ITOPF

PROMOTING EFFECTIVE SPILL RESPONSE

Oil Tanker Spill Statistics 2022

January 2023

Contents

For further information, please contact Naa Sackeyfio, Information Data Analyst (naasackeyfio@itopf.org).

Introduction

ITOPF's annual Oil Tanker Spill Statistics publication presents data on accidental spills of oil from tankers. This includes incidents involving both 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 oil tanker spills since 1970.

Data is held on over 10,000 oil spills from tankers, including combined carriers, FPSOs and barges. This includes the location and cause of the incident, the vessel involved, the type of oil spilt and the amount of oil spilt. Spills are categorised by size, ie small (<7 tonnes or 50 bbls), medium (7-700 tonnes or 50-5,000 bbls) or large (>700 tonnes or 5,000 bbls), although the actual amount spilt is also recorded.

Information is gathered from shipping and other specialist publications, as well as from vessel owners, their insurers and ITOPF's own experience at incidents. Historically, information from published sources related mostly to large spills, often resulting from collisions, groundings, structural damage, fire or explosions. Nevertheless, in recent decades reporting of smaller spills has improved.

It should be noted that the estimate of the amount of oil spilt in an incident includes 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 amount 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 available. Occasionally, data is received after publication and, in this 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.

It is also important to note that accidental spills from tankers account for only a small percentage of the oil that enters the oceans each year. Pipeline spills, oil industry activities, petroleum usage (including oil spills from non-tankers and 'run-off' from roads and other land-based sources), as well as natural seepage, all contribute towards annual inputs. Therefore, ITOPF's report shows only part of the picture relating to the global input of oil into the marine environment.

For further information on ITOPF's tanker spill statistics, please contact Naa Sackeyfio, Information Data Analyst (naasackeyfio@itopf.org). We regret that it is not possible to provide direct access to our database or to release the names of individual tanker incidents.

Tanker Spills Recorded in 2022

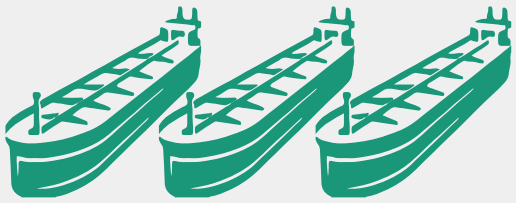
Seven oil spills over 7 tonnes were recorded from tanker incidents in 2022. This brings the decade average to almost 6, which is on a par with the average for the 2010s and a dramatic reduction from the numbers reported in earlier decades.

Three of the seven incidents in 2022 resulted in spills greater than 700 tonnes (classified as 'large' spills). Two of these incidents occurred in Asia and one in Africa, resulting in the release of crude, bitumen and fuel oil into the environment. The four other incidents (classified as 'medium' spills) involved spills of fuel oil and diesel. Two of these incidents occurred in North America, one in Asia and one in Africa.

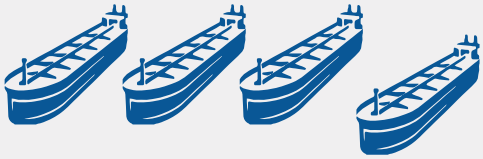
The total volume of oil lost to the environment from tanker spills in 2022 was approximately 15,000 tonnes. Over 14,000 tonnes was spilt in the three large incidents. The estimated quantity of oil spilt this year is higher than the previous three years but remains a fraction of the 2.95 billion tonnes[1] of oil that is transported by sea each year.

ITOPF has recorded tanker spill statistics over the last 50 years and in this time, despite some annual fluctuations, the number and volume of oil spills from tankers has dropped dramatically. These numbers are stabilising at a low level, with the reduction being driven by positive change from the shipping industry, and supported by governments. The ongoing commitment to exploring and investing in ways to improve standards is reflected in the trends we see in the spill statistics.

Large spills
(>700 tonnes)



Medium spills
(7-700 tonnes)



Locations

Africa

Asia

North America

15,000 tonnes of oil lost
from tanker accidents

[1] *This figure is for crude oil and petroleum products loaded. Source: Review of Maritime Transport 2022 | UNCTAD*

Major Oil Spills in History

A summary of the 20 largest oil 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 most recent addition to the top 20, 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 these incidents, despite their large size, necessitated little or no response as the oil was spilt some distance offshore and did not impact coastlines. PRESTIGE, EXXON VALDEZ and HEBEI SPIRIT are 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 tanker spills since 1967

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

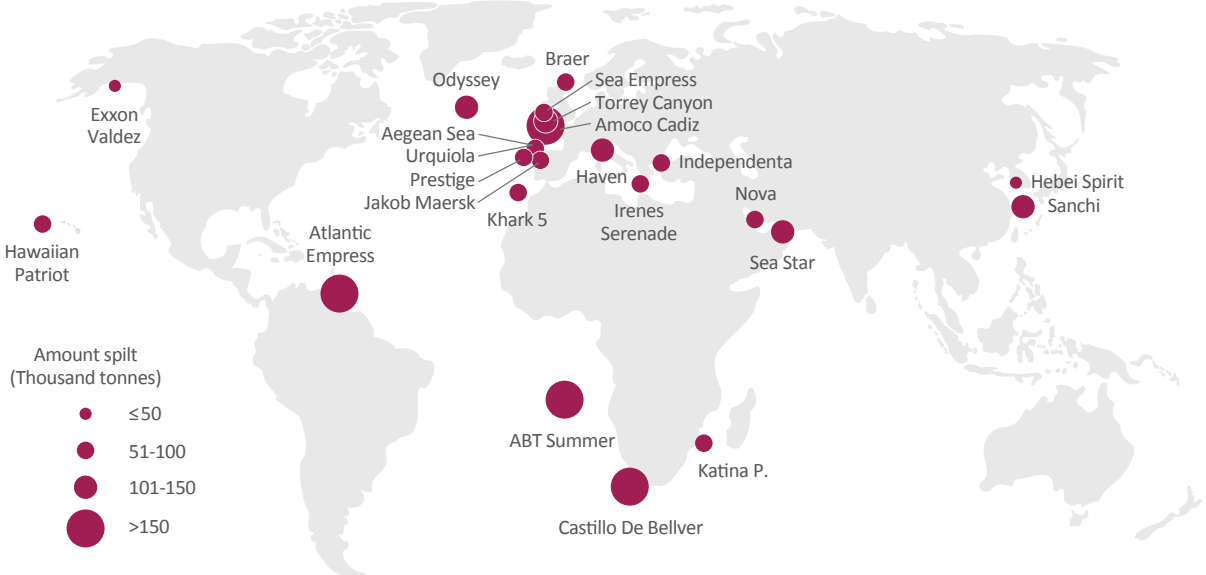


Figure 1: Location of top 20 major tanker spills (All rights reserved © ITOPF)

Number of Oil Spills

The number of oil spills from tankers has decreased significantly over the last five decades. Spills in excess of 7 tonnes have reduced by over 90% since 1970. There has however been little change in the last decade.

1970s

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

1980s

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

1990s

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

2000s

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

2010s

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	4	3
2019	2	1
Total	45	18
Average	4.5	1.8

2020s

Year	7–700 Tonnes	>700 Tonnes
2020	4	0
2021	5	1
2022	4	3
Total	13	4
Average	4.3	1.3

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

Quantities of Oil Spilt

From 1970 to 2022, approximately 5.88 million tonnes of oil was lost as a result of tanker incidents globally. However, there has been a significant reduction in the 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.

1970s

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

1980s

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

1990s

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

2000s

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

2010s

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
2018	116,000
2019	1,000
Total	164,000

2020s

Year	Quantity (Tonnes)
2020	1,000
2021	10,000
2022	15,000
Total	26,000

** Figures in table are annual estimates for spills >7 tonnes, rounded to the nearest thousand.*

Table 3: Annual quantity of oil spilt from tanker incidents

Global Oil Spill Trend

Over the past half a century, statistics for the frequency of spills greater than 7 tonnes from tankers have shown a marked downward trend. As illustrated in Figure 2 below, the average number of spills per year in the 1970s was about 79 and decreased by over 90 percent to 6 in the 2010s. So far this decade, the annual average number of oil spills is about 6, the same as the average recorded last decade.

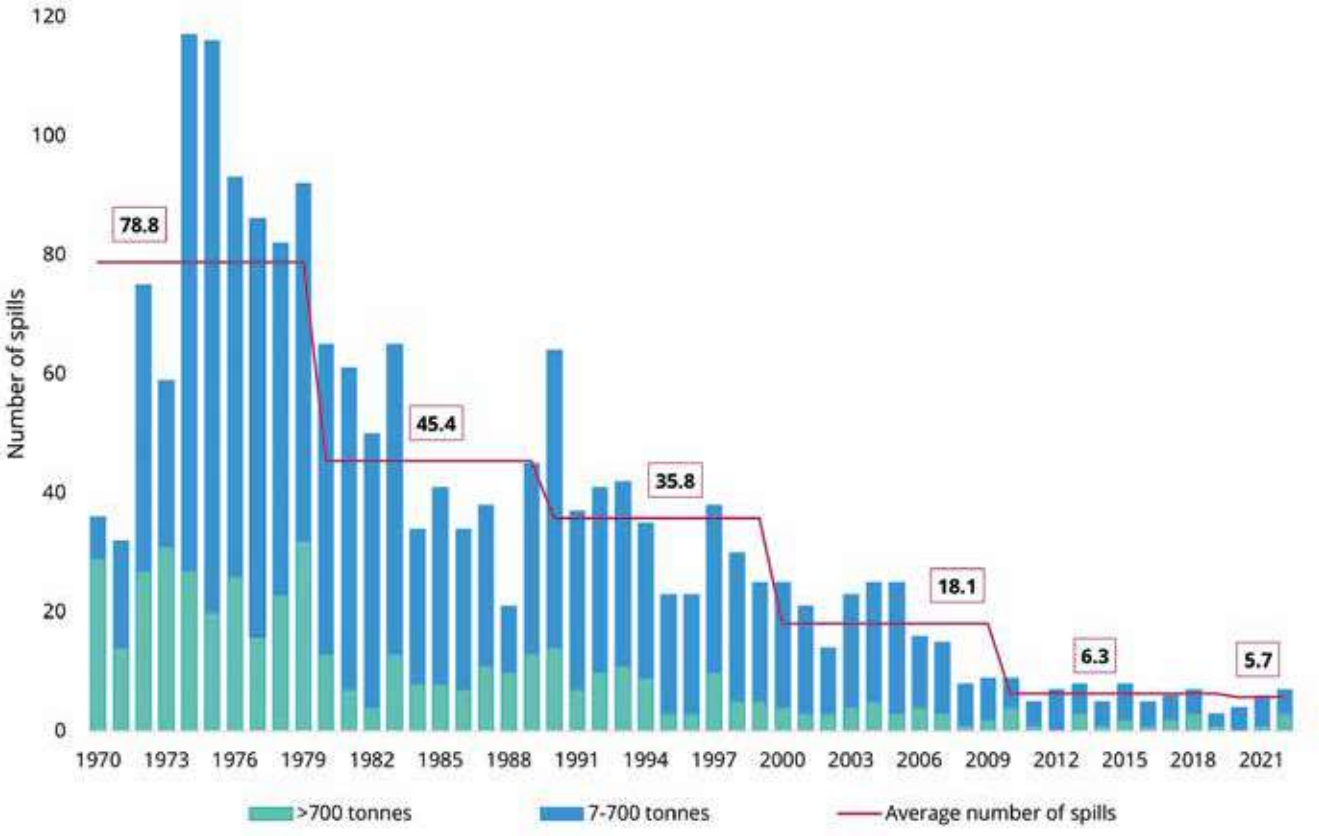


Figure 2: Number of medium (7-700 tonnes) and large (>700 tonnes) tanker spills from 1970-2022

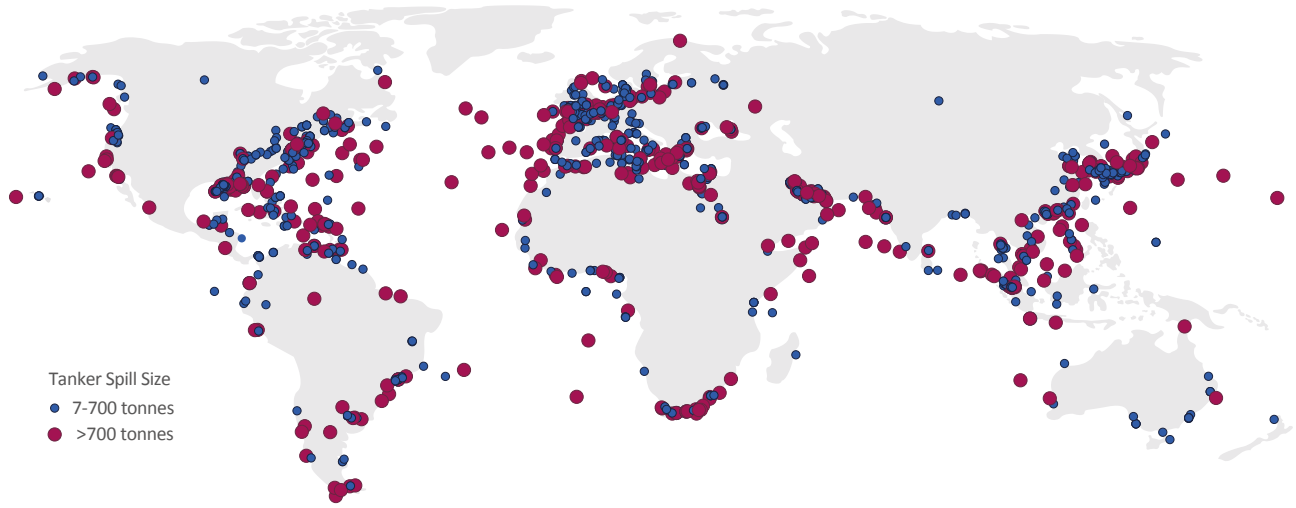
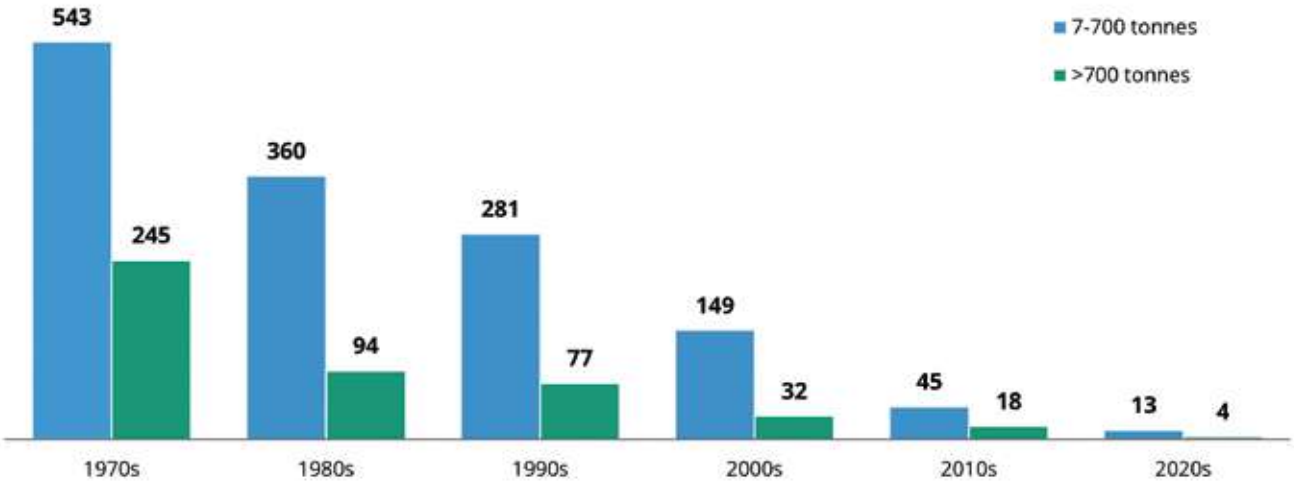


Figure 3: Map of tanker spills (>7 tonnes) from 1970-2022 (All rights reserved © ITOPF)

Spill Frequency Analysis

Data on spills of 7 tonnes and over has been analysed to identify trends and reveal patterns in reported oil spills. Unfortunately, data on small spills (<7 tonnes), which forms over 80% of spills recorded since 1970, has been excluded. Information on this category of spills is often incomplete thus reliable reporting is difficult to achieve.

The number of large (>700 tonnes) and medium spills (7-700 tonnes) have decreased significantly over the past 53 years as shown in Figure 4. The annual average number of spills recorded this decade is less than a tenth of the average recorded in the decade 1970 -1979, for both spill size classes. There has, however, been little change since the 2010s, with numbers stabilising at a low level. It is also interesting to note that the progressive reduction in the number of spills over the last few decades is significant when data is analysed per decade. Data recorded from 1970 to 2022 illustrates fluctuations in the yearly values within a decade (Figure 2).



** Only three years of data available for the 2020s*

Figure 4: Number of medium (7-700 tonnes) and large (>700 tonnes) tanker spills, 1970-2022

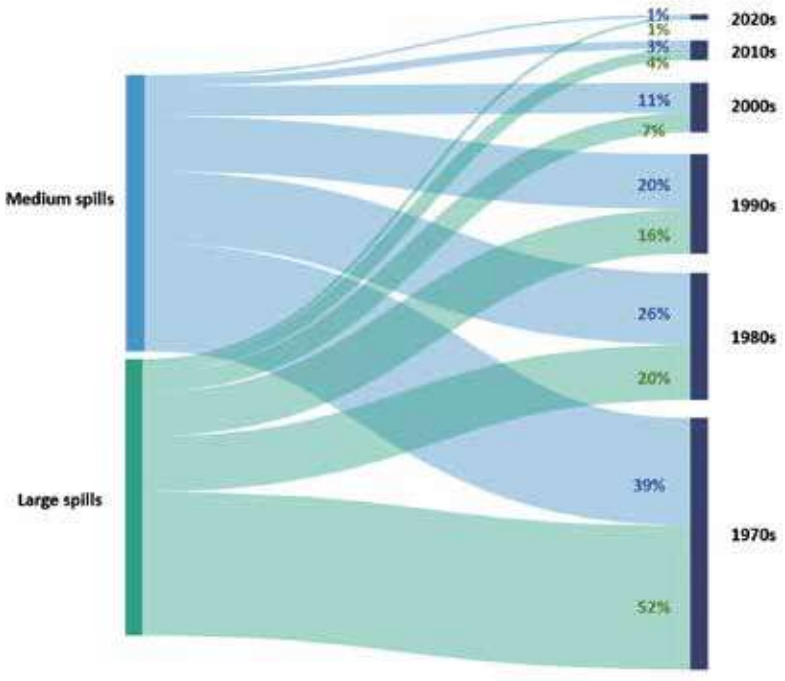


Figure 5: Medium (7-700 tonnes) and large (>700 tonnes) tanker spills as a percentage of those recorded per decade, 1970-2022

A quarter of all spills recorded over 7 tonnes are large. More than half of these (52%) occurred in the 1970s (Figure 5).

Spill Quantity Analysis

In terms of the volume of oil spilt, the figures for a particular year may be severely distorted by a single large incident, as illustrated below (Figure 6).

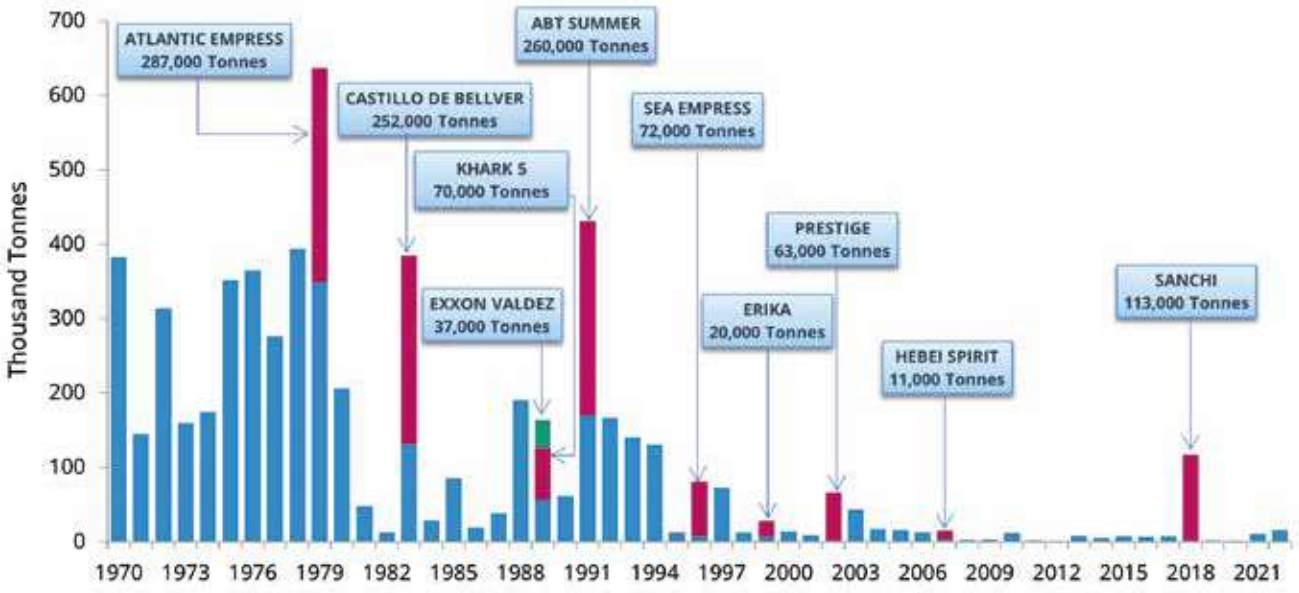
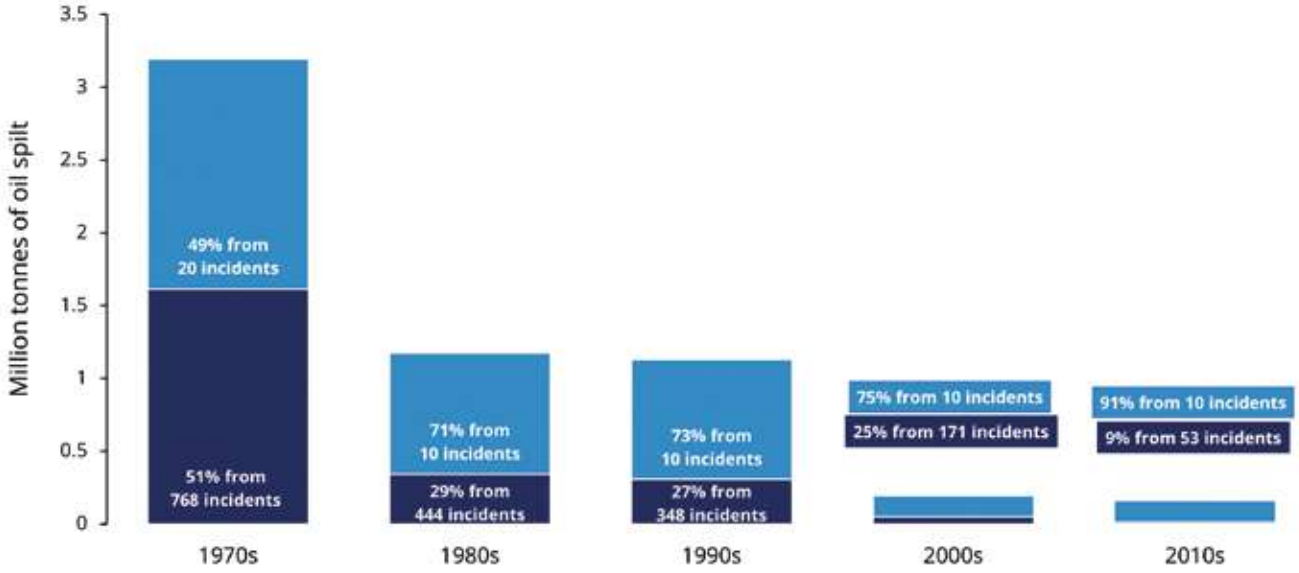


Figure 6: Quantities of oil spilt 7 tonnes and over (rounded to nearest thousand) from tanker incidents, 1970-2022

Figure 7 below also demonstrates the influence of a few very large spills on the estimated quantities of oil spilt. The following can be seen for recent decades:

- 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 2010s there were 63 spills of 7 tonnes and over, resulting in 164,000 tonnes of oil lost; 91% of this amount was spilt in just 10 incidents. One incident was responsible for about 70% of the quantity of oil spilt.

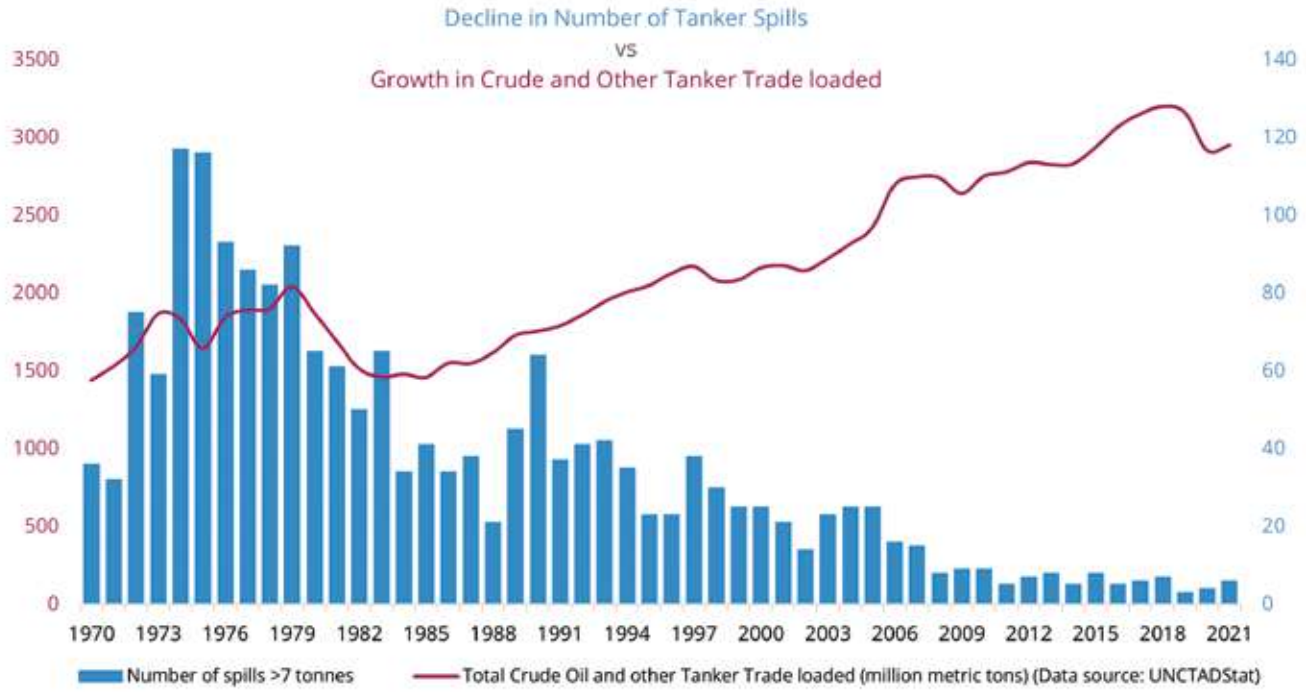


** 2020s excluded. Only three years of data available.*

Figure 7: Tanker 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

International seaborne oil trade has grown steadily since the 1970s, except for a fall in the early 1980s during the worldwide economic recession (Figure 8). A fall can also be seen for 2020 but the full effect of Covid-19 is still unclear at this stage. Conversely, the frequency of oil spills has continued to decline despite an overall increase in oil trading over the period. Presently, over 99.99% of oil transported by sea arrives safely at its destination.



** UNCTADStat information is not yet available for 2022*

Figure 8: Decline in number of tanker spills vs growth in crude and other tanker trade loaded, 1970-2021

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 obtain as data is sometimes inconsistent or not available, particularly for small spills.

For this analysis, the primary causes of oil spills greater than 7 tonnes 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 9, below, provides an overview of the causes by size of spill.

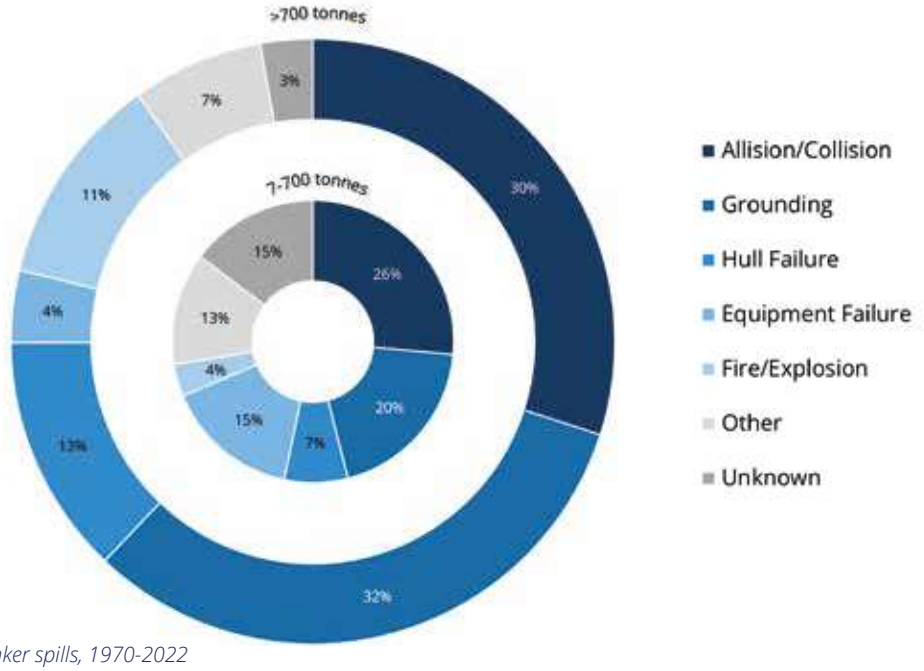
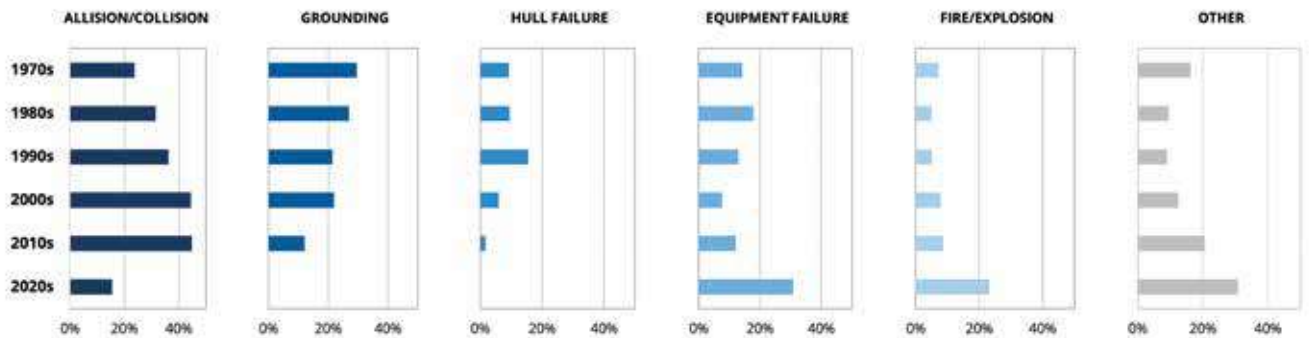


Figure 9: Causes of tanker spills, 1970-2022

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 2022 were caused by Allisions/Collisions and Groundings. From Figure 10 overleaf, it is evident that whilst the overall number of spills has reduced over the decades, the proportion of those that arise from Allisions/Collisions has increased and those due to Groundings have decreased. Figure 10 also demonstrates a decrease in the proportion of spills caused by Hull Failure, with a significant drop after the 1990s and none recorded so far this decade. The outlook for this decade is, however, uncertain, with only three years of data recorded.



** Only three years of data available for the 2020s.*

Figure 10: Causes of tanker spills per decade, 1970-2022

It can also be seen from Figure 11 that less than 10% of spills (>7 tonnes) are caused by fires and explosions. Interestingly, the quantity of oil lost as a result of Fire/Explosion is comparable to the quantity spilt from Groundings and Allisions/Collisions, each responsible for about 26% of the total quantity of oil spilt since 1970.

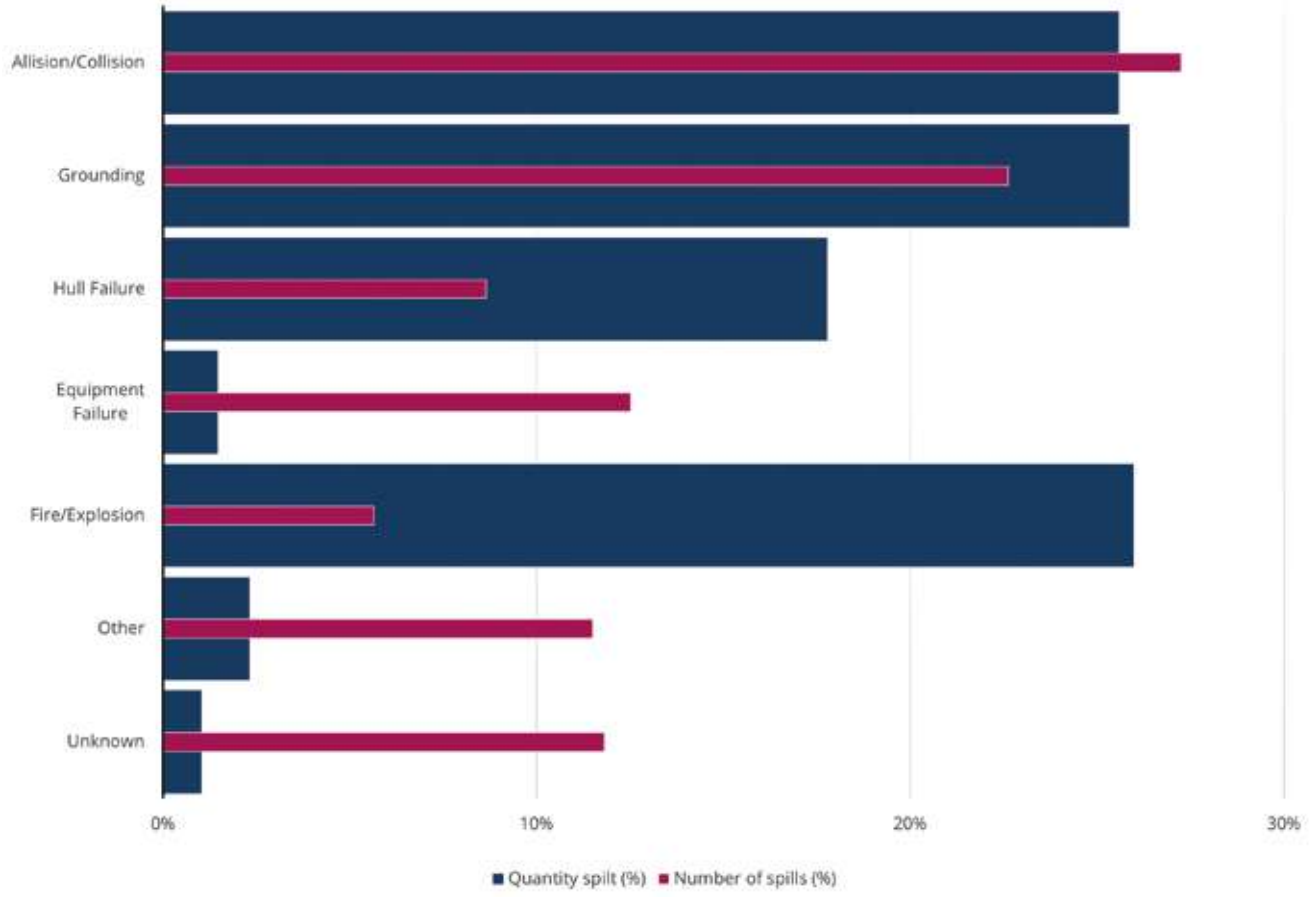


Figure 11: Number of tanker spills and quantity spilt per cause, 1970-2022

Vessel Operation at Time of Spill

In the following analysis, the operation that the vessel was undertaking at the time of the incident is explored.

Reporting of large spills (>700 tonnes) tends to provide more information and greater accuracy than smaller spills. Vessel operations have therefore 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.

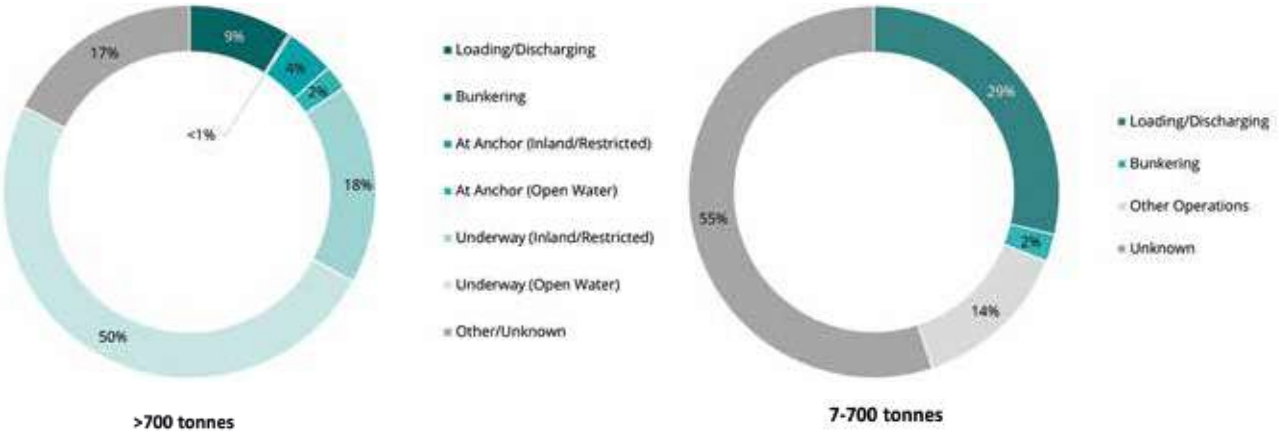
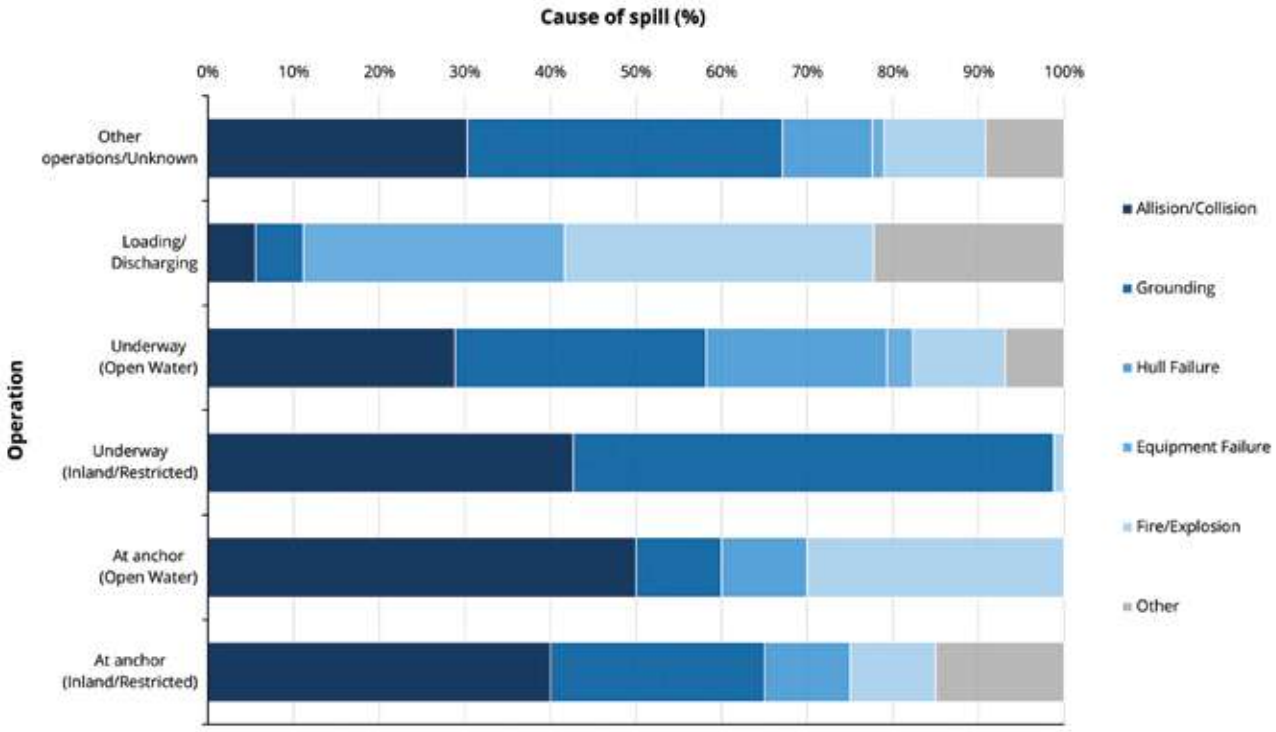


Figure 12: Number of tanker spills by operation at time of incident, 1970-2022

Although reporting of medium spills has improved over recent decades, information available from the 1970s is deficient. Vessel operations for medium spills have therefore 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.

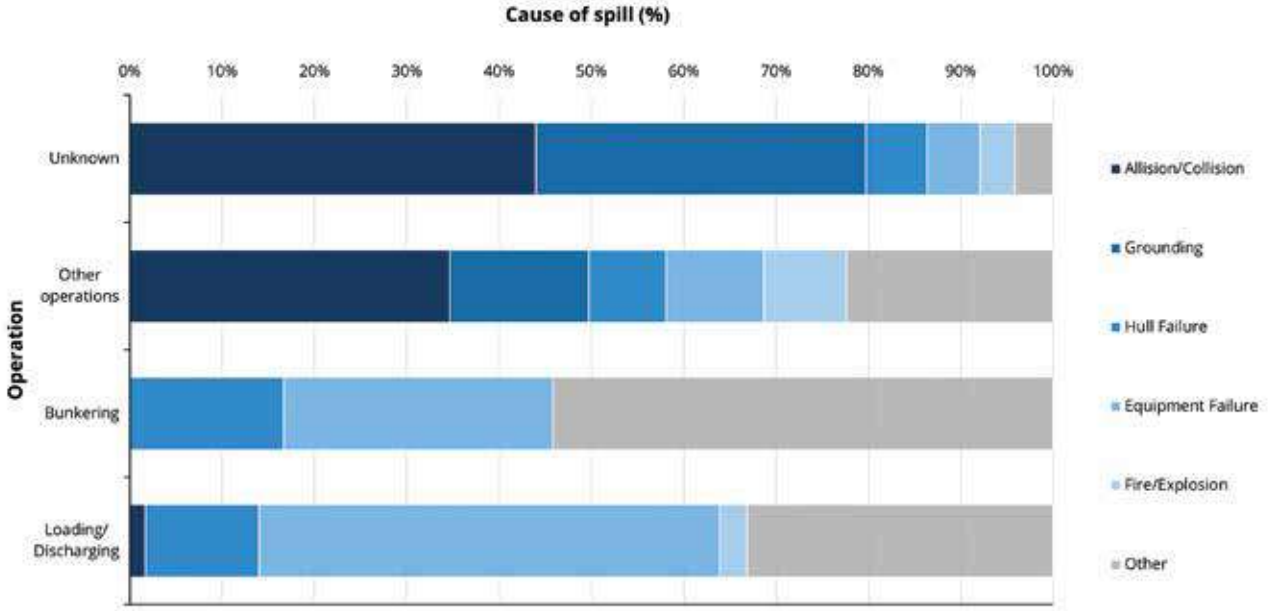
From Figure 12, it can be seen that 50% of large spills occurred while the vessels were underway in open water; allisions, collisions and groundings account for 58% of the causes of these spills (Figure 13). These same causes account for an even higher percentage of spills (99%) when the vessels were underway in inland or restricted waters. Restricted waters include water areas in ports and harbours.

Nine percent of large spills recorded occurred during loading or discharging activities (Figure 12) which normally take place in ports and oil terminals. Significantly more medium sized spills (29%) occurred during these operations. For the large spills, 36% were caused by fires and explosions. In contrast, during loading and discharging, less than 4% of medium sized spills were caused by fires and explosions. In addition, 31% of large spills resulted from equipment failures compared to approximately 50% for medium spills (Figures 13 & 14).



** Unknown causes are excluded*

Figure 13: Number of tanker spills >700 tonnes by operation at time of incident and primary cause of spill, 1970-2022



** Unknown causes are excluded*

Figure 14: Number of tanker spills 7-700 tonnes by operation at time of incident and primary cause of spill, 1970-2022

Tables 4 and 5 show the number of spills by cause and operation for large and medium spills recorded from 1970 to 2022.

Causes	Operations						
	At anchor (Inland/ Restricted)	At anchor (Open Water)	Underway (Inland/ Restricted)	Underway (Open Water)	Loading/ discharging	Other Operations/ Unknown	**Total**
Allision/Collision	8	5	35	67	2	23	**140**
Grounding	5	1	46	68	2	28	**150**
Hull Failure	2	1	0	49	0	8	**60**
Equipment Failure	0	0	0	7	11	1	**19**
Fire/Explosion	2	3	1	25	13	10	**54**
Other	3	0	0	16	8	7	**34**
Unknown	0	0	0	1	6	6	**13**
Total	**20**	**10**	**82**	**233**	**42**	**83**	**470**
Percentage (%)	4	2	17.5	50	9	17.5	

Table 4: Number of tanker spills >700 tonnes by operation at time of incident and primary cause of spill, 1970-2022

Causes	Operations				
	Loading/ Discharging	Bunkering	Other Operations	Unknown	**Total**
Allision/Collision	5	0	62	300	**367**
Grounding	0	0	27	244	**271**
Hull Failure	37	4	15	45	**101**
Equipment Failure	149	7	19	39	**214**
Fire/Explosion	9	0	16	26	**51**
Other	99	13	40	28	**180**
Unknown	100	9	16	82	**207**
Total	**399**	**33**	**195**	**764**	**1391**
Percentage (%)	29	2	14	55	

Table 5: Number of tanker spills 7-700 tonnes by operation at time of incident and primary cause of spill, 1970-2022

Current Trends – Spills since 2010

The global oil tanker spill trend is firmly downward, however, when the frequency of spills since 2010 is reviewed (Figure 15), fluctuations in yearly values within a decade, illustrated in Figure 2, can be seen. As expected, these differences are not as vast as they are for some years in previous decades. As the number of spills recorded each year approaches zero, the fluctuations are decreasing and the figures largely stabilising.

The annual average number of spills >7 tonnes for the 2010s was 6.3, which is a 65% drop from the average in the previous decade (Figure 2 & 15). The annual average so far this decade is 5.7.

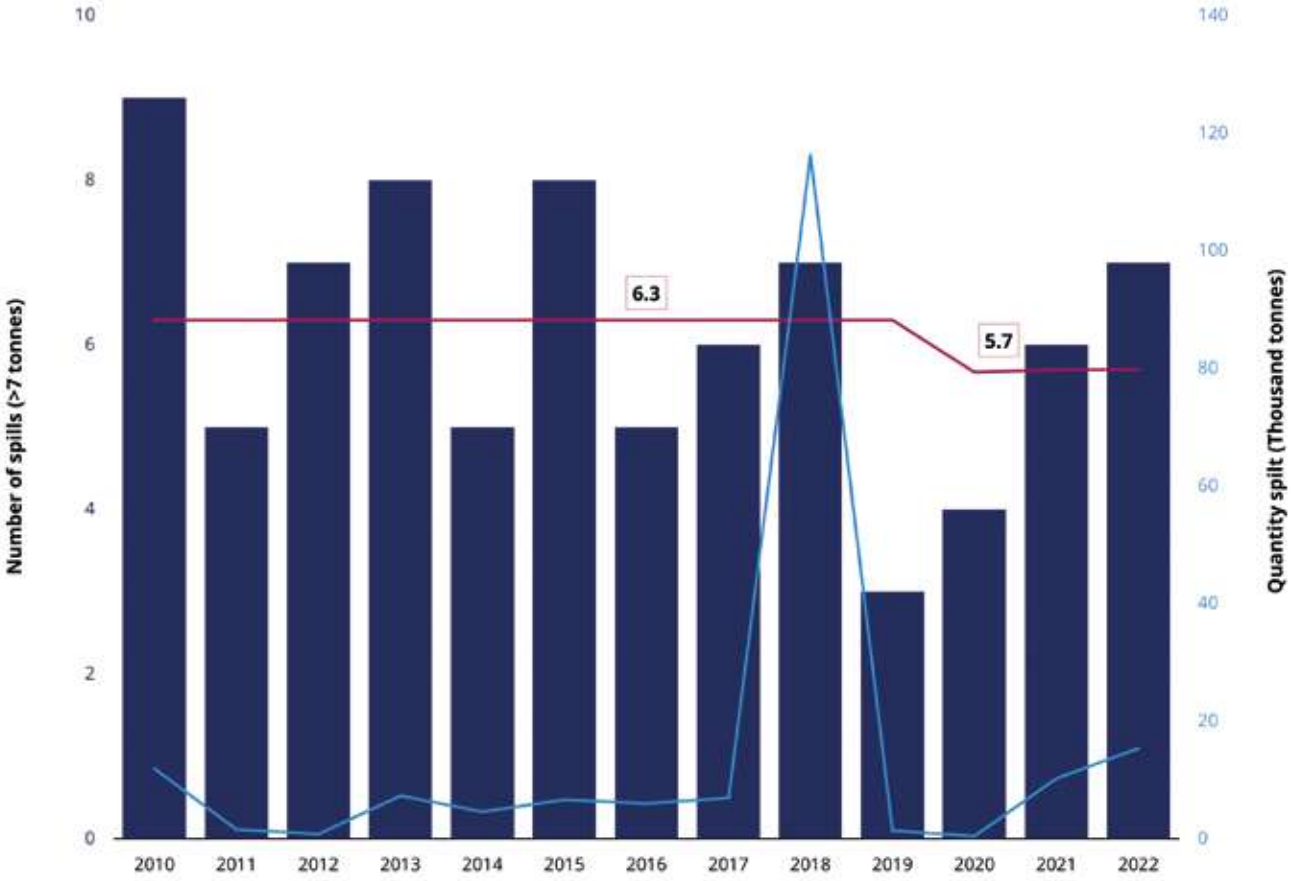


Figure 15: Number of tanker spills and quantities of oil spilt (>7 tonnes) from 2010-2022

With regard to the volume of oil spilt during the last decade, low annual quantities compared to prior decades were recorded for most years. However, a single large spill in 2018 resulted in the largest annual quantity of oil spilt in 24 years being recorded (Figure 15). Also, the spill amount for 2022 is the second highest estimate in the last 14 years.

The most frequent cause of medium and large spills since 2010 is Allisions/Collisions. About 36% of spills resulted from allisions or collisions, which is higher than the proportions recorded for most previous decades since 1970. Groundings, conversely, have decreased significantly over the period. Nine percent of spills (>7 tonnes) recorded since 2010 were as a result of groundings compared to 30% for the 1970s (Figure 10).

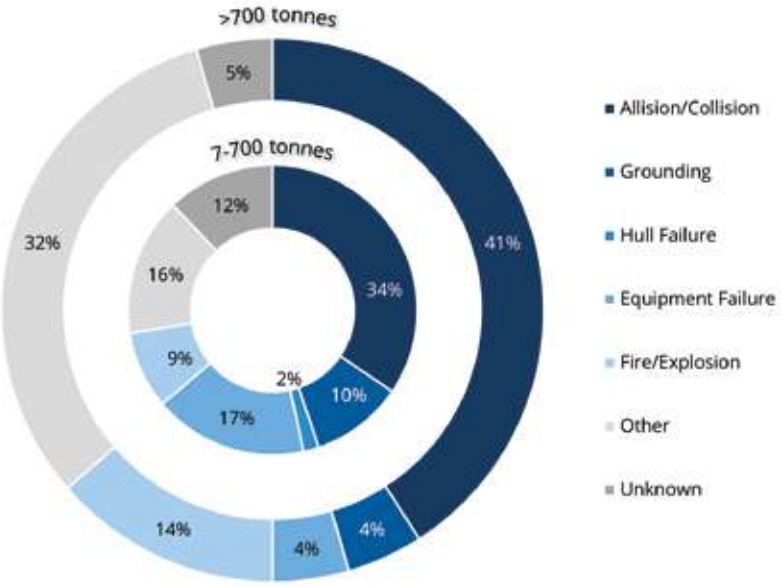
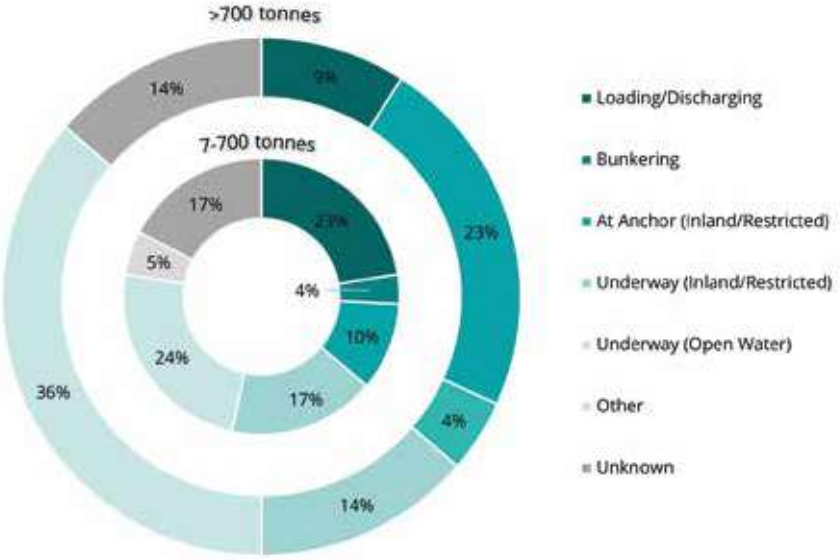


Figure 16: Causes of tanker spills, 2010-2022

Figure 12 shows that for data gathered on medium sized spills since 1970, operations that vessels were undertaking at the time of incident were largely unknown (over 50%). However, data since 2010 shows that reporting has improved and the proportion of medium spills attributable to 'unknown' operations has reduced to 17%, close to the 14% recorded for large spills since 2010. This suggests that more accurate and consistent information is becoming available for spills of less than 700 tonnes. This has allowed further breakdown of vessel operations for medium spills as shown in Figure 17.

Similar to what was observed for earlier decades, most large spills since 2010 occurred while the vessels were underway in open water. For medium spills, the percentage of spills that occurred while the vessels were underway in open water compared to inland water is only slightly higher (Figure 17).



** None of the spills occurred while the vessel was "At Anchor in Open Water"*

Figure 17: Number of tanker spills by operation, 2010-2022

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 835 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
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The TIPs and films are available in multiple languages on ITOPF's website **www.itopf.org**.

ITOPF Limited

1 Oliver's Yard, 55 City Road, London EC1Y 1DT, UK
Registered Office – No. 944863

Tel: +44 (0)20 7566 6999
24hr: +44 (0)20 7566 6998
Email: central@itopf.org
Web: www.itopf.org

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