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Years
1968 - 2018

JANUARY 2018



THE INTERNATIONAL TANKER OWNERS POLLUTION FEDERATION LIMITED

OIL TANKER SPILL STATISTICS 2017

Introduction to ITOPF

Promoting effective spill response

ITOPF is a not-for-profit organisation established on behalf of the world's shipowners and their insurers to promote effective response to marine spills of oil, chemicals and other hazardous substances. Technical services include emergency response, advice on clean-up techniques, damage assessment, claims analysis, assistance with spill response planning and the provision of training and information.

Since 1968, ITOPF technical staff have responded on-site to almost 800 shipping incidents in 99 countries, to provide scientific and objective advice on clean-up measures, the effects of pollutants on the environment and economic activities, and on compensation. ITOPF has also provided advice remotely for numerous other incidents. These incidents can involve oil, chemical and dry bulk and packaged cargoes, as well as bunker fuel from all types of ship. Advice is also given occasionally in relation to oil spills from other potential sources of marine pollution, including pipelines and offshore installations, and physical damage to coral reefs resulting from ship groundings.

The first-hand experience gained by ITOPF's staff through direct involvement in pollution incidents is utilised during damage assessment, contingency planning and training assignments, as well as in the production of technical publications and films.

ITOPF's membership comprises over 7,900 tanker owners and bareboat charterers, who between them own or operate almost 13,500 tankers, barges, LPG/LNG carriers, FPSOs/FSUs and combination carriers, with a total gross tonnage of about 426 million GT. This represents virtually all the world's ocean-going bulk oil, chemical and gas carrier tonnage and so it is extremely rare for the owner of any tanker engaged in international trade not to be a Member of ITOPF. Associates comprise the owners and bareboat charterers of all other types of ship, currently totalling some 792 million GT.

ITOPF's activities are overseen by an international Board of Directors representing the organisation's independent and oil company Members, its Associates and their P&I insurers.

During the last half century, ITOPF has evolved into the maritime industry's primary source of objective technical advice, expertise and information on effective response to ship-source pollution. It has observer status at both the International Maritime Organization (IMO) and the International Oil Pollution Compensation Funds (IOPC Funds) and regularly contributes to policy discussions and legal texts.

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
- 17 Response to Marine Chemical Incidents

ITOPF Film Series

- 1 Introduction to Oil Spills
- 2 Aerial Surveillance
- 3 At-Sea Response
- 4 Shoreline Clean-up
- 5 Waste Management
- 6 Environmental Impacts
- 7 Oil Spill Compensation
- 8 Oil Spills in Cold Climates

The TIPs and films are available in multiple languages on ITOPF's website www.itopf.com.

Oil Tanker Spill Statistics

I TOPF'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 incidence and size of tanker oil spills since 1970.

I TOPF 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

I TOPF'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 incidence 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.

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. A number of these incidents, 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.

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	IRENES SERENADE	1980	Navarino Bay, Greece	100,000
10	URQUIOLA	1976	La Coruna, Spain	100,000
11	HAWAIIAN PATRIOT	1977	300 nautical miles off Honolulu	95,000
12	INDEPENDENTA	1979	Bosphorus, Turkey	95,000
13	JAKOB MAERSK	1975	Oporto, Portugal	88,000
14	BRAER	1993	Shetland Islands, UK	85,000
15	AEGEAN SEA	1992	La Coruna, Spain	74,000
16	SEA EMPRESS	1996	Milford Haven, UK	72,000
17	KHARK 5	1989	120 nautical miles off Atlantic coast of Morocco	70,000
18	NOVA	1985	Off Kharg Island, Gulf of Iran	70,000
19	KATINA P	1992	Off Maputo, Mozambique	67,000
20	PRESTIGE	2002	Off Galicia, Spain	63,000
35	EXXON VALDEZ	1989	Prince William Sound, Alaska, USA	37,000
131	HEBEI SPIRIT	2007	South Korea	11,000

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



Figure 1: Location of major spills

Global Oil Spill Trend

Over the last 48 years, statistics for spills greater than 7 tonnes from tankers show a marked downward trend as illustrated below.

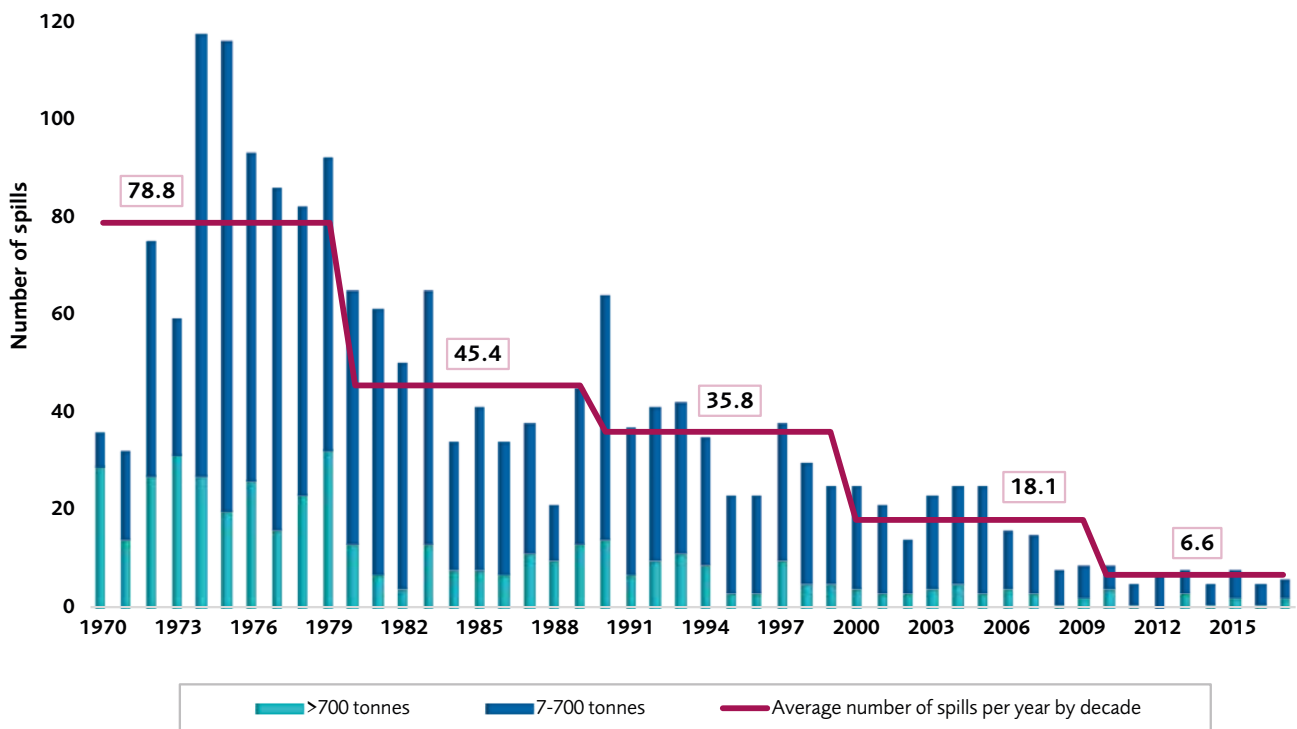


Figure 2: Number of spills (>7 tonnes) from 1970–2017

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 best possible result.

The number of large spills has decreased significantly over the last few decades and since 2010, averages 1.8

per year (Figure 3). It can be observed from Figure 4 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 2017 illustrate fluctuations in the yearly values within a decade.

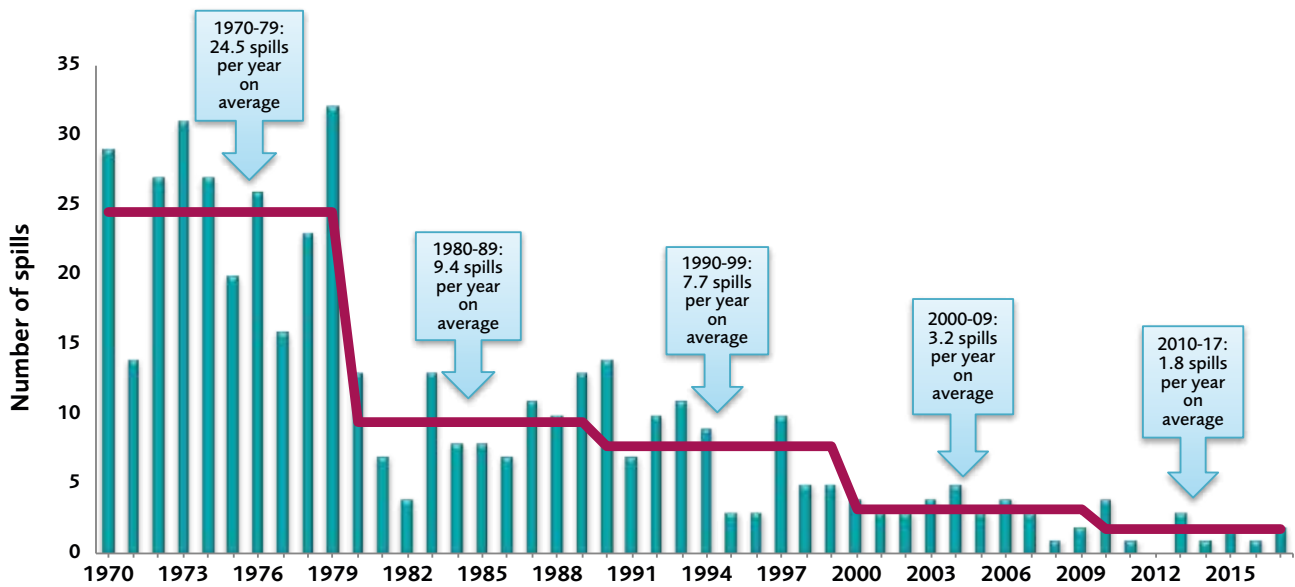


Figure 3: Number of large spills (>700 tonnes) from 1970–2017

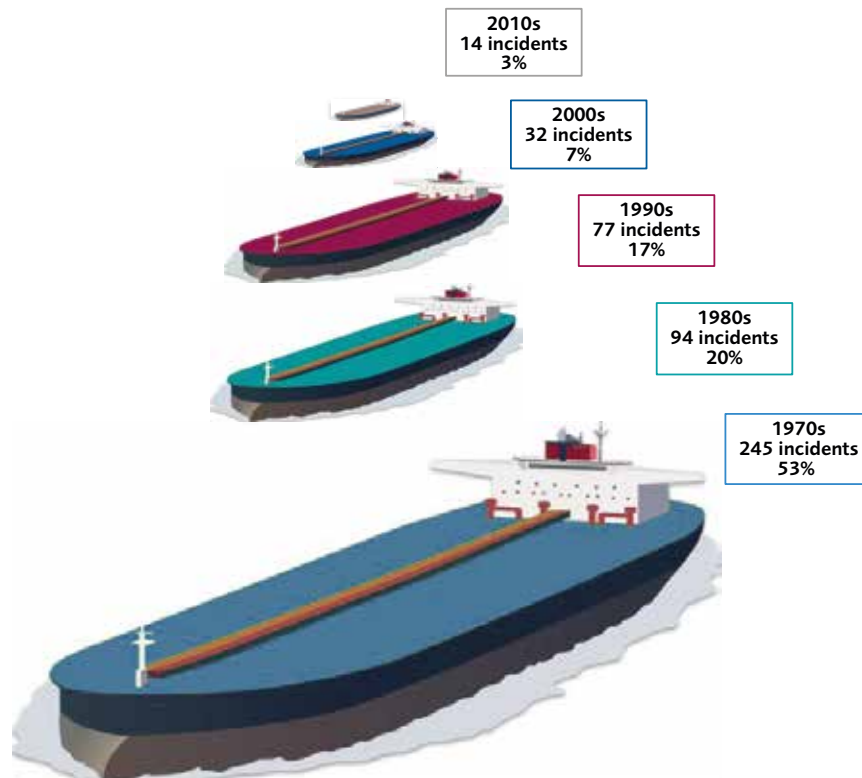


Figure 4: Large spills (>700 tonnes) as a percentage of those recorded from 1970–2017 per decade

A decline can also be observed with medium sized spills (7–700 tonnes) as shown in Table 2 and Figure 5. Here, the average number of spills per year in the 1990s was 28.1, reducing to 14.9 in the 2000s and is currently 4.9 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
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

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

Six spills (>7 tonnes) were recorded in 2017

For the year 2017, we recorded two large spills (>700 tonnes) and four medium spills (7–700 tonnes).

The first large spill occurred in June when a tanker sank in the Indian Ocean with over 5,000 tonnes of oil on board. The second incident involved a tanker which sank

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

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
2010	5	4
2011	4	1
2012	7	0
2013	5	3
2014	4	1
2015	6	2
2016	4	1
2017	4	2
Total	39	14
Average	4.9	1.8

off the coast of Greece in September spilling about 700 tonnes of oil.

Of the four medium sized spills two were recorded in January 2017 in South Asia and Southeast Asia; both resulted from collisions and involved the release of bunker fuel. A third spill was reported in East Asia in August. This also involved bunker fuel and resulted from a vessel grounding in bad weather. The fourth medium-sized spill occurred in October in the USA.

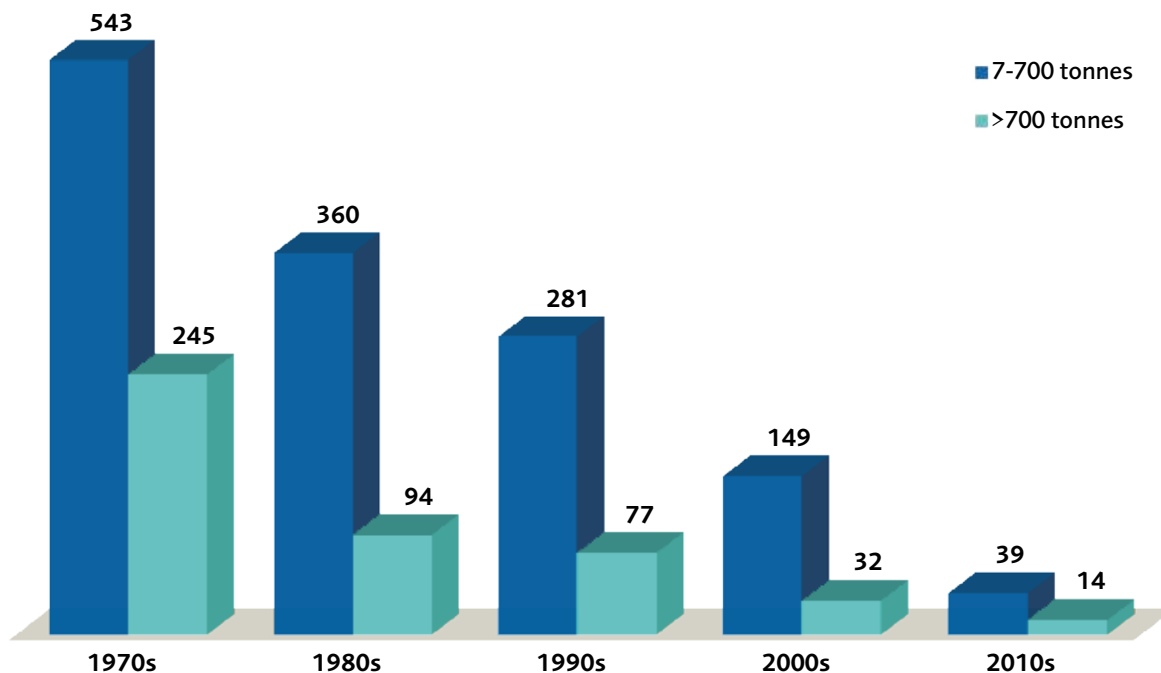


Figure 5: Number of medium (7–700 tonnes) and large (>700 tonnes) spills per decade from 1970 to 2017*

* Only 8 years of data for the period 2010–2017

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.

Approximately 5.74 million tonnes of oil were lost as a result of tanker incidents from 1970 to 2017. 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 2017 was approximately 7,000 tonnes, the majority of which can be attributed to the large spill (>700 tonnes) that occurred in the Indian Ocean in June (Table 3).

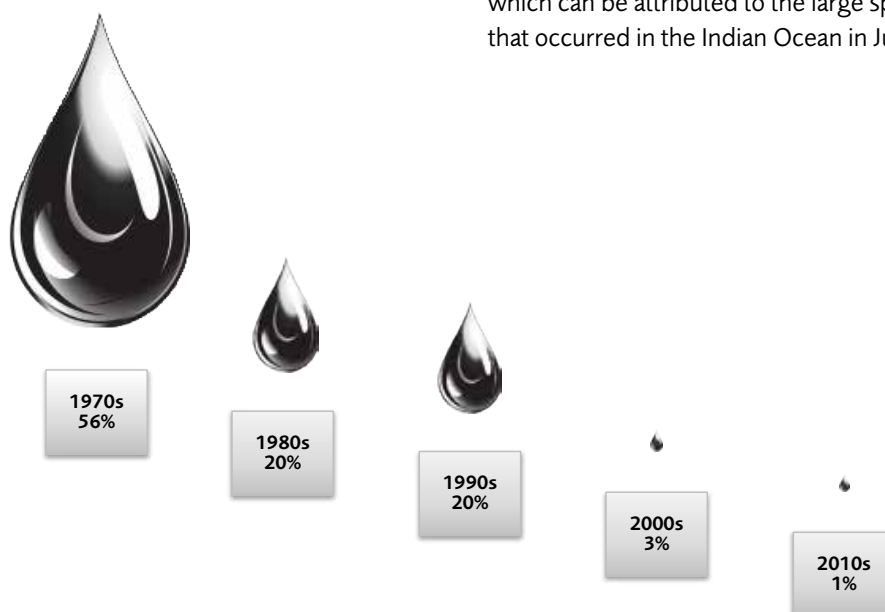


Figure 6: Oil spilt per decade as a percentage of the total spilt between 1970 and 2017

Year	Quantity (Tonnes)
1970	383,000
1971	144,000
1972	313,000
1973	159,000
1974	174,000
1975	352,000
1976	365,000
1977	276,000
1978	393,000
1979	636,000
Total	3,195,000

Year	Quantity (Tonnes)
1990	61,000
1991	431,000
1992	167,000
1993	140,000
1994	130,000
1995	12,000
1996	80,000
1997	72,000
1998	13,000
1999	28,000
Total	1,134,000

Year	Quantity (Tonnes)
2010	12,000
2011	2,000
2012	1,000
2013	7,000
2014	5,000
2015	7,000
2016	6,000
2017	7,000
Total	47,000

Year	Quantity (Tonnes)
1980	206,000
1981	48,000
1982	12,000
1983	384,000
1984	29,000
1985	85,000
1986	19,000
1987	38,000
1988	190,000
1989	164,000
Total	1,175,000

Year	Quantity (Tonnes)
2000	14,000
2001	9,000
2002	66,000
2003	43,000
2004	17,000
2005	15,000
2006	12,000
2007	15,000
2008	2,000
2009	3,000
Total	196,000

Table 3: Annual quantity of oil spilt

Influence of Large Spills on Quantities of Oil Spilt

As demonstrated in Figures 7 and 8, 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:

- 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 eight year period 2010–2017 there have been 53 spills of 7 tonnes and over, resulting in 47,000 tonnes of oil lost; 80% of this amount was spilt in just 10 incidents.

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 and ABT SUMMER (1991), 260,000 tonnes spilt (Figure 7).

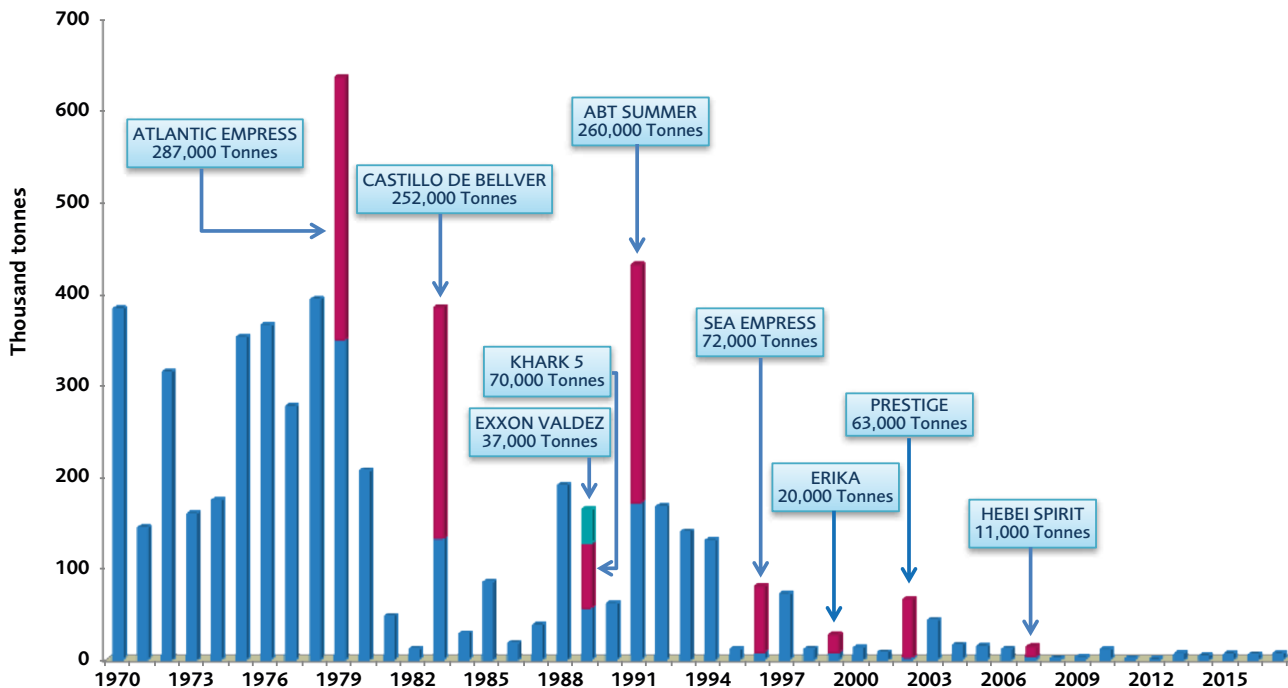


Figure 7: Quantities of oil spilt 7 tonnes and over (rounded to nearest thousand), 1970–2017

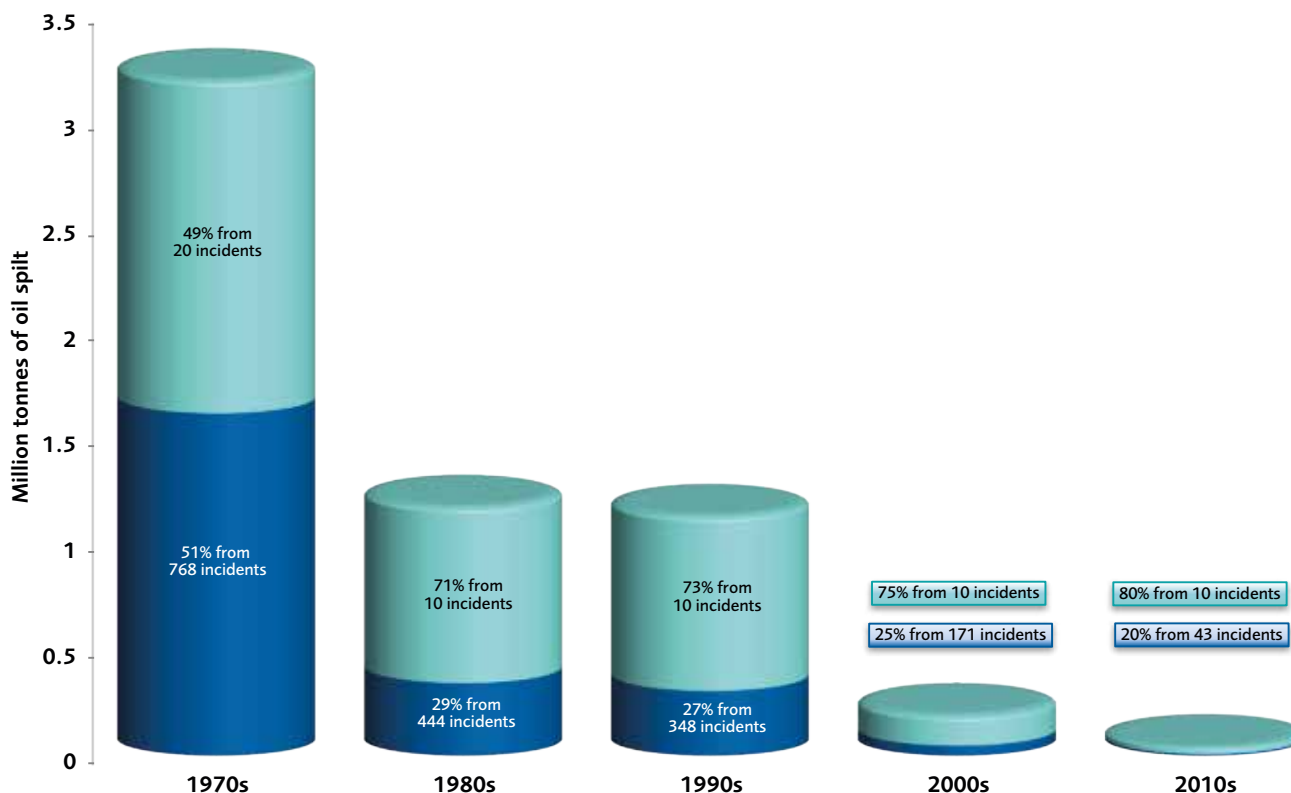


Figure 8: Spills 7 tonnes and over per decade showing the influence of a relatively small number of comparatively large spills on the overall figure

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 9). While increased tanker movements might imply increased risk, it is

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

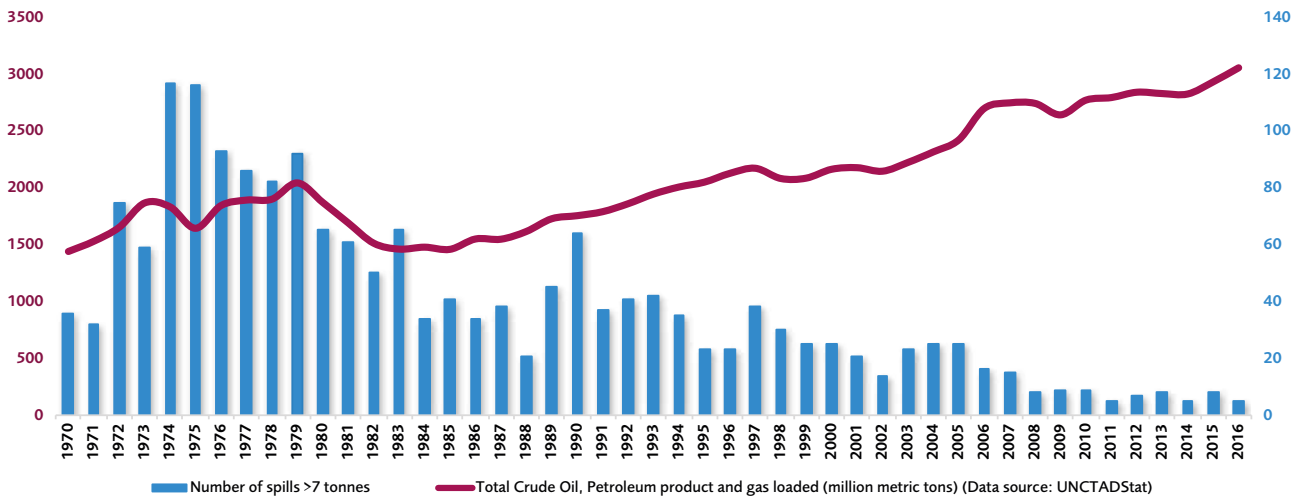


Figure 9: Decline in number of tanker spills vs growth in crude, petroleum and gas loaded

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 10, below, provides an overview of the causes by size.

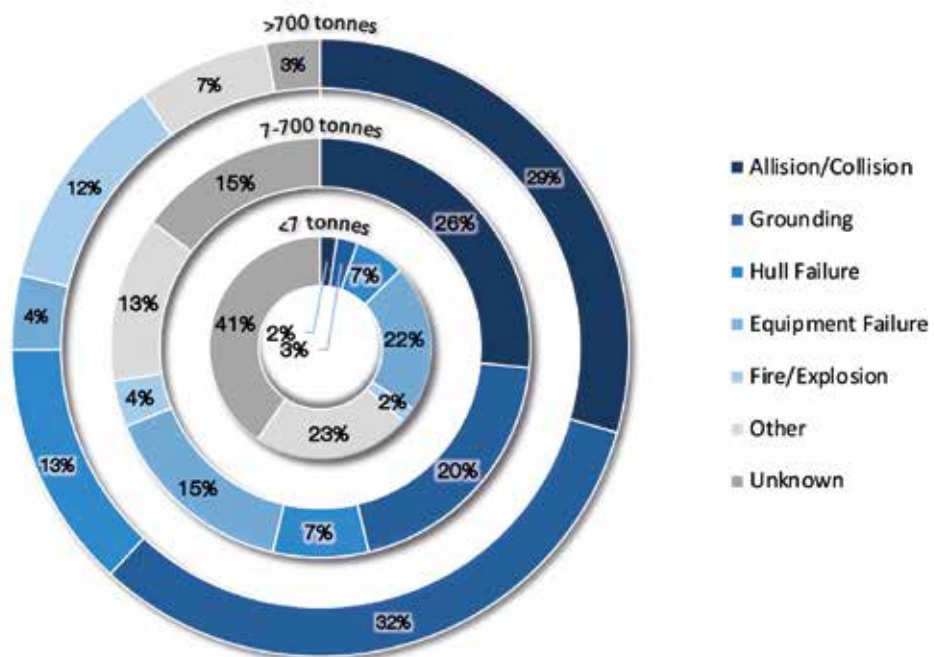


Figure 10: Incidence of spills by cause, 1970–2017

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

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

Most oil spills (>7 tonnes) recorded between 1970 and 2017 were caused by Allisions/Collisions and Groundings. From Figure 11 below, it is evident that there has been a steady increase in the percentage of Allisions/Collisions over the decades, while Groundings have been declining. Figure 11 also demonstrates a decrease in percentage of spills caused by Hull Failure, with a significant drop after the 1990s.

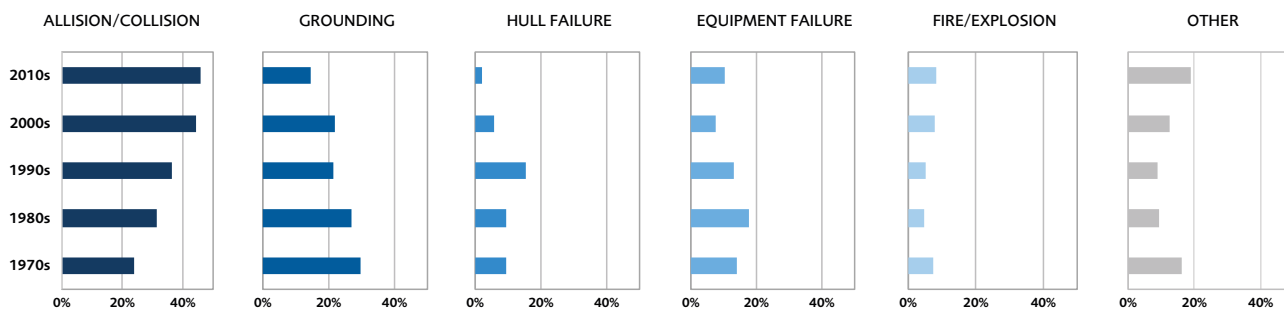


Figure 11: Percentage of spills by cause per decade, 1970–2017

In the following analysis the primary cause of the spill and the operation that the vessel was undertaking at the time of the incident is 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 (Figures 11).

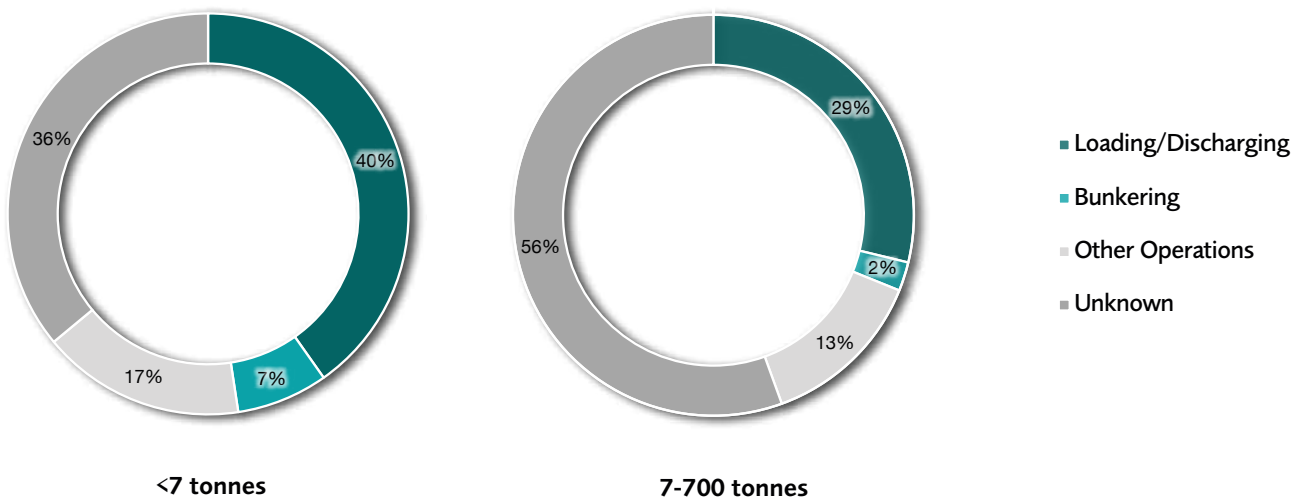


Figure 12: Incidence of small (<7 tonnes) and medium (7-700 tonnes) spills by operation, 1970–2017

Based on spills for which the primary cause is known, it can be seen from Figures 13 and 14 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.

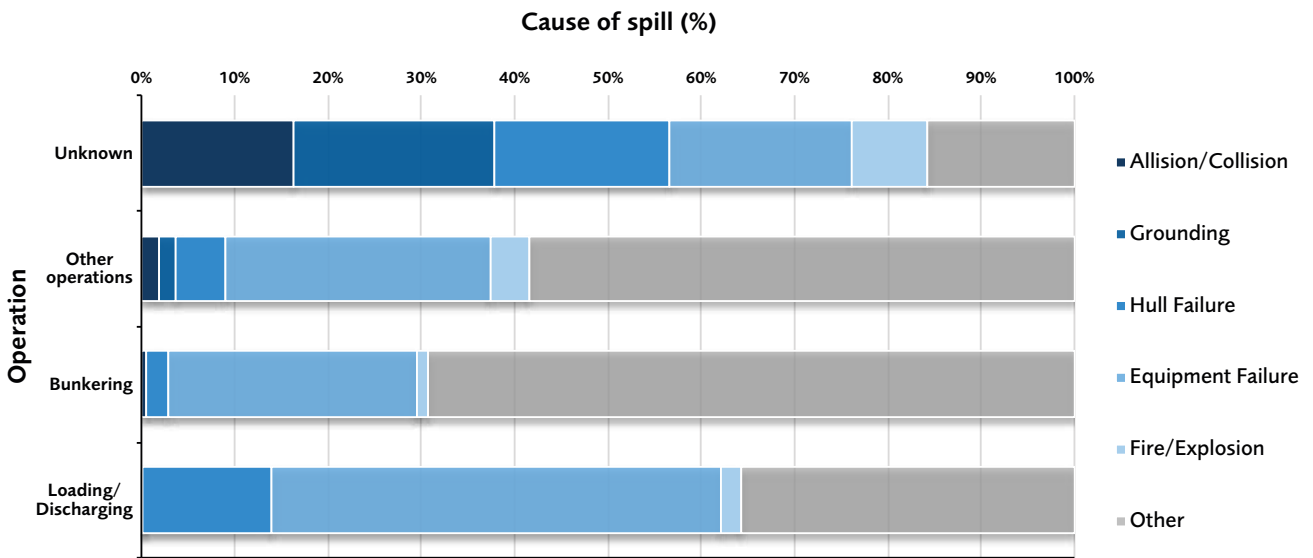


Figure 13: Incidence of spills <7 tonnes by operation at time of incident and primary cause of spill, 1974–2017

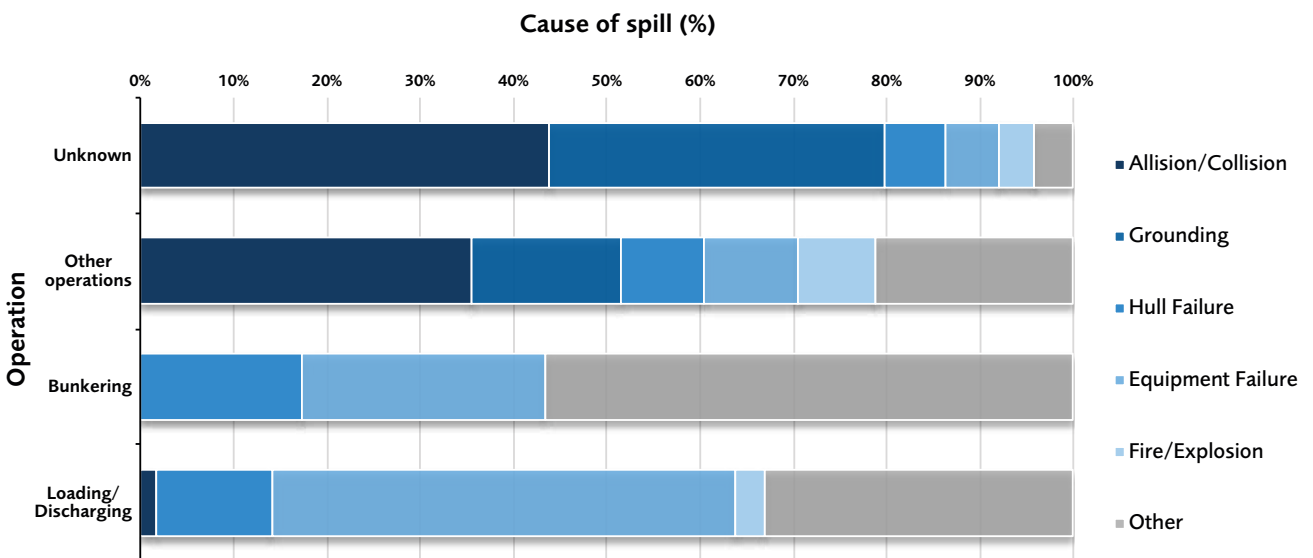


Figure 14: Incidence of spills 7–700 tonnes by operation at time of incident and primary cause of spill, 1970–2017

Large spills account for the remaining 5% of all the incidents recorded and the occurrence of these incidents has significantly decreased over the past 48 years. From Figure 15, it can be seen that 50% of large spills occurred while the vessels were underway in open water; allisions, collisions and groundings accounted for 59% of the causes of these spills (Figure 16). Perhaps unsurprisingly, these same causes account for an even higher percentage of incidents when the vessel was 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 12 & 15). For large spills that occurred during loading and discharging, 31% were caused by fires and explosions in contrast to less than 5% for small and medium sized spills. Also, 26% resulted from equipment failures compared to the 48% and 50% for small and medium spills respectively (Figures 13, 14 & 16).

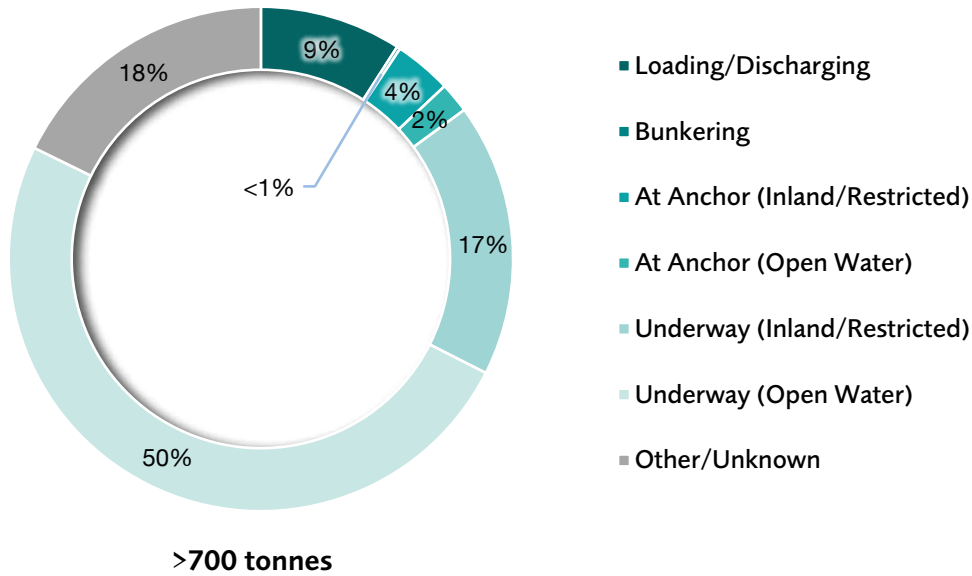


Figure 15: Incidence of spills >700 tonnes by operation at time of incident, 1970-2017

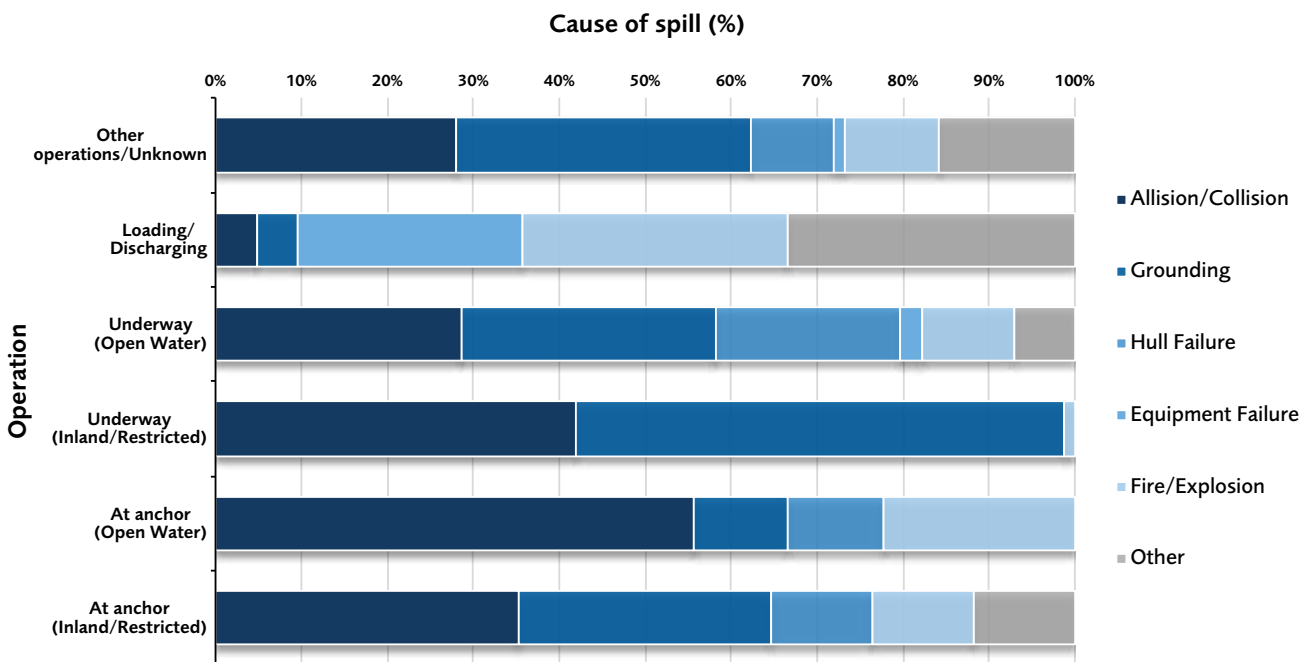


Figure 16: Incidence of spills >700 tonnes by operation at time of incident and primary cause of spill, 1970-2017

Tables 4 and 5 show the frequency of spills by cause and operation for large and medium spills, illustrating the interrelation between the two variables.

		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	6	5	34	66	2	0	23	136
	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	15	8	0	7	32
	Unknown	0	0	0	1	6	0	6	13
	Total	17	9	81	230	42	1	82	462
Percentage (%)		4	2	17	50	9	0	18	

Table 4: Incidence of spills >700 tonnes by operation at time of incident and primary cause of spill, 1970–2017

		Operations				Total
		Loading/ Discharging	Bunkering	Other Operations	Unknown	
Causes	Allision/Collision	5	0	60	299	364
	Grounding	0	0	27	244	271
	Hull Failure	37	4	15	45	101
	Equipment Failure	147	6	17	39	209
	Fire/Explosion	9	0	14	26	49
	Other	98	13	36	28	175
	Unknown	99	9	14	81	203
	Total	395	32	183	762	1,372
Percentage (%)		29	2	13	56	

Table 5: Incidence of spills 7–700 tonnes by operation at time of incident and primary cause of spill, 1970–2017

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ITOPF is established on behalf of the world's shipowners and their insurers to promote effective response to marine spills of oil, chemicals and other hazardous substances and operates on a not-for-profit basis. Technical services include emergency response, advice on clean-up techniques, pollution damage assessment, assistance with spill response planning and the provision of training. ITOPF supports research and development activities through its annual R&D Award and is also a source of comprehensive information on marine pollution. For further information please contact:

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