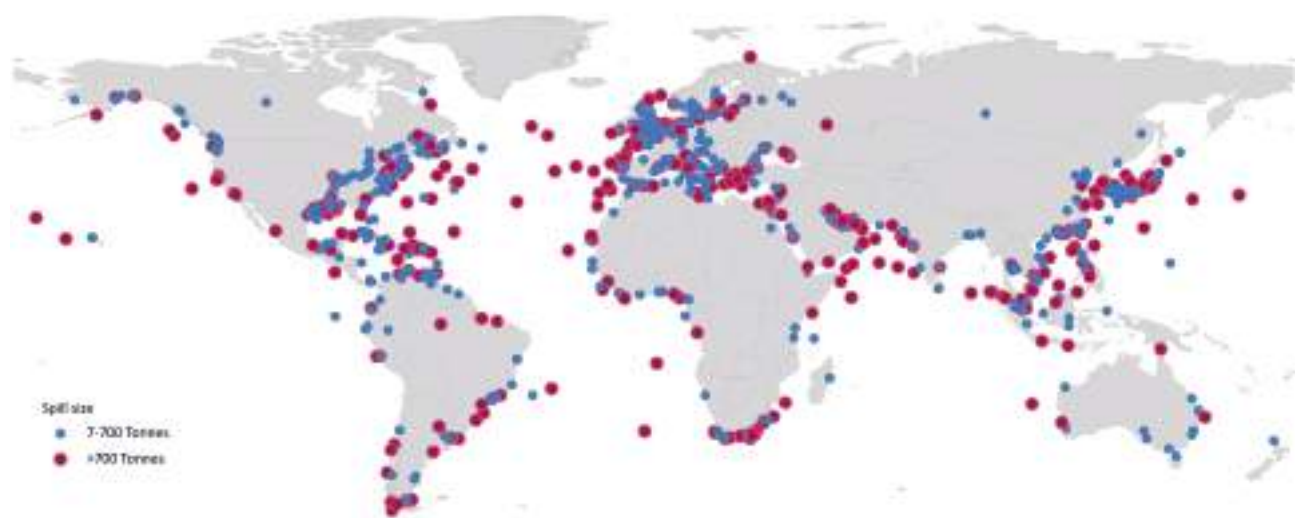


Figure 3: Location of spills >7 tonnes* from 1970 to 2018 (All rights reserved © ITOPF)

* This map represents nearly 90% of the spills (>7 tonnes) recorded in the ITOPF database. Records without specific location information have been omitted. Please note that approximate geographic coordinates have been used to map some records.

Number of Oil Spills

The occurrence of large spills (>700 tonnes) is relatively low and detailed statistical analysis is rarely possible. Consequently, emphasis is placed on identifying trends and revealing patterns in the data to present the most accurate result.

The number of large spills has decreased significantly over the last few decades and since 2010 averages

1.9 per year (Figure 4). It can be observed from Figure 5 that 53% of all large spills recorded occurred in the 1970s. It is, however, interesting to note that the progressive reduction in the number of large spills is significant when data is analysed per decade rather than annually, as demonstrated in Figure 4. Data recorded from 1970 to 2018 illustrate fluctuations in the yearly values within a decade.

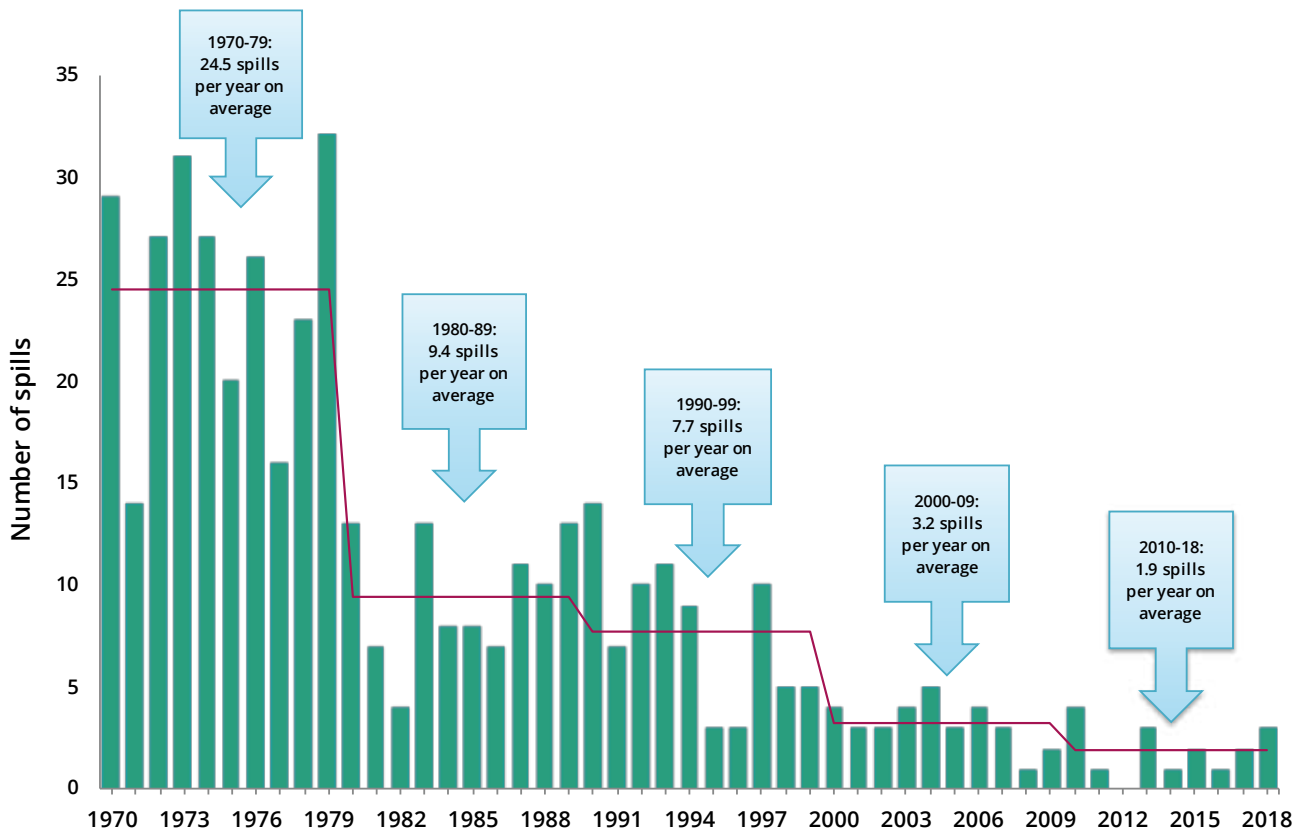


Figure 4: Number of large spills (>700 tonnes) from 1970–2018

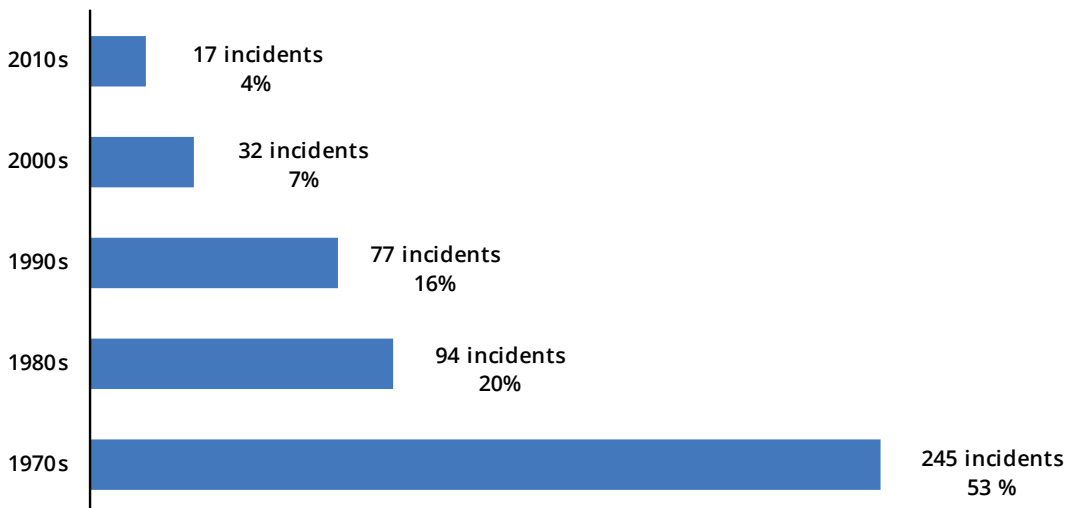


Figure 5: Large spills (>700 tonnes) as a percentage of those recorded from 1970–2018 per decade

A decline can also be observed with medium sized spills (7–700 tonnes) as shown in Table 2 and Figure 6. Here, the average number of spills per year in the 1990s was 28.1, reducing to 14.9 in the 2000s and is currently 4.7 for the 2010s (not a complete decade).

Over 80% of the incidents recorded since 1970 are small spills (<7 tonnes). Unfortunately, reliable reporting of this category of spills is often difficult to achieve as data available is often incomplete.

Year	7–700 Tonnes	>700 Tonnes
1970	7	29
1971	18	14
1972	48	27
1973	28	31
1974	90	27
1975	96	20
1976	67	26
1977	70	16
1978	59	23
1979	60	32
Total	543	245
Average	54.3	24.5

Year	7–700 Tonnes	>700 Tonnes
2000	21	4
2001	18	3
2002	11	3
2003	19	4
2004	20	5
2005	22	3
2006	12	4
2007	12	3
2008	7	1
2009	7	2
Total	149	32
Average	14.9	3.2

Year	7–700 Tonnes	>700 Tonnes
1980	52	13
1981	54	7
1982	46	4
1983	52	13
1984	26	8
1985	33	8
1986	27	7
1987	27	11
1988	11	10
1989	32	13
Total	360	94
Average	36	9.4

Year	7–700 Tonnes	>700 Tonnes
2010	5	4
2011	4	1
2012	7	0
2013	5	3
2014	4	1
2015	6	2
2016	4	1
2017	4	2
2018	3	3
Total	42	17
Average	4.7	1.9

Year	7–700 Tonnes	>700 Tonnes
1990	50	14
1991	30	7
1992	31	10
1993	31	11
1994	26	9
1995	20	3
1996	20	3
1997	28	10
1998	25	5
1999	20	5
Total	281	77
Average	28.1	7.7

Table 2: Annual number of oil spills (>7 tonnes)

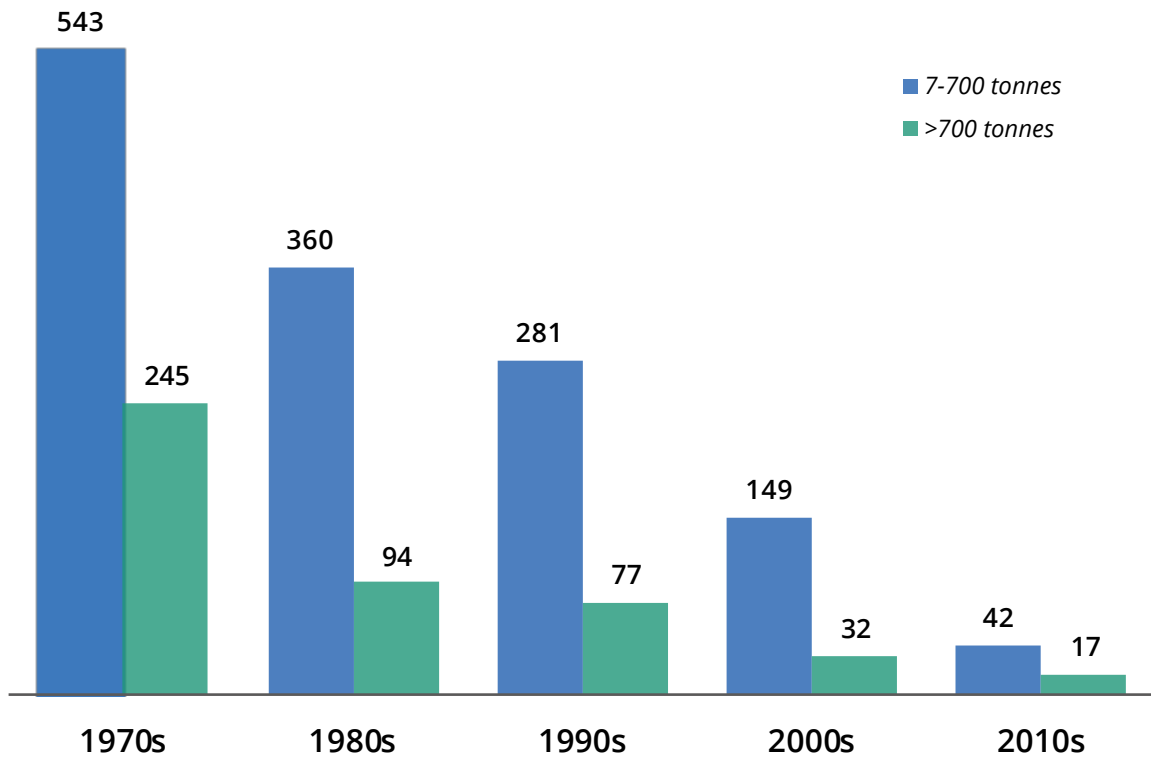


Figure 6: Number of medium (7-700 tonnes) and large (>700 tonnes) spills per decade from 1970-2018*

*Nine years of data for the period 2010-2018

6 spills (>7 tonnes) were recorded in 2018

For the year 2018, we recorded three large spills (>700 tonnes) and three medium spills (7-700 tonnes).

The first large spill occurred early in the new year when a tanker collided with another vessel resulting in a fire/explosion and consequently sank in the East China Sea. The second incident involved a tanker which sank in the Persian Gulf with over 1000 tonnes of cargo on board. The third large spill occurred late in the year when a

tanker collided with another tanker in China resulting in a spill of oil cargo.

The first medium sized spill was recorded in the Gulf of Guinea in February and occurred during a ship-to-ship transfer. The second resulted from an allision and occurred in June in Europe. The third medium sized spill occurred in Africa in November when a vessel dragged anchor and collided with another vessel.

Quantities of Oil Spilt

The vast majority of spills are small (i.e. less than 7 tonnes). However, there are inconsistencies in the quantities reported for these spills worldwide. Reports on spills of 7 tonnes and above tend to be more reliable and have been analysed to provide annual estimates of the quantity of oil spilt (Table 3), which are rounded to the nearest thousand.

To date, approximately 5.86 million tonnes of oil have been lost as a result of tanker incidents from 1970 to 2018. However, there has been a significant reduction in volume of oil spilt through the decades. Currently, the volume of oil lost in accidents is a tiny fraction of the volume that is delivered safely to its destination each year. From Table 3 it is interesting to observe that an amount greater than the total quantity of oil spilt in the decade 2000 to 2009 (196,000 tonnes) was spilt in several single years in earlier decades.

The total volume of oil lost to the environment recorded in 2018 was approximately 116,000 tonnes, the majority

of which can be attributed to the incident involving the MT SANCHI that occurred in the East China Sea (Table 3). This annual quantity is the largest recorded in 24 years.

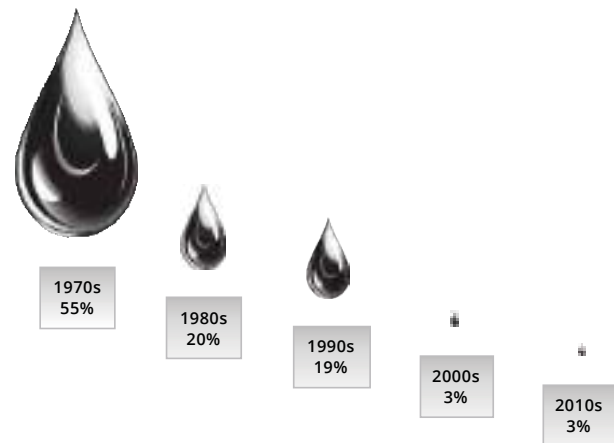


Figure 7: Oil spilt per decade as a percentage of the total spilt between 1970 and 2018

Year	Quantity (Tonnes)	Year	Quantity (Tonnes)	Year	Quantity (Tonnes)
1970	383,000	1990	61,000	2010	12,000
1971	144,000	1991	431,000	2011	2,000
1972	313,000	1992	167,000	2012	1,000
1973	159,000	1993	140,000	2013	7,000
1974	174,000	1994	130,000	2014	5,000
1975	352,000	1995	12,000	2015	7,000
1976	365,000	1996	80,000	2016	6,000
1977	276,000	1997	72,000	2017	7,000
1978	393,000	1998	13,000	2018	116,000
1979	636,000	1999	28,000	Total	163,000
Total	3,195,000	Total	1,134,000		

Year	Quantity (Tonnes)	Year	Quantity (Tonnes)
1980	206,000	2000	14,000
1981	48,000	2001	9,000
1982	12,000	2002	66,000
1983	384,000	2003	43,000
1984	29,000	2004	17,000
1985	85,000	2005	15,000
1986	19,000	2006	12,000
1987	38,000	2007	15,000
1988	190,000	2008	2,000
1989	164,000	2009	3,000
Total	1,175,000	Total	196,000

Table 3: Annual quantity of oil spilt

Influence of Large Spills on Quantities of Oil Spilt

As demonstrated in Figures 8 and 9, when looking at the frequency and quantities of oil spilt, it should be noted that a few very large spills are responsible for a high percentage of the oil spilt. For example, in more recent decades the following can be seen (Figure 8):

- In the 1990s there were 358 spills of 7 tonnes and over, resulting in 1,134,000 tonnes of oil lost; 73% of this amount was spilt in just 10 incidents.
- In the 2000s there were 181 spills of 7 tonnes and over, resulting in 196,000 tonnes of oil lost; 75% of this amount was spilt in just 10 incidents.

- In the nine year period 2010 to 2018 there have been 59 spills of 7 tonnes and over, resulting in 163,000 tonnes of oil lost; 92% of this amount was spilt in just 10 incidents. One incident is responsible for about 70% of the quantity of oil spilt this decade.

In terms of the volume of oil spilt the figures for a particular year may be severely distorted by a single large incident. This is clearly illustrated by incidents such as ATLANTIC EMPRESS (1979), 287,000 tonnes spilt; CASTILLO DE BELLVER (1983), 252,000 tonnes spilt; ABT SUMMER (1991), 260,000 tonnes spilt and SANCHI (2018), 113,000 tonnes spilt (Figure 9).

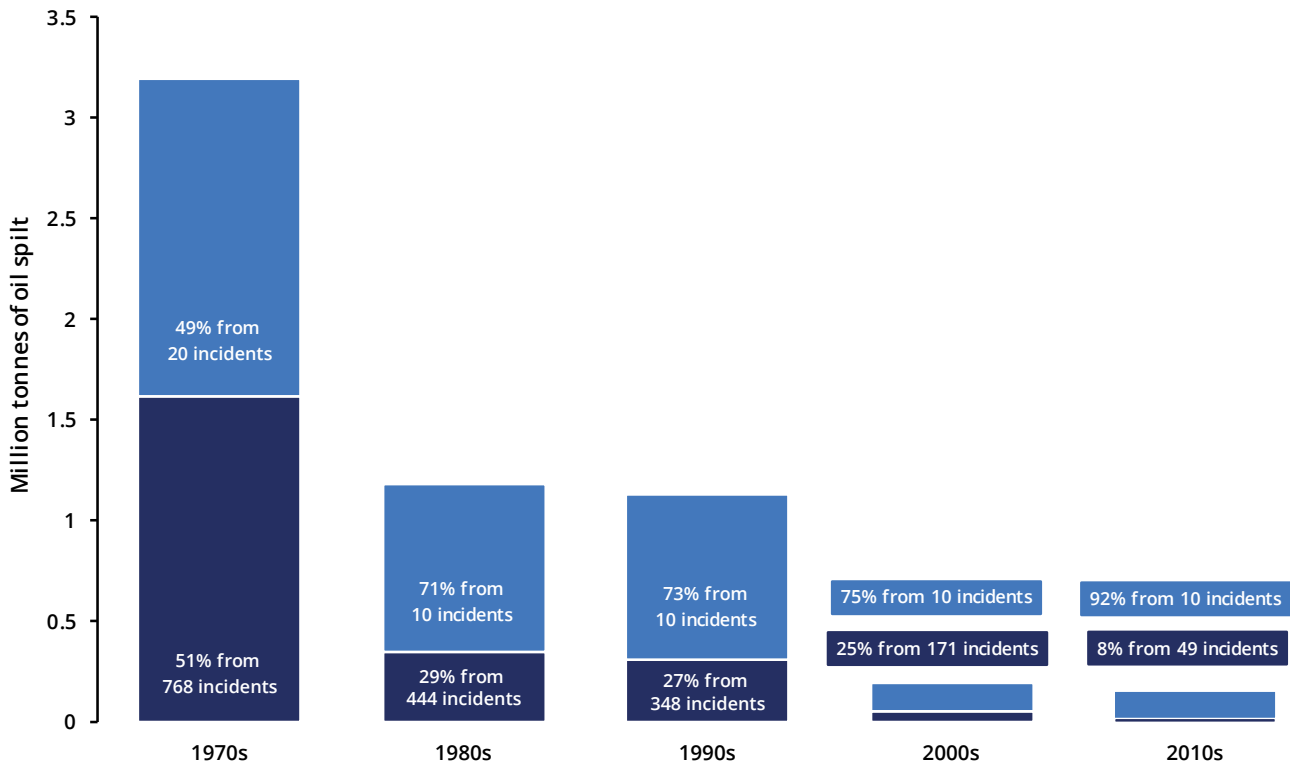


Figure 8: Spills 7 tonnes and over per decade showing the influence of a relatively small number of comparatively large spills on the overall figure

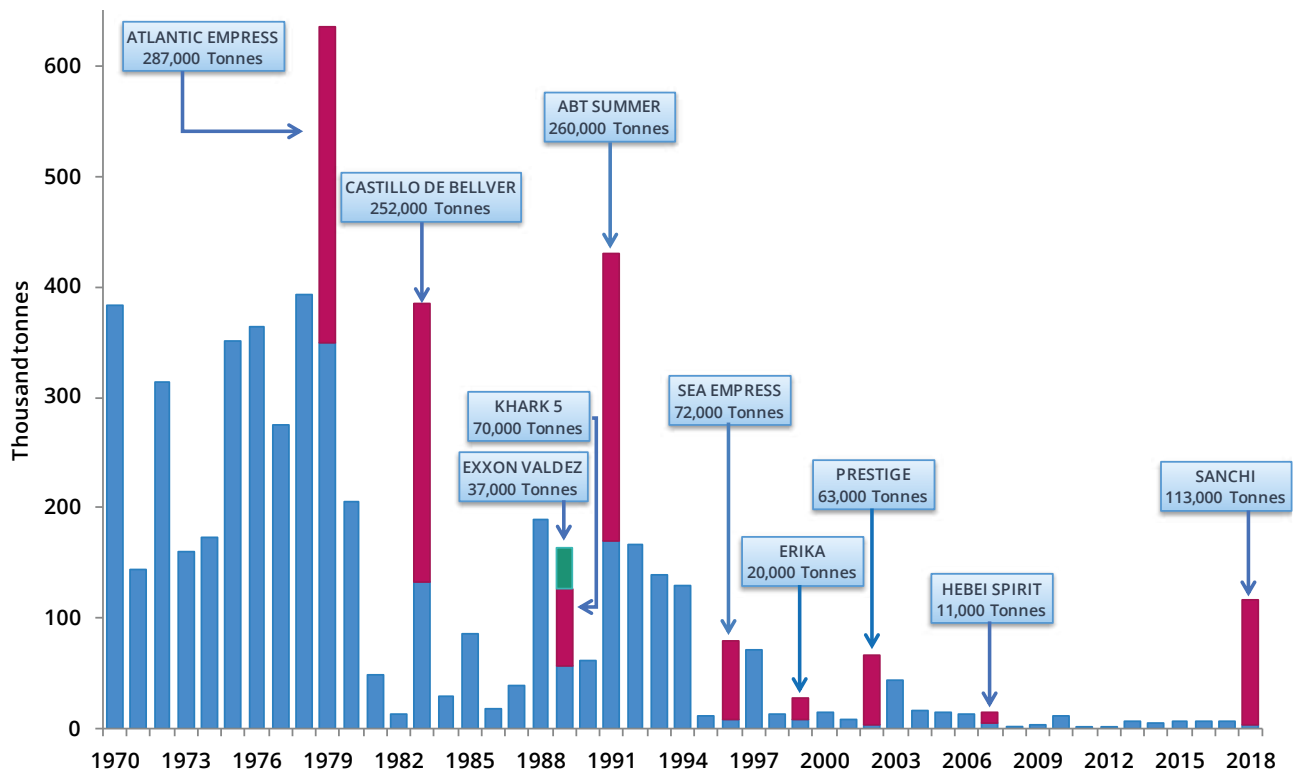


Figure 9: Quantities of oil spilled 7 tonnes and over (rounded to nearest thousand), 1970–2018

Tanker Spills versus Seaborne Oil Trade

Apart from a fall in the early 1980s during the worldwide economic recession, seaborne oil trade has grown steadily from 1970 (Figure 10). While increased tanker movements might imply increased risk,

it is encouraging to observe that the downward trend in frequency of oil spills continues despite an overall increase in oil trading over the period.

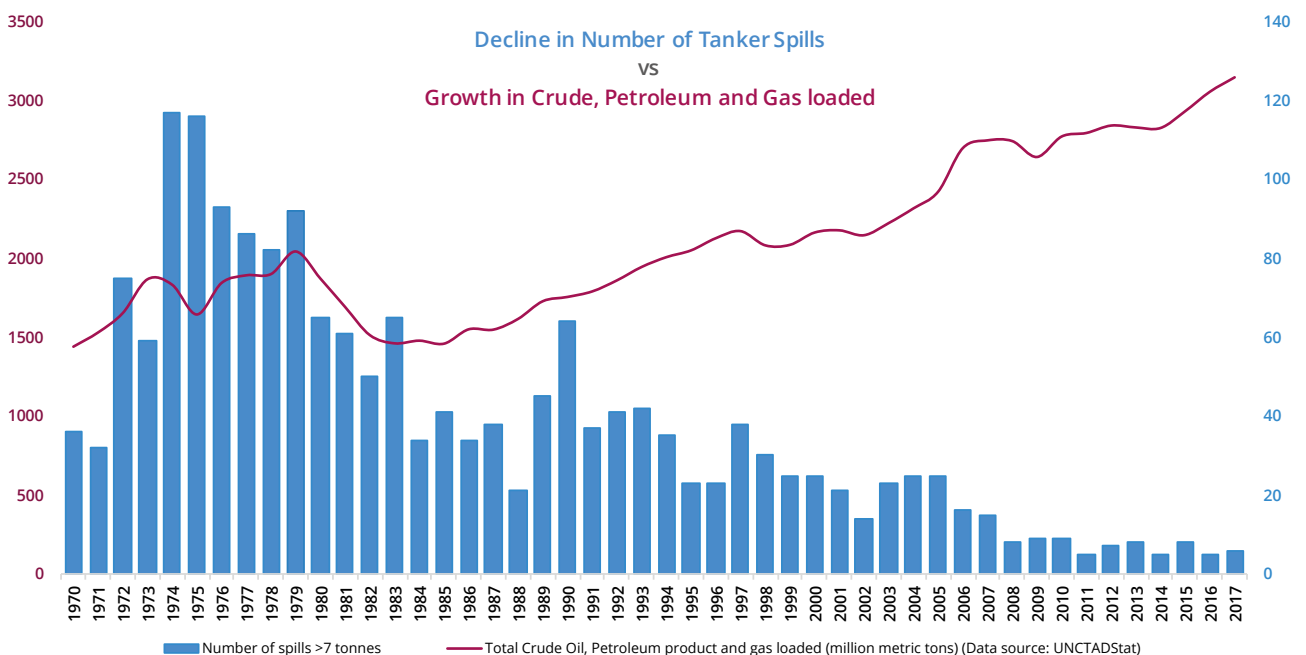


Figure 10: Decline in number of tanker spills vs growth in crude, petroleum and gas loaded

Causes of Spills

The causes and circumstances of oil spills are varied, and their analyses provide valuable insights for managing risk. This information is, however, difficult to attain as data is sometimes inconsistent or not available, particularly for small spills.

For this analysis, the primary causes of the oil spills have been grouped into Allisions/Collisions, Groundings,

Hull Failures, Equipment Failures, Fires and Explosions, Others and Unknown. Events such as heavy weather damage and human error have been categorised as Other and spills where the relevant information is not available have been designated as Unknown and are reported but excluded from the analysis. Figure 11, below, provides an overview of the causes by size of spill.

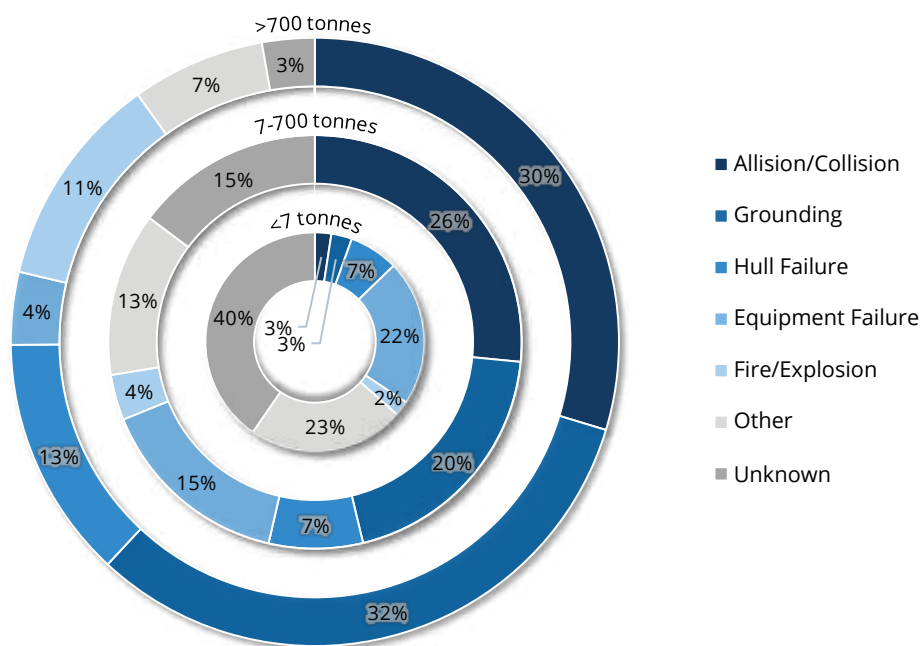


Figure 11: Cause of spills, 1970-2018

The most frequent causes of oil spills (>7 tonnes) from tankers are Allisions/Collisions and Groundings.

The following analysis is based on spills over 7 tonnes for which the cause is known.

Most oil spills (>7 tonnes) recorded between 1970 and 2018 were caused by Allisions/Collisions and Groundings. From Figure 12 below, it is evident that

whilst the overall number of spills has reduced, the proportion of those that are the result of Allisions/Collisions has increased and those due to Groundings have decreased. Figure 12 also demonstrates a decrease in the proportion of spills caused by Hull Failure, with a significant drop after the 1990s.

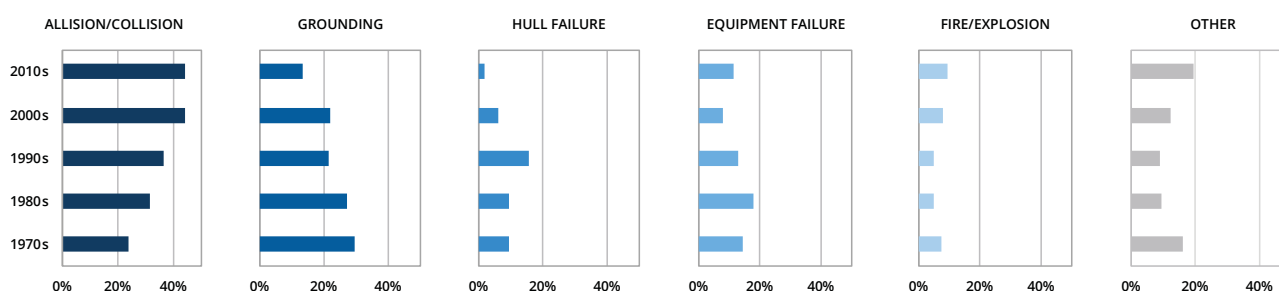


Figure 12: Cause of spills per decade, 1970-2018

In the following analysis the primary cause of the spill, and the operation that the vessel was undertaking at the time of the incident, are explored.

The primary causes have been designated as above and unknown causes are excluded from the analysis of operations taking place at the time of the spill.

For small and medium sized spills, operations have been grouped into Loading/Discharging, Bunkering, Other Operations and Unknown Operations. Other Operations include activities such as ballasting, de-ballasting, tank cleaning and when the vessel is underway. Reporting of large spills tends to provide

more information and greater accuracy, which has allowed further breakdown of vessel operations. Therefore, operations for large spills have been grouped into Loading/Discharging, Bunkering, At Anchor (Inland/Restricted waters), At Anchor (Open water), Underway (Inland/Restricted waters), Underway (Open water), Other Operations and Unknown Operations.

Small and medium sized spills account for 95% of all the incidents recorded. While the cause of these spills is often unknown, a significant percentage, 40% and 29% respectively, occurred during loading and discharging operations which normally take place in ports and oil terminals (Figure 13).

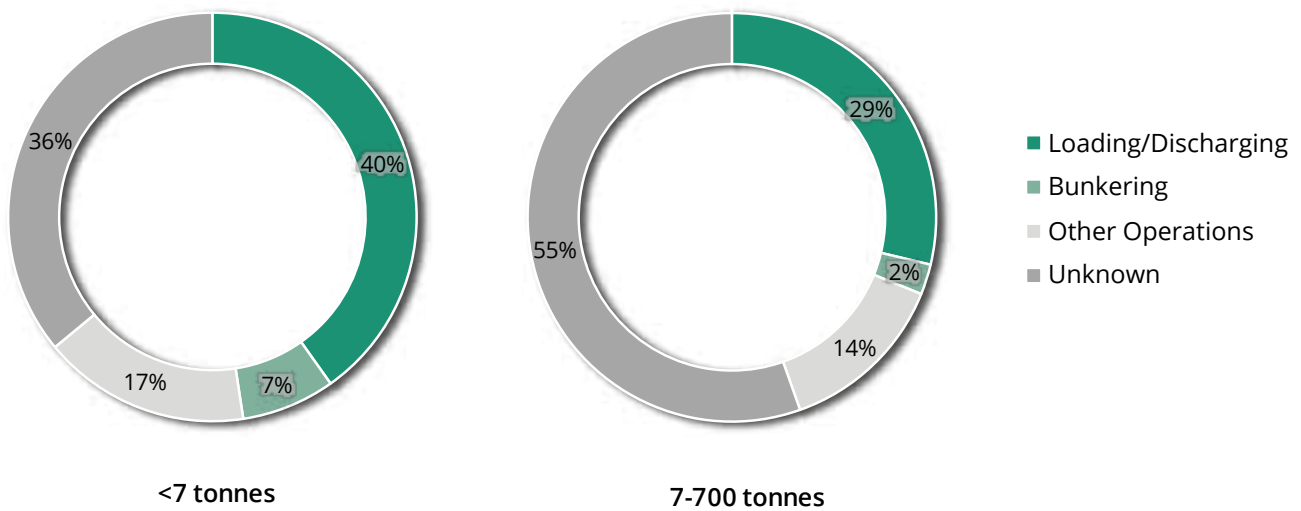


Figure 13: Number of small (<7 tonnes) and medium (7-700 tonnes) spills by operation, 1970–2018

Based on spills for which the primary cause is known, it can be seen from Figures 14 and 15 that equipment failure accounts for approximately 50% of incidents occurring during loading and discharging for both small and medium size categories. Nevertheless, when

considering Other Operations there is a significant difference in the percentage of allisions, collisions and groundings between these two size groups where we see the percentage increasing from 4% for smaller spills to 51% for medium spills.

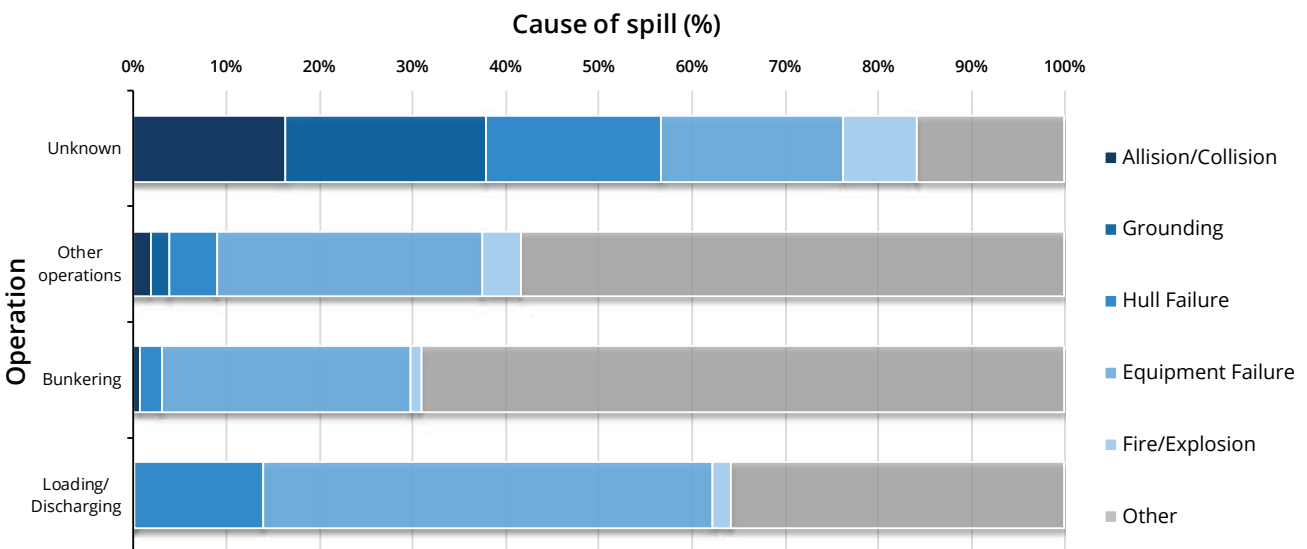


Figure 14: Number of spills <7 tonnes by operation at time of incident and primary cause of spill, 1974–2018

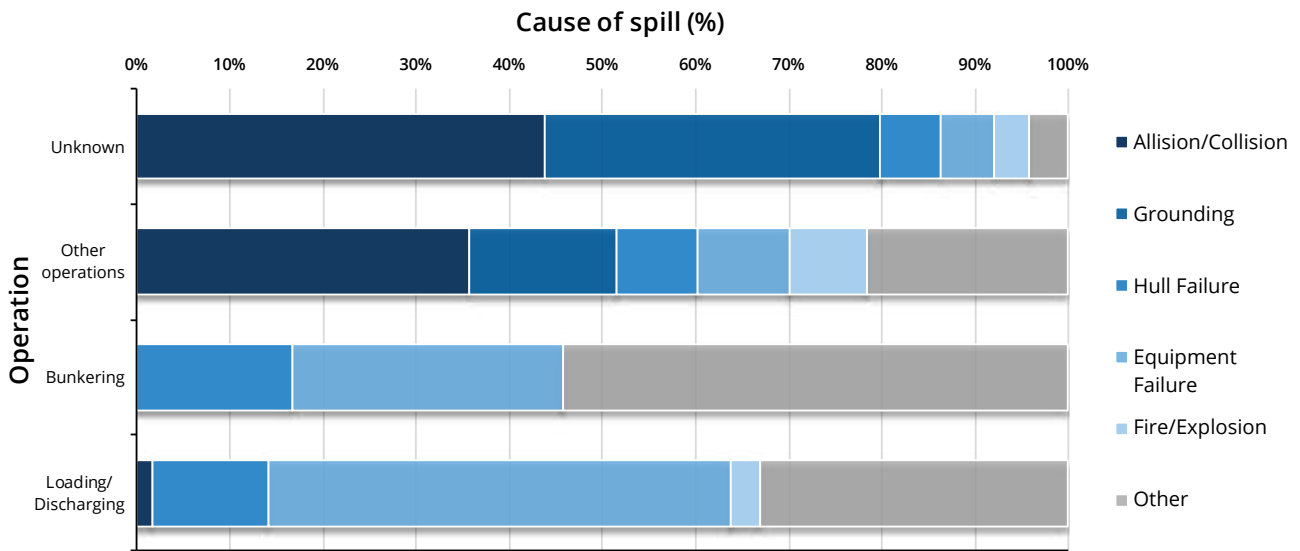


Figure 15: Number of spills 7–700 tonnes by operation at time of incident and primary cause of spill, 1970–2018

Large spills account for the remaining 5% of all the incidents recorded and the occurrence of these incidents has significantly decreased over the past 49 years. From Figure 16, it can be seen that 50% of large spills occurred while the vessels were underway in open water; allisions, collisions and groundings account for 58% of the causes of these spills (Figure 17). Perhaps unsurprisingly, these same causes account for an even higher percentage of incidents when the vessels were underway in inland or restricted waters, being linked to some 99% of spills. Restricted

waters include water areas in ports and harbours.

Activities during loading or discharging result in significantly more small or medium sized spills than large spills (Figures 13 & 16). For large spills, 36% were caused by fires and explosions. In contrast, during loading and discharging less than 5% of small or medium sized spills were caused by fires and explosions. In addition, 31% of large spills resulted from equipment failures compared to 48% and 50% for small and medium spills respectively (Figures 14, 15 & 17).

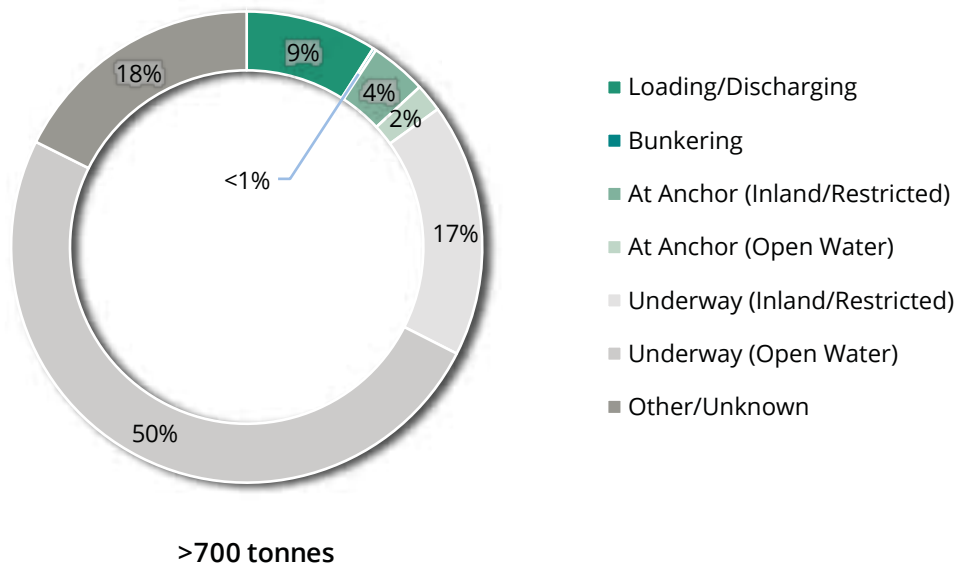


Figure 16: Number of spills >700 tonnes by operation at time of incident, 1970–2018

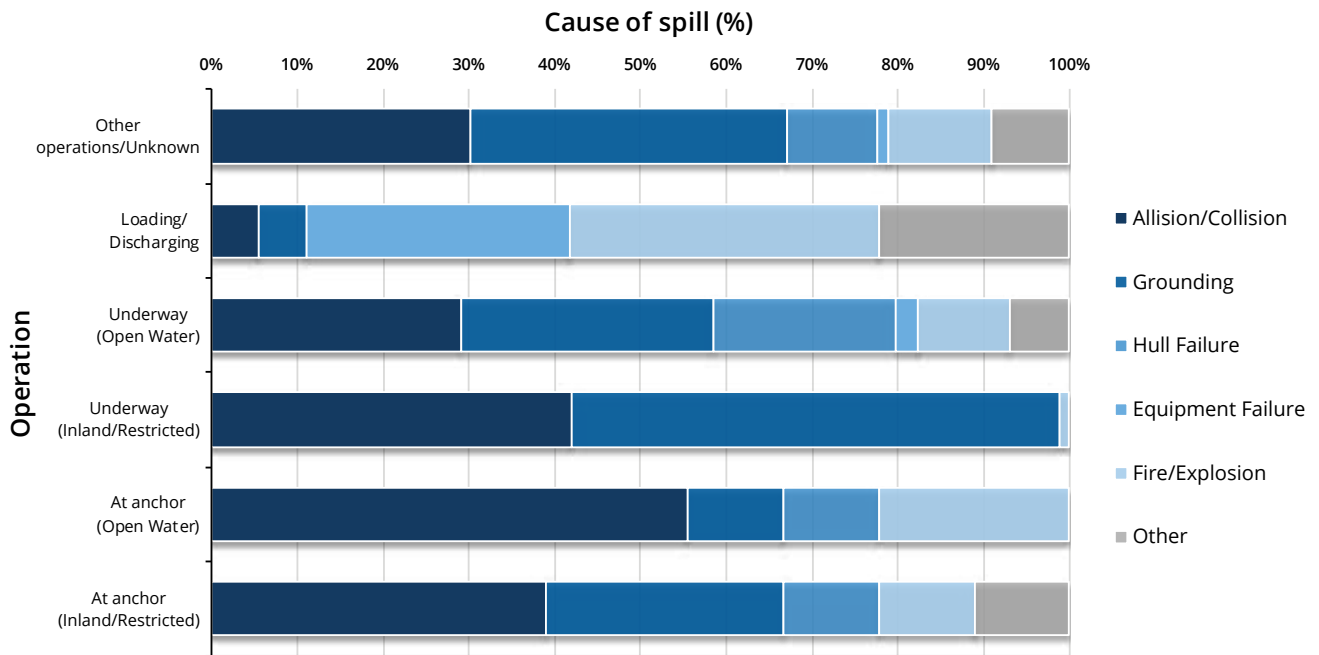


Figure 17: Number of spills >700 tonnes by operation at time of incident and primary cause of spill, 1970–2018

Tables 4 and 5 show the number of spills by cause and operation for medium and large spills recorded from 1970 to 2018.

		Operations				Total
		Loading/Discharging	Bunkering	Other Operations	Unknown	
Causes	Allision/Collision	5	0	61	299	365
	Grounding	0	0	27	244	271
	Hull Failure	37	4	15	45	101
	Equipment Failure	147	7	17	39	210
	Fire/Explosion	9	0	14	26	49
	Other	98	13	37	28	176
	Unknown	99	9	14	81	203
	Total	395	33	185	762	1,375
Percentage (%)	29	2	14	55		

Table 4: Number of spills 7-700 tonnes by operation at time of incident and primary cause of spill, 1970–2018

		Operations						Total	
		At anchor (Inland/Restricted)	At anchor (Open Water)	Underway (Inland/Restricted)	Underway (Open Water)	Loading/discharging	Bunkering		Other Operations/Unknown
Causes	Allision/Collision	7	5	34	67	2	0	23	138
	Grounding	5	1	46	68	2	0	28	150
	Hull Failure	2	1	0	49	0	0	8	60
	Equipment Failure	0	0	0	6	11	0	1	18
	Fire/Explosion	2	2	1	25	13	1	9	53
	Other	2	0	0	16	8	0	7	33
	Unknown	0	0	0	1	6	0	6	13
	Total	18	9	81	232	42	1	82	465
Percentage (%)	4	2	17	50	9	0	18		

Table 5: Number of spills >700 tonnes by operation at time of incident and primary cause of spill, 1970–2018

About ITOPF

ITOPF is maintained by the world's shipowners and their insurers on a not-for-profit basis to promote effective response to spills of oil, chemicals and other substances in the marine environment.

Since ITOPF's establishment in 1968, our technical staff have attended on-site at over 800 shipping incidents in 100 countries to provide objective and scientific advice on clean-up measures, the effects of pollutants on the environment and economic activities, and on compensation. These incidents can involve oil, chemicals and other cargoes, whether bulk or packaged, as well as bunker fuel from all types of ship. We also provide advice in relation to oil spills from other potential sources of marine pollution, including pipelines and offshore installations; physical damage to coral reefs resulting from ship groundings; and environmental impacts associated with shipwrecks.

Our first-hand experience of pollution incidents is utilised during contingency planning and other advisory assignments for government and industry. We are an authoritative source of information on marine spills and share our knowledge at training courses and seminars throughout the world, encouraging best practice through outreach and education.

Practical guidance on oil and chemical spill response and effects in the marine environment is available through ITOPF's Technical Information Papers (TIPs) and its Response to Marine Oil Spills film series.

ITOPF TIPs

- 1 Aerial Observation of Marine Oil Spills
- 2 Fate of Marine Oil Spills
- 3 Use of Booms in Oil Pollution Response
- 4 Use of Dispersants to Treat Oil Spills
- 5 Use of Skimmers in Oil Pollution Response
- 6 Recognition of Oil on Shorelines
- 7 Clean-up of Oil from Shorelines
- 8 Use of Sorbent Materials in Oil Spill Response
- 9 Disposal of Oil and Debris
- 10 Leadership, Command & Management of Oil Spills
- 11 Effects of Oil Pollution on Fisheries and Mariculture
- 12 Effects of Oil Pollution on Social and Economic Activities
- 13 Effects of Oil Pollution on the Environment
- 14 Sampling and Monitoring of Marine Oil Spills
- 15 Preparation and Submission of Claims from Oil Pollution
- 16 Contingency Planning for Marine Oil Spills
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