ITOPF

PROMOTING EFFECTIVE SPILL RESPONSE

Oil Tanker Spill Statistics 2020

January 2021

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
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.org.

Contents

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, 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, i.e. small (<7 tonnes or 50 bbls), medium (7-700 tonnes or 50-5000 bbls) or large (>700 tonnes or 50,000 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 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 2020

0 Spills > 700 tonnes

3 Spills 7-700 tonnes

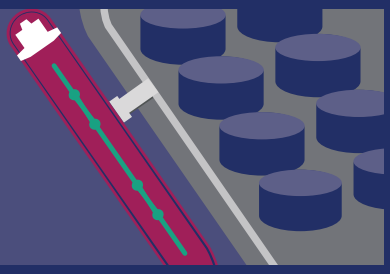
~1,000 tonnes
of oil lost as a result of tanker incidents

- Three medium tanker spills[1] (7–700 tonnes) were recorded in the year 2020.
- The first occurred early in the year in Europe and the other two occurred in the last quarter of the year in Africa and Asia.
- This is the same number of spills >7 tonnes as recorded in 2019 and remains the lowest number in any particular year since 1970.
- The total volume of oil lost to the environment from tanker spills in 2020 was approximately 1,000 tonnes[2].
- This is the same quantity as recorded in 2012 and 2019, and the lowest annual figure recorded in the last five decades.

Global Trend in Oil Spills from Tankers

Governments and industry continue to work towards improving safety & standards of operations

Accidents still happen, but **>99.99%** of oil transported by sea arrives safely at its destination



Data relates to spills of 7 tonnes and over from 1970-2020

[1] *This relates to spills with confirmed volumes*

[2] *Quantity rounded to nearest thousand*

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 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 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. In the year 2020, the number of oil spills recorded was less than the annual average recorded for the previous decade.

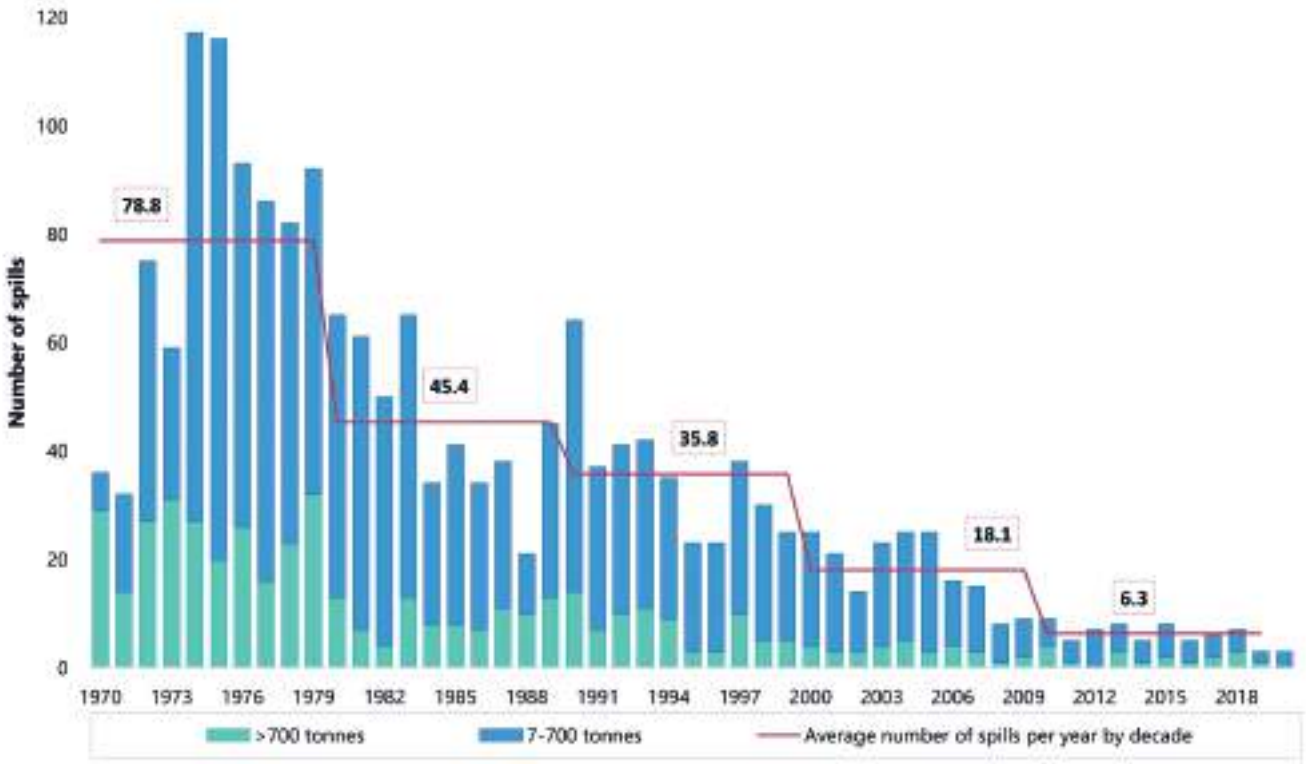


Figure 2: Number of medium and large spills (>7 tonnes) from 1970-2020

Figure 3: Map of spills (>7 tonnes) from 1970-2020 (All rights reserved © ITOPF)

Number of Oil Spills

The following analysis involves the review of historical and current data to identify trends and reveal patterns in oil spill frequency. It is based on large (>700 tonnes) and medium (7–700 tonnes) spills as sufficient information is available for these categories of spill volume.

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

The number of large spills (>700 tonnes) has decreased significantly over the last 51 years (Figure 4). The annual average recorded in the decade 2010-2019 was 1.8 spills, which is less than a tenth of the average recorded in the decade 1970-1979. The outlook for the next ten years is uncertain, but it is encouraging that no large spills were recorded for the first year of the new decade. It can also be observed from Figure 5 that 52% of all large spills recorded in the last five decades occurred in the 1970s and only 4% was recorded in the last decade. 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 2020 illustrate fluctuations in the yearly values within a decade.

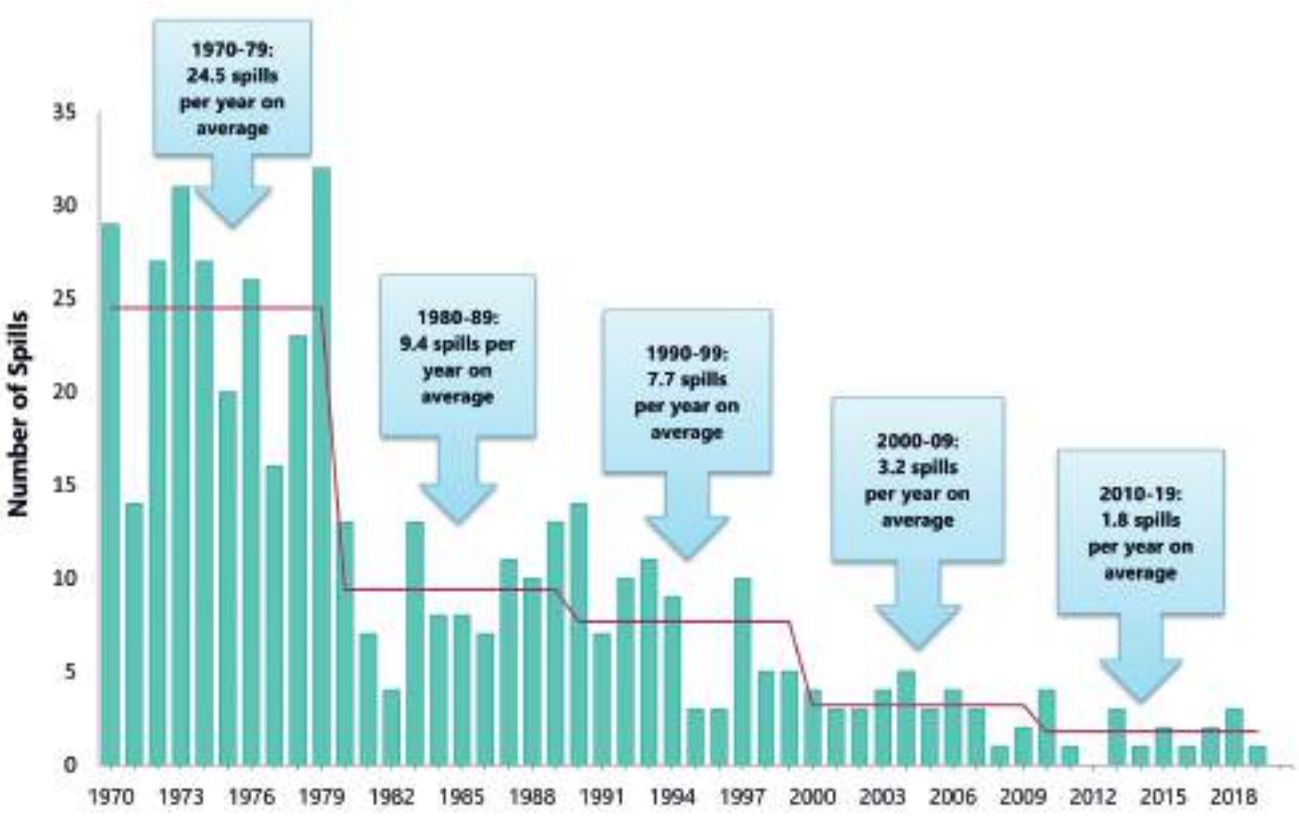


Figure 4: Number of large spills (>700 tonnes) from 1970-2020

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	3	0
Total	3	0

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

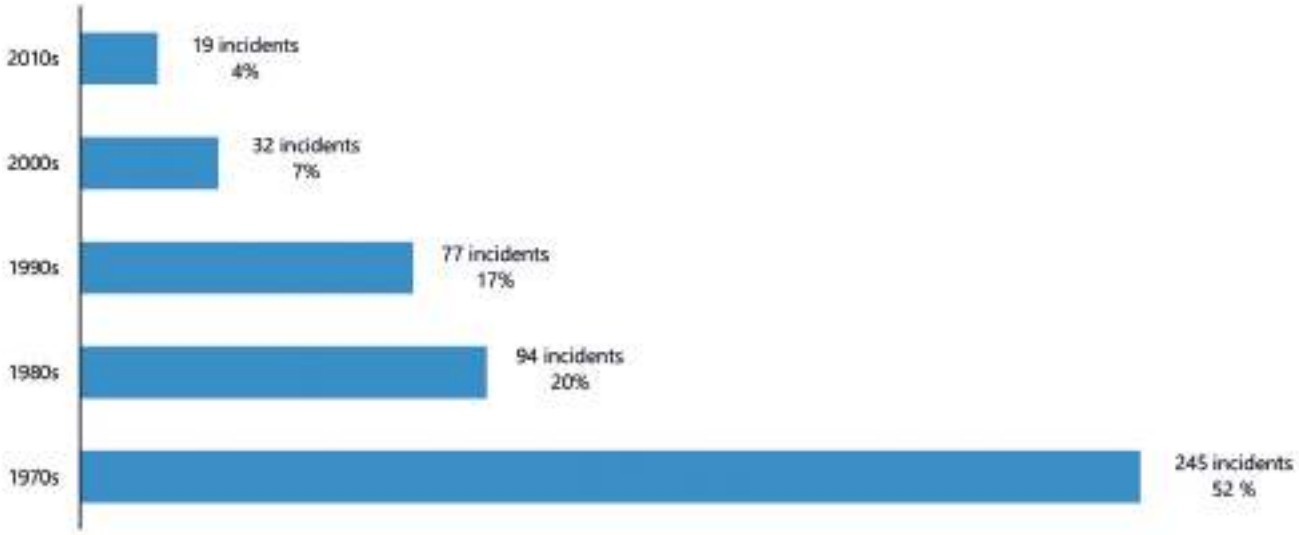


Figure 5: Large spills (>700 tonnes) as a percentage of those recorded from 1970-2019 per decade

**2020s excluded. Only one year of data available and no large spill was recorded.*

Continuation of the long-term decline can also be seen with medium sized spills (7–700 tonnes) as shown in Table 2 and Figure 6. The annual average for the number of spills during the last decade was 4.5, which is also below a tenth of the average recorded in the 1970s.

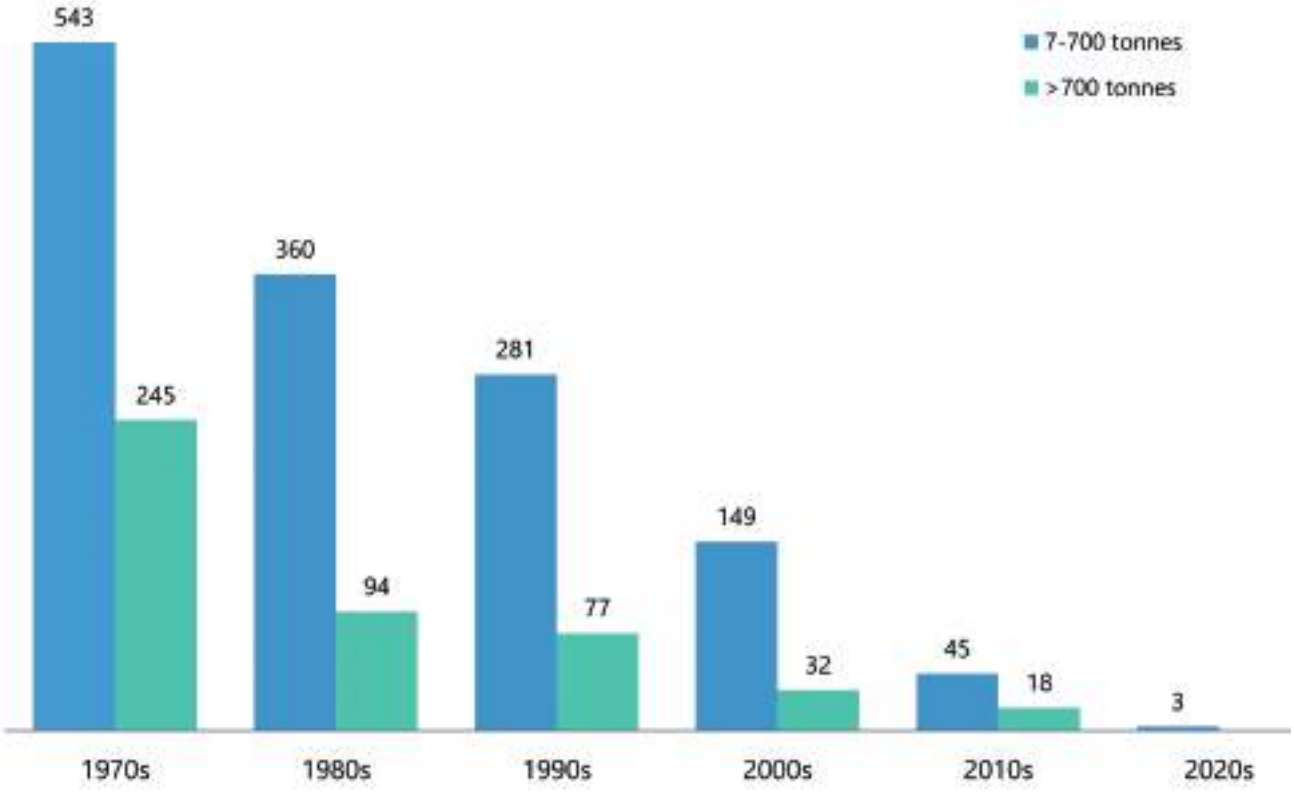


Figure 6: Number of medium (7–700 tonnes) and large (>700 tonnes) spills per decade from 1970-2020

**Only a year of data available for the 2020s*

Quantities of Oil Spilt

Data on spills of 7 tonnes and above have been analysed to provide annual estimates of the quantity of oil spilt. The figures in Table 3 are rounded to the nearest thousand. Due to the lack of data and inconsistencies in the reporting of small spills (< 7 tonnes), this category of spills has been excluded.

From 1970 to 2020, approximately 5.86 million tonnes of oil were 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. From Table 3, it is interesting to observe that the total quantity of oil spilt over the last decade in its entirety, i.e.164,000 tonnes, was less than that spilt in several single years in earlier decades.

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
Total	1,000

Table 3: Annual quantity of oil spilt

Influence of Large Spills on Quantities of Oil Spilt

As discussed in previous reports, a few very large spills are responsible for a high percentage of the quantity of oil spilt each decade. When the frequency and quantities of oil spilt in recent decades are reviewed, the following can be seen (Figure 7):

- 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.

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 illustrated clearly 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, as shown in Figure 8.

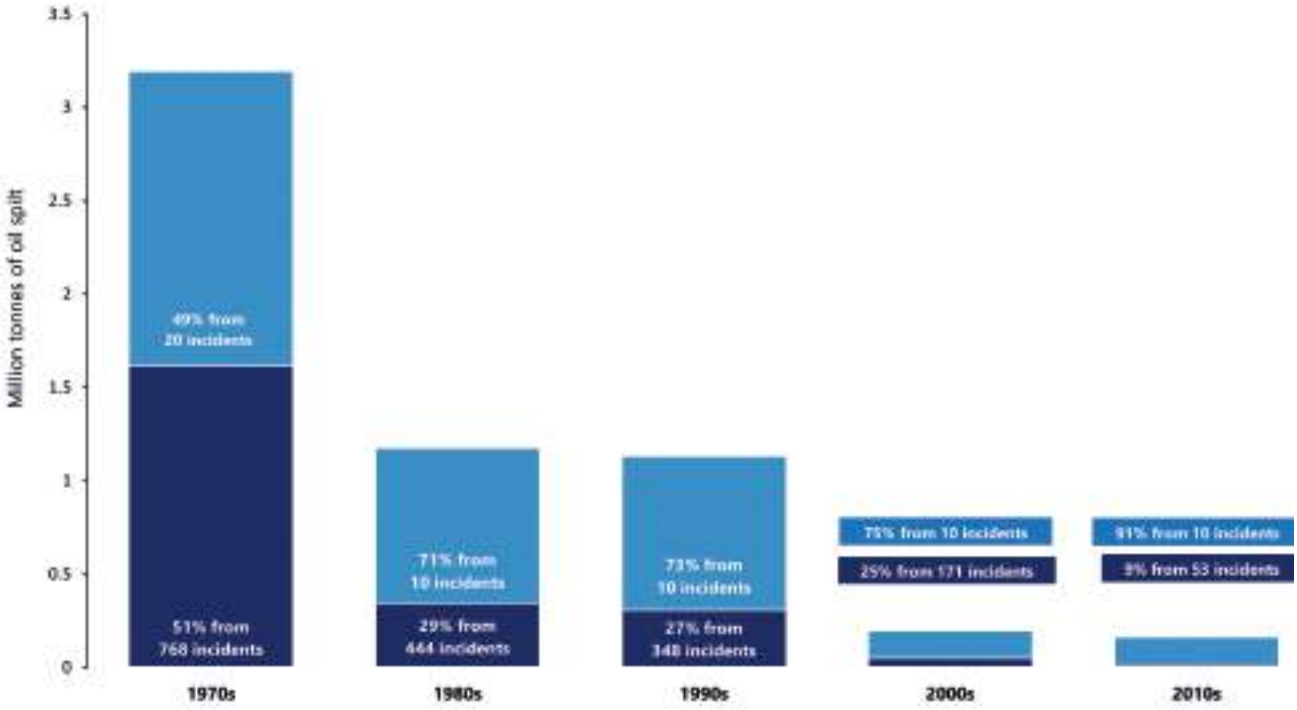


Figure 7: Spills 7 tonnes and over per decade showing the influence of a relatively small number of comparatively large spills on the overall figure

**2020s excluded. Only one year of data available.*

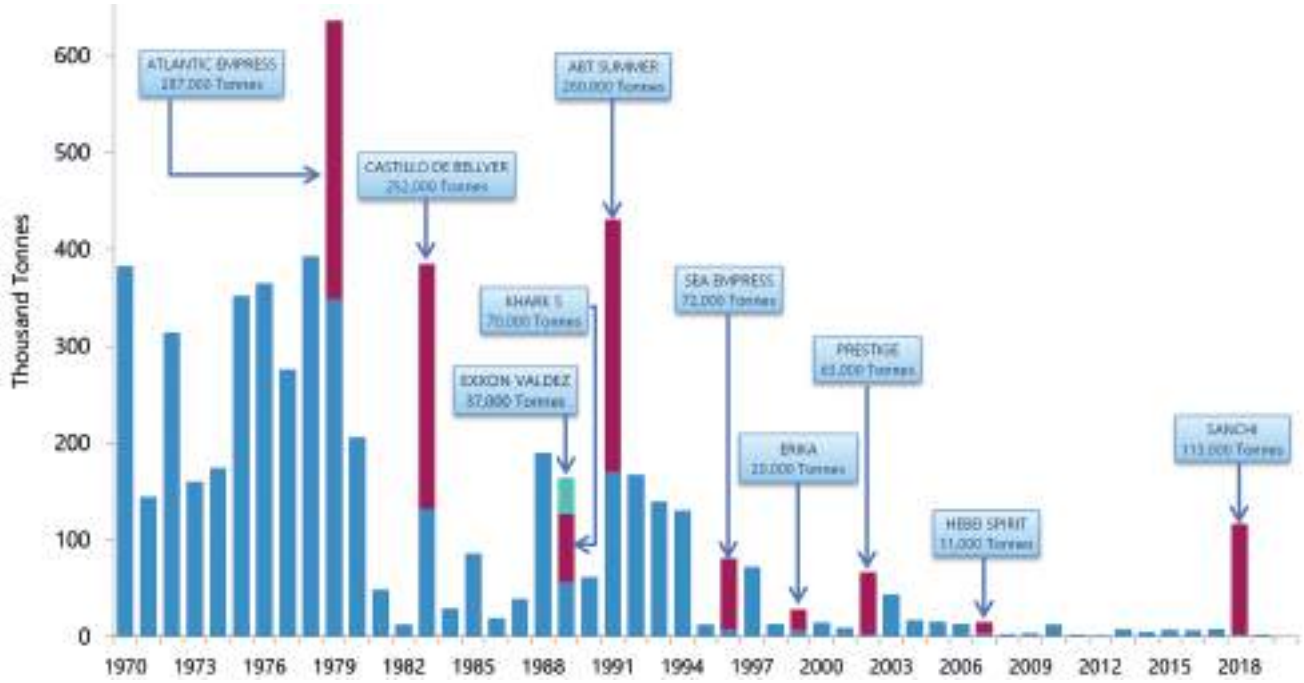


Figure 8: Quantities of oil spilt 7 tonnes and over (rounded to nearest thousand), 1970-2020

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 9). The effect of Covid-19 is also 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.

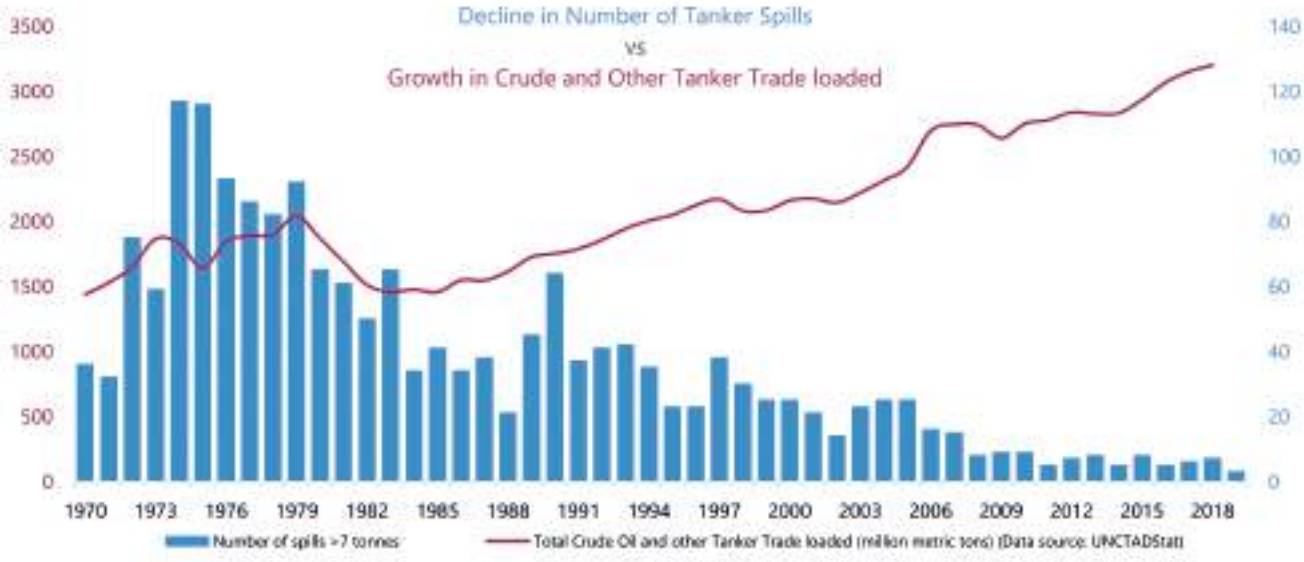


Figure 9: Decline in number of tanker spills vs growth in crude and other tanker trade loaded 1970-2019 (UNCTADstat information not yet available for 2020)

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

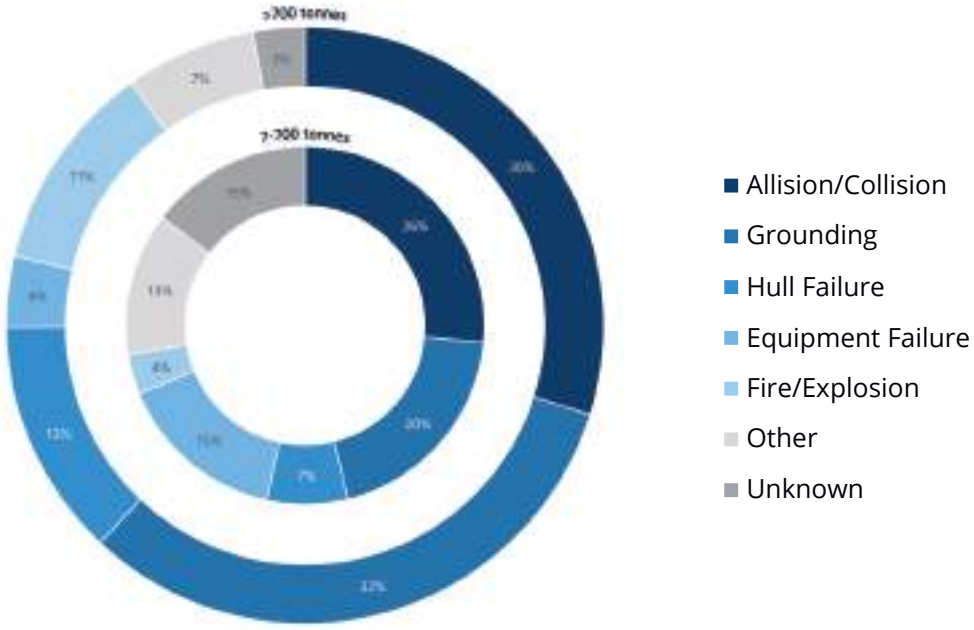


Figure 10: Cause of spills, 1970-2020

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 2020 were caused by Allisions/Collisions and Groundings. From Figure 11 below, it is evident that whilst the overall number of spills has reduced, the proportion of those that arise from Allisions/Collisions has increased and those due to groundings have decreased. Figure 11 also demonstrates a decrease in the proportion of spills caused by Hull Failure, with a significant drop after the 1990s.

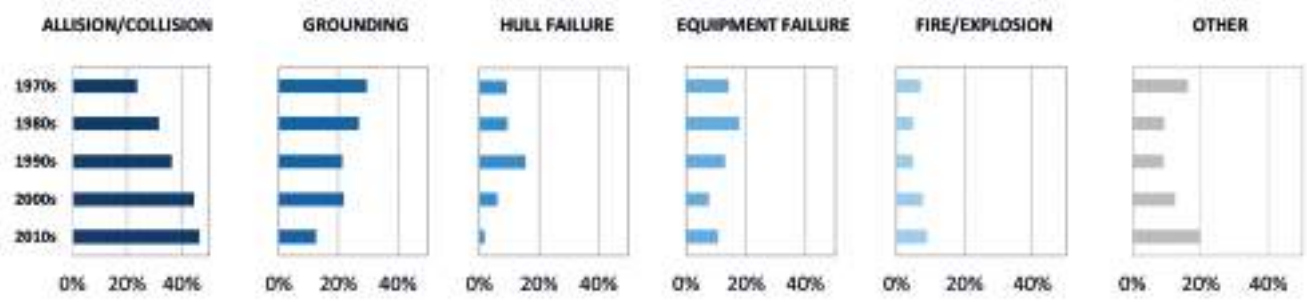


Figure 11: Cause of spills per decade, 1970-2020

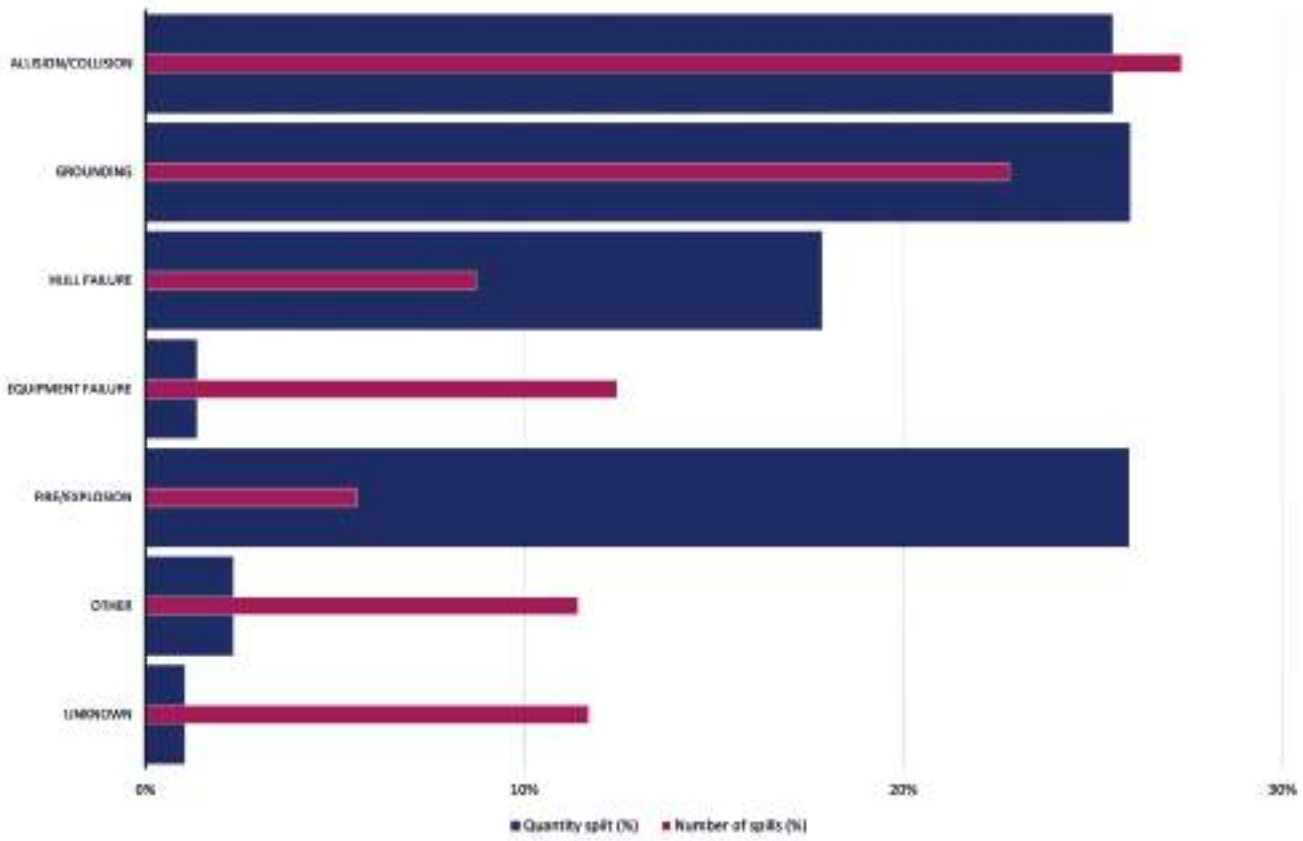


Figure 12: Number of spills and quantity spilt per cause, 1970-2020

It can also be seen from Figure 12 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 collisions, each responsible for about 26% of the total quantity of oil spilt since 1970.

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. Unknown causes are excluded from the analysis of operations taking place at the time of the spill.

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. 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.

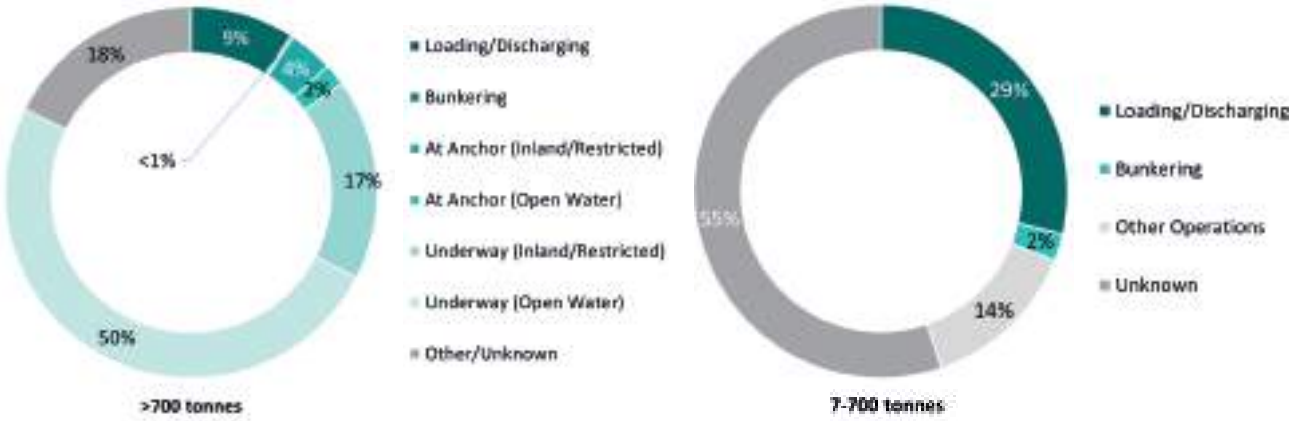
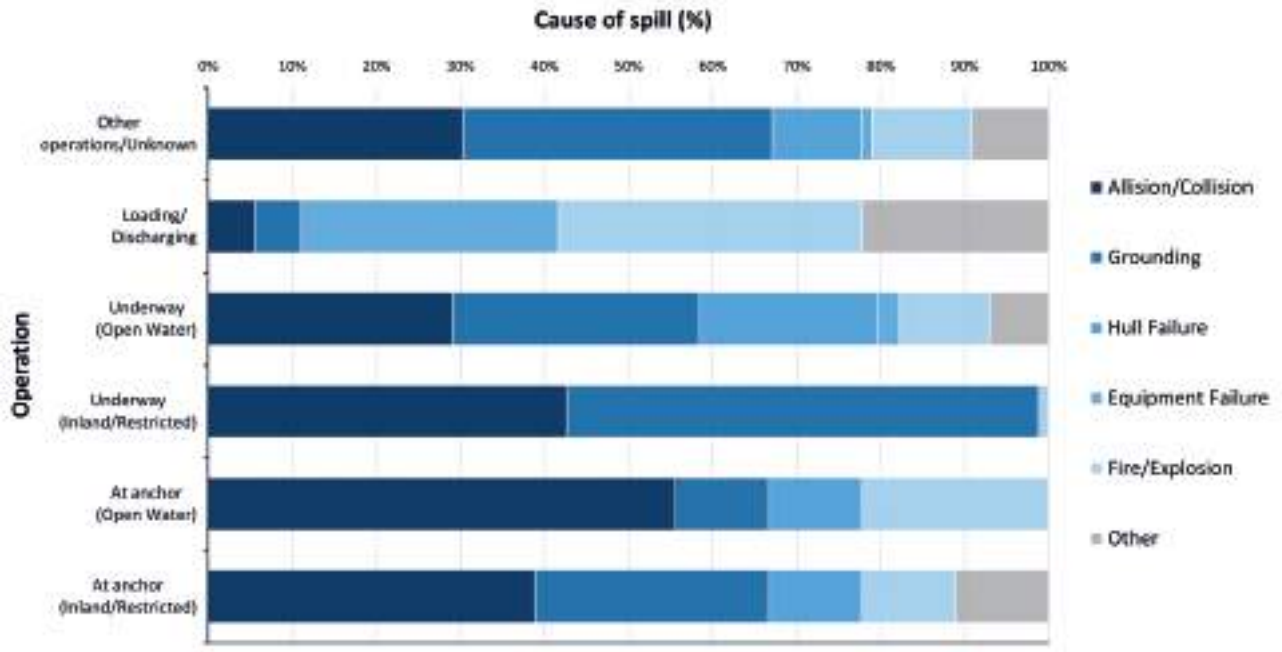


Figure 13: Number of spills by operation at time of incident, 1970-2020

Large spills account for only about 5% of all the incidents recorded. From Figure 13, 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 14). 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 13) which normally take place in ports and oil terminals. Significantly more medium sized spills (29%) occurred during these operations. For large spills, 36% were caused by fires and explosions. In contrast, during loading and discharging, less than 5% 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 14 & 15).



One spill, which occurred during bunkering operation is excluded from this chart.

Figure 14: Number of spills >700 tonnes by operation at time of incident and primary cause of spill, 1970-2020

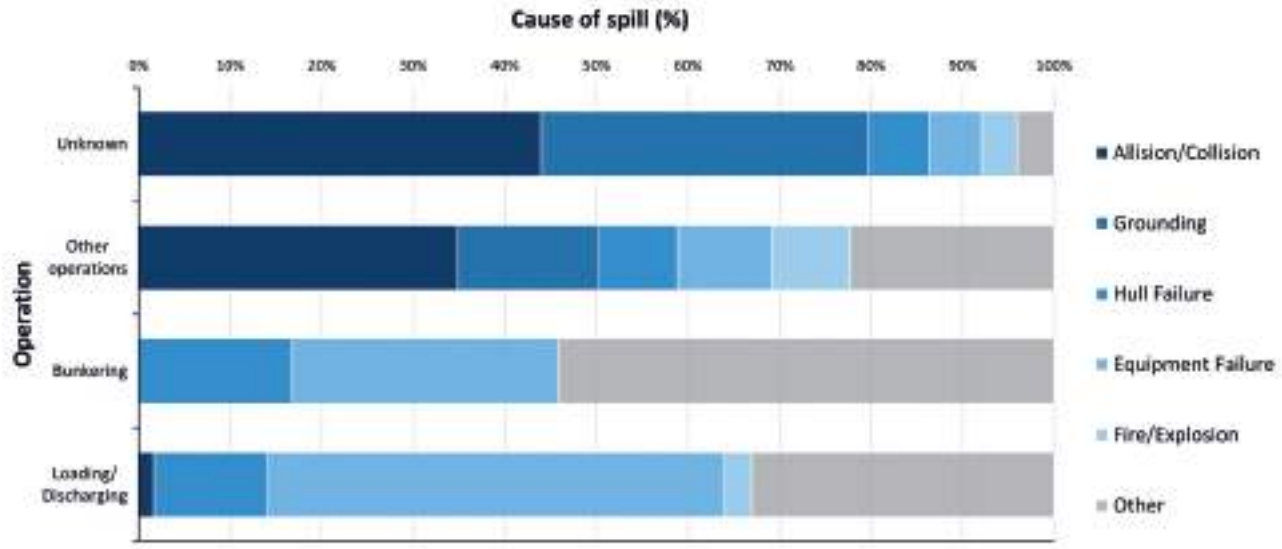


Figure 15: Number of spills 7-700 tonnes by operation at time of incident and primary cause of spill, 1970-2020

Tables 4 and 5 show the number of spills by cause and operation for large and medium spills recorded from 1970 to 2020.

		Operations							
		At anchor (Inland/ Restricted)	At anchor (Open Water)	Underway (Inland/ Restricted)	Underway (Open Water)	Loading/ discharging	Bunkering	Other Operations/ Unknown	**Total**
Causes	Allision/Collision	7	5	35	67	2	0	23	**139**
	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**	**82**	**232**	**42**	**1**	**82**	**466**
	Percentage (%)	4	2	17.5	50	9	0	17.5	

Table 4: Number of spills >700 tonnes by operation at time of incident and primary cause of spill, 1970-2020

		Operations				
		Loading/ Discharging	Bunkering	Other Operations	Unknown	**Total**
Causes	Allision/Collision	5	0	61	300	**366**
	Grounding	0	0	27	244	**271**
	Hull Failure	37	4	15	45	**101**
	Equipment Failure	148	7	18	39	**212**
	Fire/Explosion	9	0	15	26	**50**
	Other	98	13	39	28	**178**
	Unknown	99	9	14	81	**203**
	Total	**396**	**33**	**189**	**763**	**1,381**
	Percentage (%)	29	2	14	55	

Table 5: Number of spills 7-700 tonnes by operation at time of incident and primary cause of spill, 1970-2020

Spills Recorded in 2020

3 medium spills were recorded in 2020

As regards spills with confirmed volumes in excess of 7 tonnes, three medium spills (7–700 tonnes) were recorded in the year 2020. The first was recorded early in the year in Europe and the other two were recorded in the last quarter of the year in Africa and Asia. This is the same number as recorded in 2019 and remains the lowest number of spills above 7 tonnes recorded since 1970.

The total volume of oil lost to the environment from tanker spills in 2020 was approximately 1,000 tonnes; the same quantity as recorded in 2012 and 2019, and the lowest annual figure recorded in the last five decades.

Current Trends – Spills since 2010

When the frequency of spills since 2010 is reviewed (Figure 16), fluctuations in yearly values within a decade, illustrated in Figure 4, 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 per year nears zero, the fluctuations are decreasing and the downward trend in the yearly average number of spills per decade is likely to slowly stabilise.

The annual average number of spills >7 tonnes for the last decade (2010s) was 6.3, which is a 65% drop from the average in the previous decade (Figure 2 & 16). In the year 2020, the number of spills recorded was lower than the annual average for the prior decade.

With regard to the volume of oil spilt during the last decade, low annual quantities compared to prior

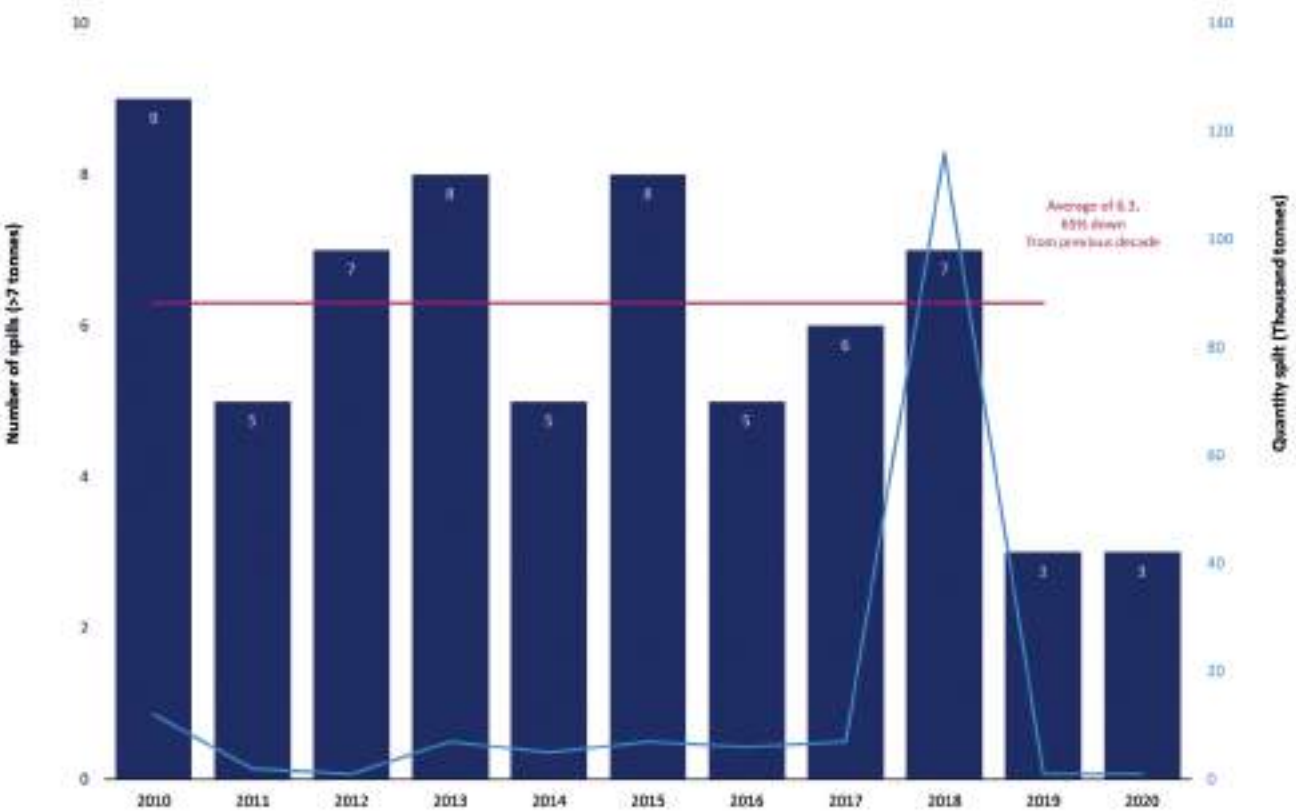


Figure 16: Number of spills and quantities of oil spilt (>7 tonnes) from 2010-2020

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 16).

The most frequent cause of medium and large spills since 2010 is Allisions/Collisions. As shown in Figure 17, 44% of these spills resulted from allisions or collisions, which is higher than the proportions recorded for previous decades (Figure 11). Groundings, on the other hand, have decreased significantly over the period. Six percent of large spills were as a result of groundings compared to the 32% for all spills recorded in the last 51 years (Figure 10).

Figure 13 shows that for data gathered on medium sized spills since 1970, operations that vessels were undertaking at the time of incident were largely unknown. However, data since 2010 shows that reporting has improved and the proportion of medium

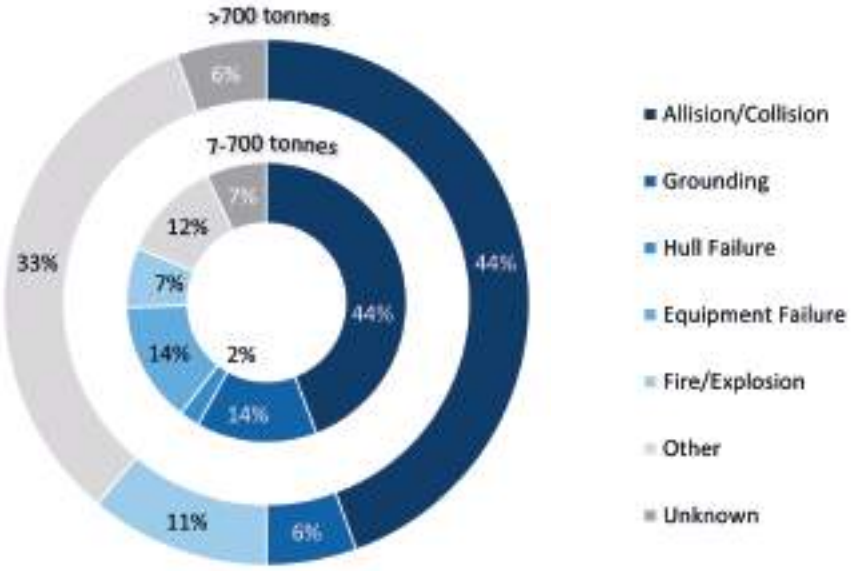
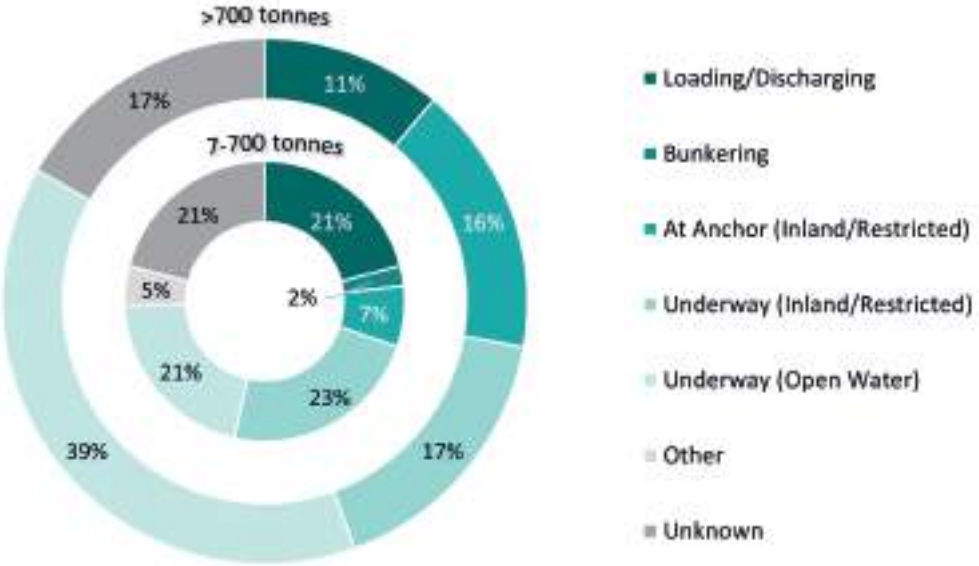


Figure 17: Causes of spills, 2010-2020

spills attributable to 'unknown' causes has reduced to 21%, close to the 17% recorded for large spills. 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 18.

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, a slightly higher percentage of spills occurred while the vessels were underway in inland water compared to open water (Figure 18).



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

Figure 18: Number of spills by operation, 2010-2020

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