ITOPF

PROMOTING EFFECTIVE SPILL RESPONSE

Oil Tanker Spill Statistics 2019

Special edition

50 years of data, 1970-2019

January 2020

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.

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Front cover image: Tanker, Todos os Santos Bay, Brazil

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

This special edition of ITOPF's annual Oil Tanker Spill Statistics publication presents 50 years of data on accidental spills of oil from tankers. We also report on new tanker spills that occurred in 2019 and trends for the decade.

ITOPF first began compiling statistics in the mid-1970s in response to the lack of reliable information on the number of oil spills from tankers occurring throughout the world. It was known that oil was being spilt but it had not been established with any accuracy how, when, where, why, or how much. ITOPF, with the owners of almost all the world's tanker tonnage as its Members, was in a unique position to gather this information. Following an initial pilot exercise, ITOPF's data collection programme was officially launched in 1974. In the early days, the voluntary nature of the reporting (via the P&I Clubs) resulted in a number of imbalances in the data but, where possible, gaps were filled by monitoring the shipping press and checking lists of spills from external sources, such as national governments, international organisations and research institutes. The programme proved successful and produced statistics capable of clarifying the size and scale of oil spills from tanker incidents. This made it possible to identify trends, highlighting common areas of concern and enabling industry discussions to be better informed.

Today, ITOPF continues to gather information 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 mostly related to large spills, often resulting from collisions, groundings, structural damage, fire or explosions. In recent decades however, reporting of smaller spills has improved.

Information is held on over 10,000 oil spills from tank vessels, including combined carriers, FPSOs and barges from 1970 onwards. This includes incidents involving both persistent and non-persistent oil from tankers, except those resulting from acts of war. Information recorded includes the location and cause of the incident, the vessel involved, the type of oil spilt and the spill amount. Spills are categorised by size, ie 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.

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 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.

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, except major spills.

Oil tanker spill statistics

50 years of data

Global issue

• Spills reported in over 100 countries

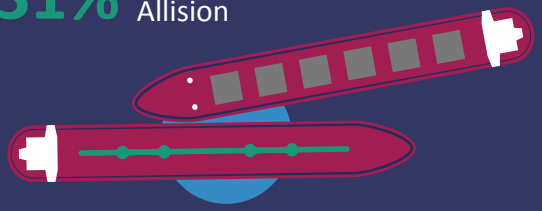
5.86 million
tonnes of oil lost as a result of tanker incidents

Largest oil spill from a tanker was
287,000
tonnes in 1979

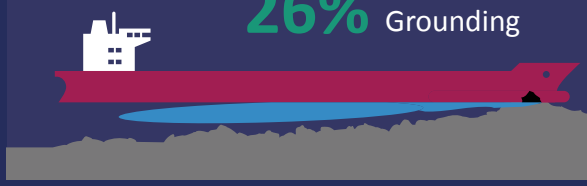
ATLANTIC EMPRESS

Most frequent causes of oil tanker spills

31% Collision/ Allision



26% Grounding



80% of tanker spills occurred within 10 nautical miles of shore

Tanker spills have decreased by **92%** since the 1970s

1970s
79 spills per year

2010s
6 spills per year

Amount of oil spilled from tanker incidents has reduced by **95%** since the 1970s

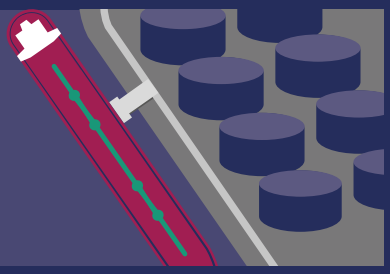
1970s
319,500
tonnes per year

2010s
16,000
tonnes per year

ITOPF
has attended
3/4
of all major spills

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 1970-2019

Major oil spills in history

A summary of the 20 largest 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 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 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

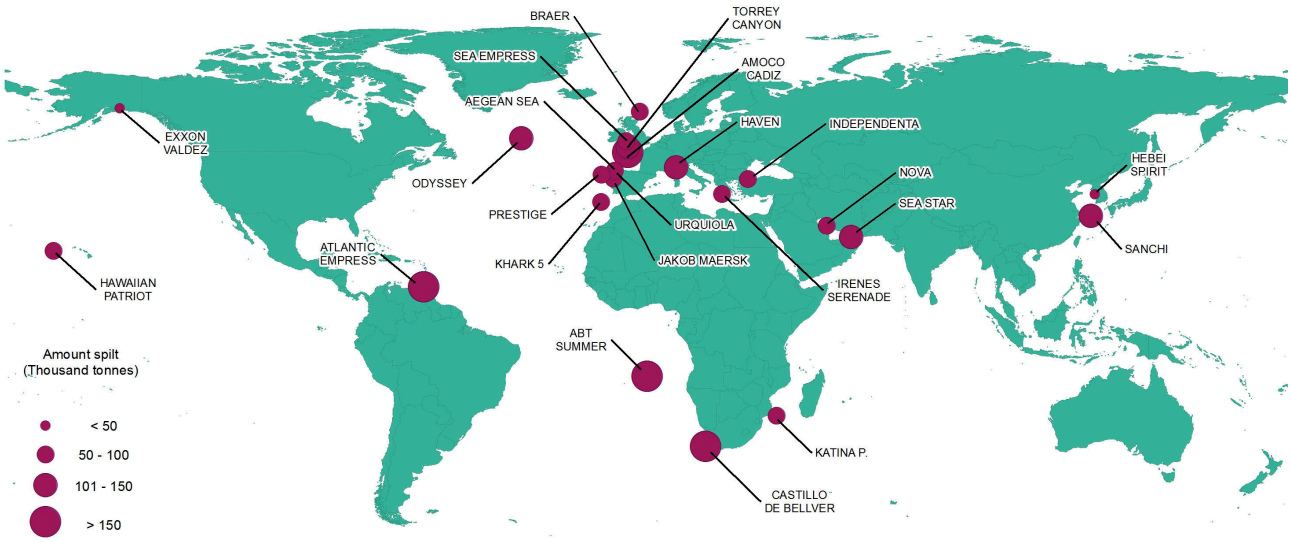


Figure 1: Location of top 20 major spills (All rights reserved © ITOPF)

Global oil spill trend

Over the last 50 years, there has been a marked downward trend in oil spills from tankers. Statistics for the frequency of spills greater than 7 tonnes is illustrated in Figure 2. The average number of spills per year in the 1970s was about 79 and has now decreased by over 90 percent to a low of 6.

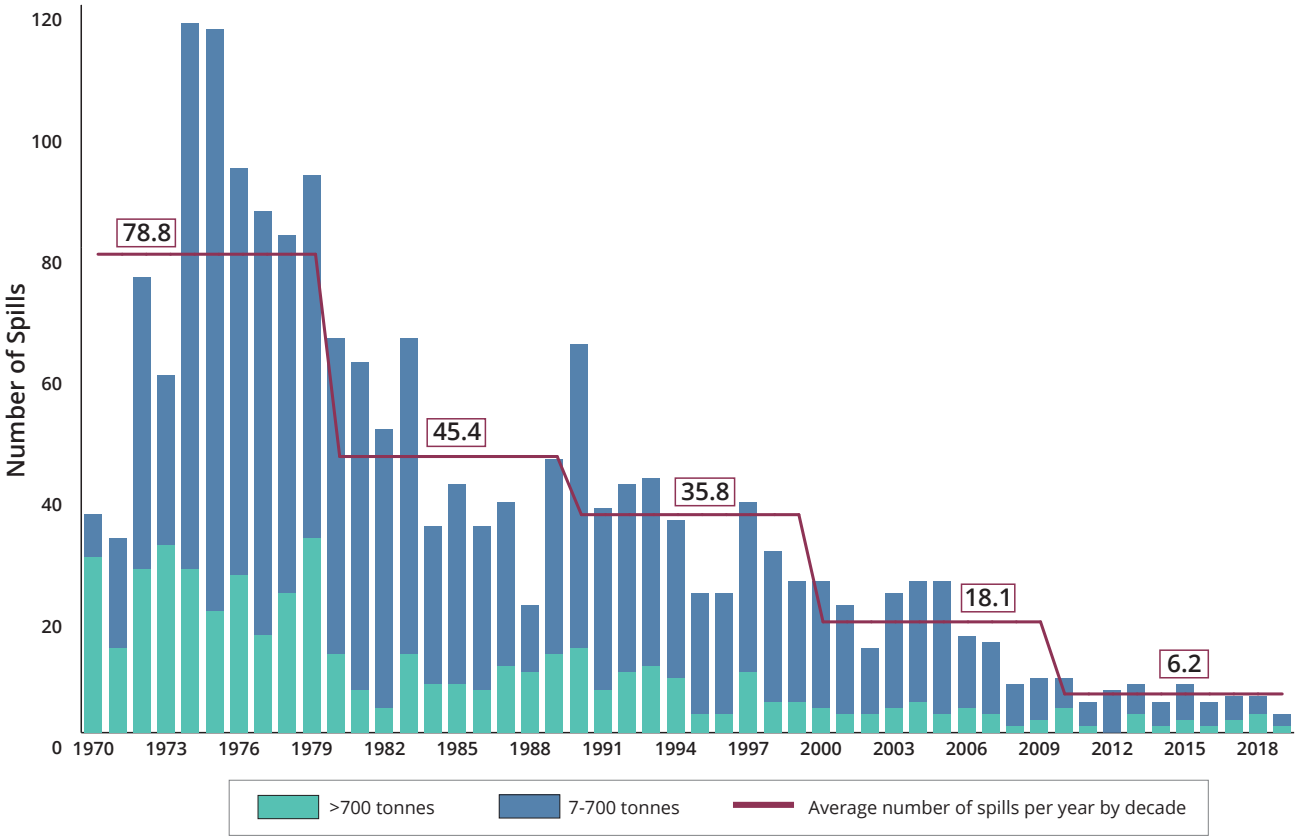
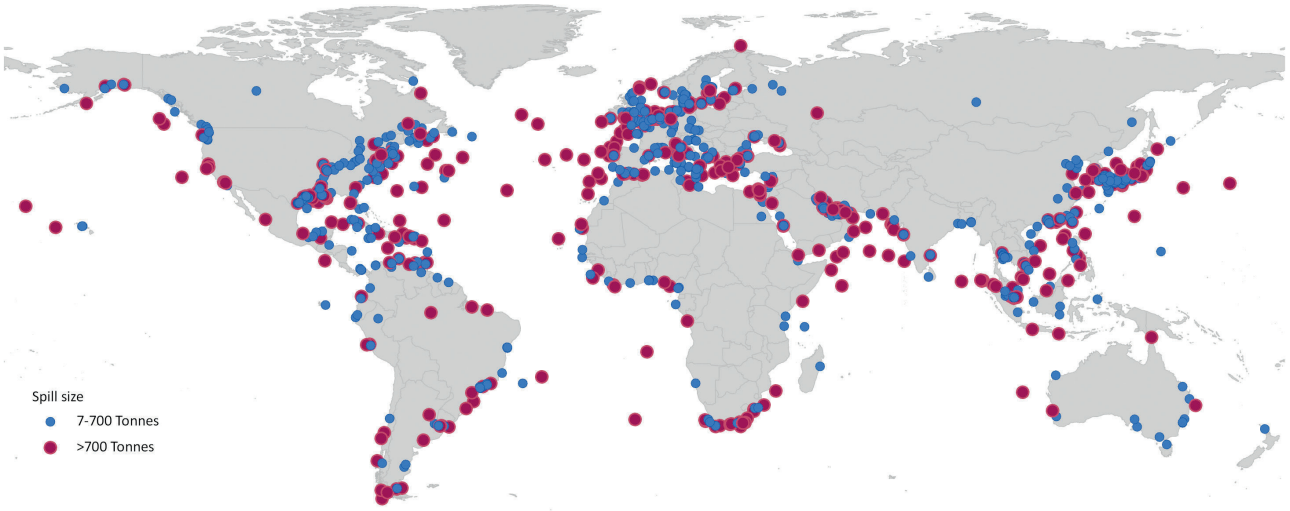


Figure 2: Number of spills (>7 tonnes) from 1970–2019



**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.*

Figure 3: Location of spills >7 tonnes from 1970–2019 (All rights reserved © ITOPF)

Number of oil spills

Over 80% of oil spills recorded in the last five decades fall into the smallest spill size category (<7 tonnes). Unfortunately, reliable reporting of this category of spills is difficult to achieve as data is often incomplete. The following analysis therefore relates to large (>700 tonnes) and medium (7–700 tonnes) spills with a focus on identifying trends and revealing patterns in the data to present the most accurate result.

The number of large spills has continued to decrease over the last 50 years (Figure 4). The yearly average recorded this decade is 1.8 spills. To put this in perspective, this is less than a tenth of the average recorded in the 1970s. Also, it can be observed from Figure 5 that 52% of all large spills recorded over the five decades occurred in the 1970s and only 4% was recorded this 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 2019 illustrate fluctuations in the yearly values within a decade.

A continuation of long-term decline can also be seen with medium sized spills (7–700 tonnes) as shown in Table 2 and Figure 6. The average number of spills per year this decade is 4.4, which is below a tenth of the average recorded in the 1970s.

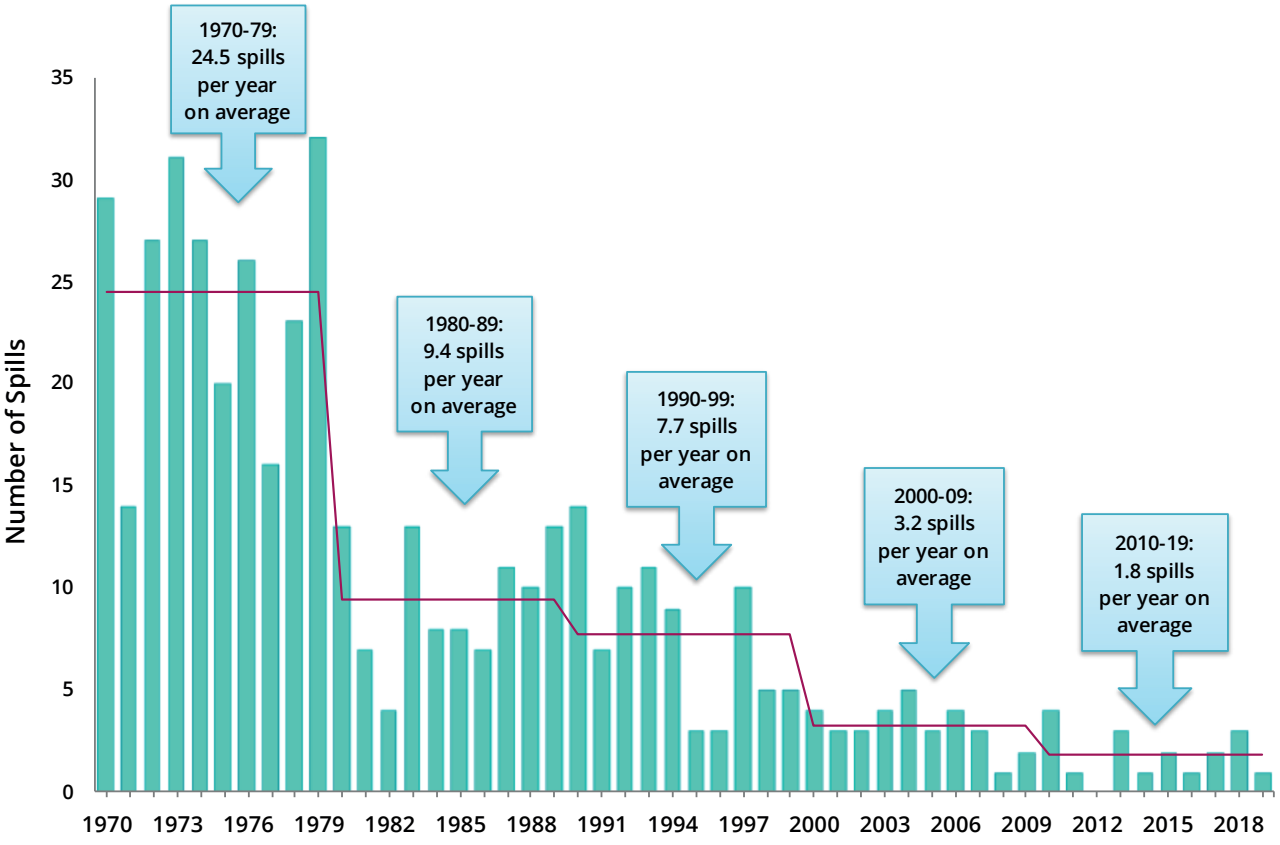


Figure 4: Number of large spills (>700 tonnes) from 1970–2019

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	3	3
2019	2	1
Total	44	18
Average	4.4	1.8

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

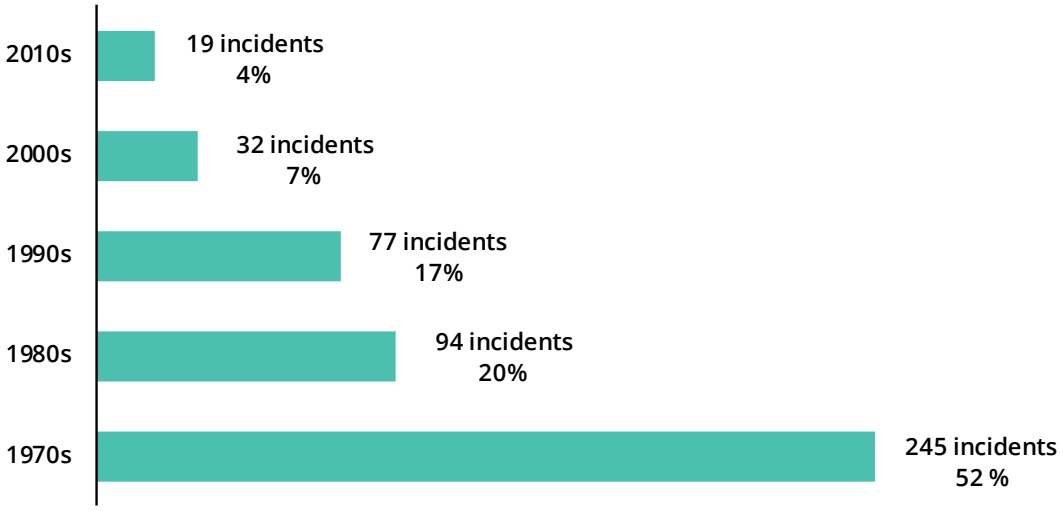


Figure 5: Large spills (>700 tonnes) as a percentage of those recorded from 1970–2019 per decade

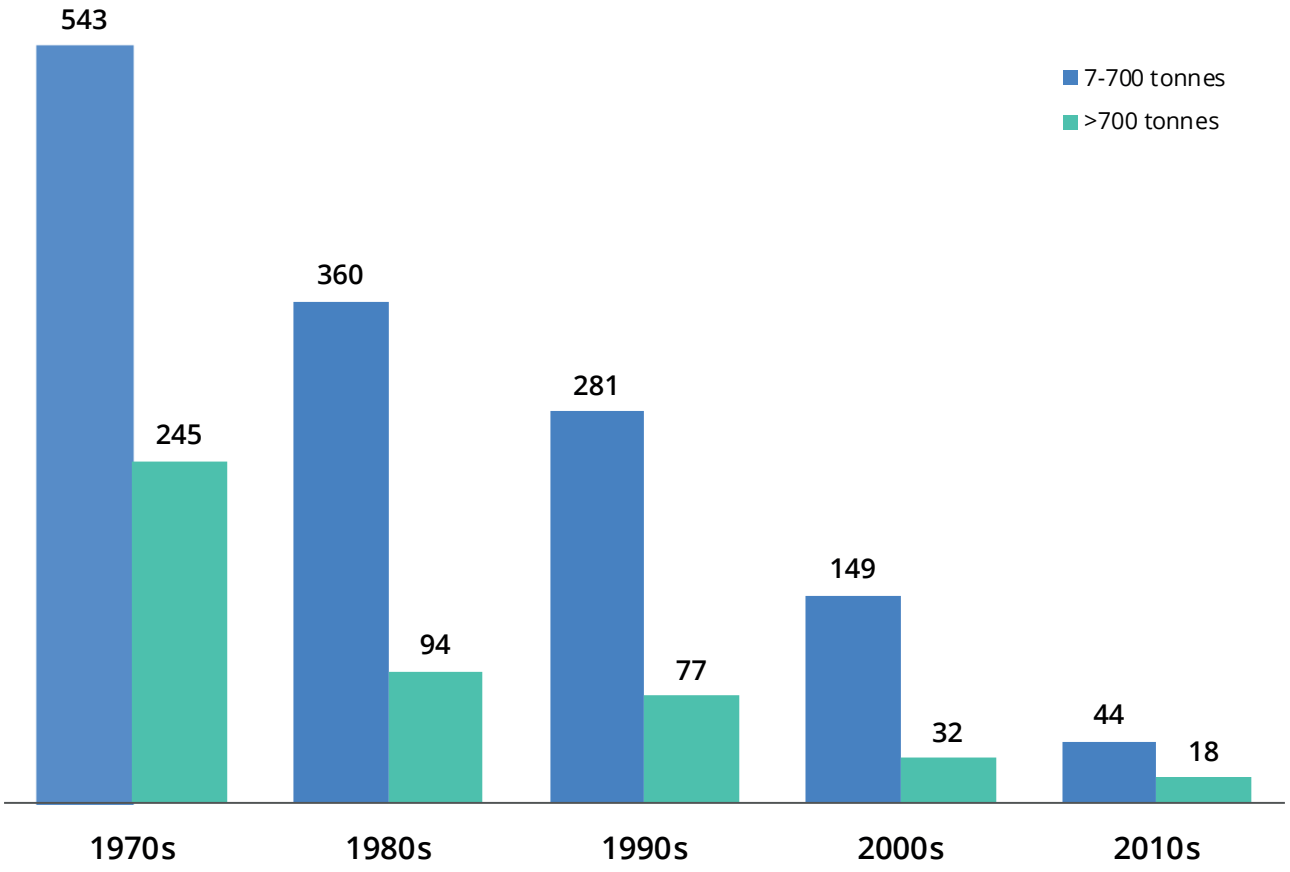


Figure 6: Number of medium (7–700 tonnes) and large (>700 tonnes) spills per decade from 1970–2019

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 unavailability of data and inconsistencies in the reporting of small spills (i.e. less than 7 tonnes), this category of spills has been excluded.

In the last five decades, approximately 5.86 million tonnes of oil have been lost as a result of tanker incidents globally. 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 this decade (164,000 tonnes) was 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

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 we look at the frequency and quantities of oil spilt in recent decades 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 have been 62 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 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, as shown in Figure 8.

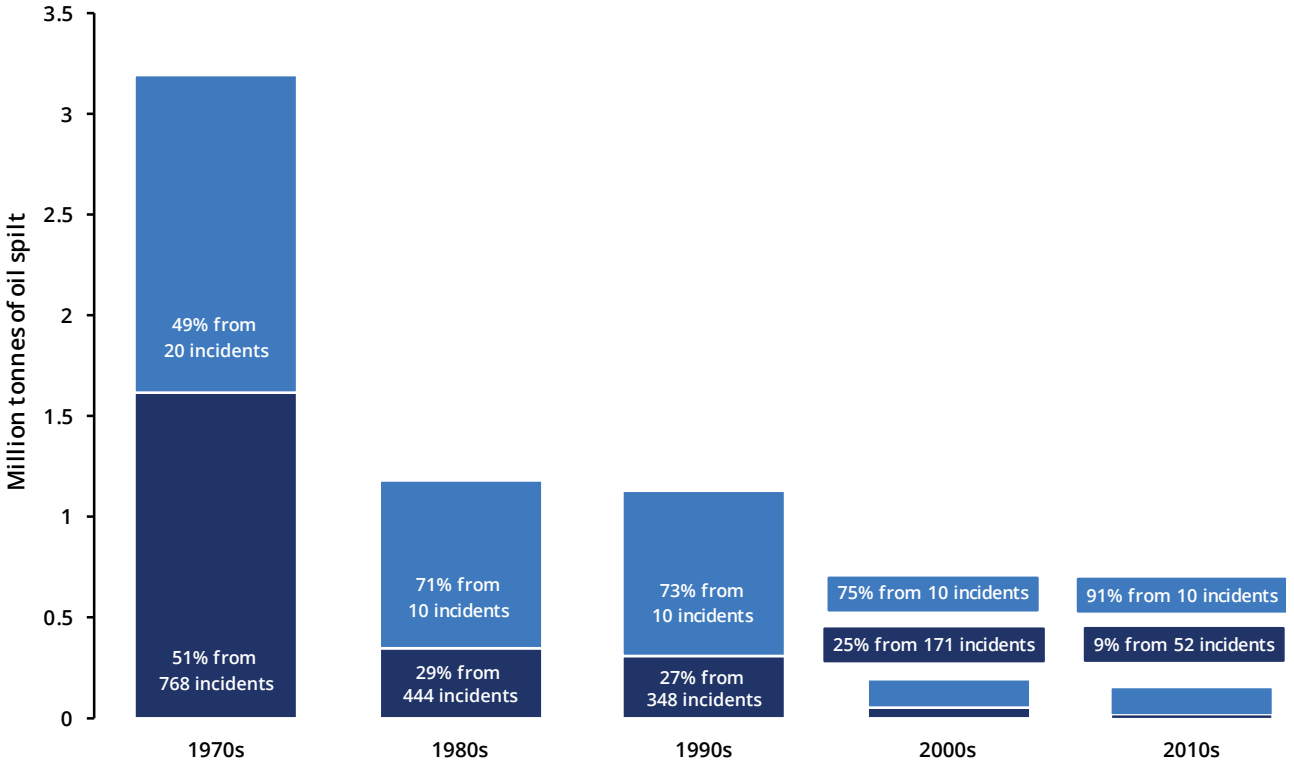


Figure 7: Spills 7 tonnes and over per decade showing the influence of a relatively small number of comparatively large spills on the overall figure

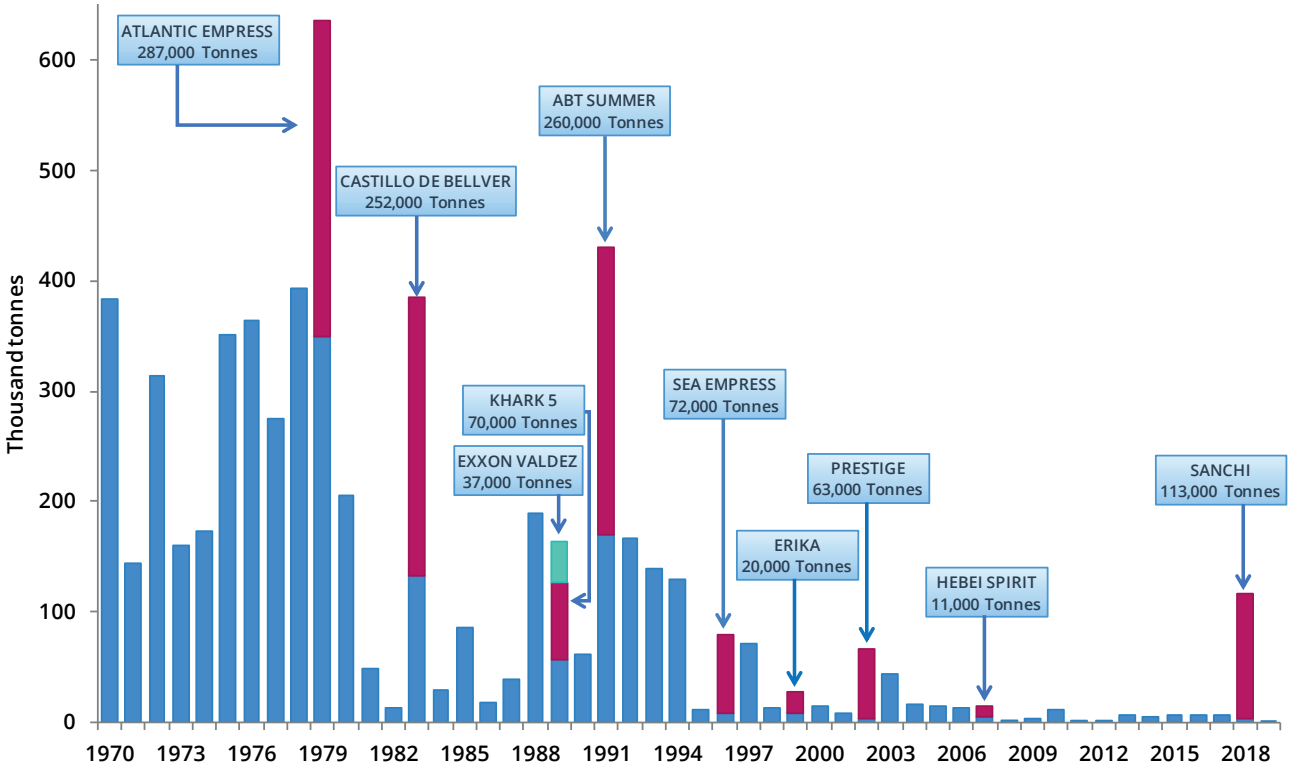


Figure 8: Quantities of oil spilt 7 tonnes and over (rounded to nearest thousand), 1970–2019

Tanker spills vs seaborne oil trade

The continuing decline in frequency of oil spills reported over the last 50 years contrasts with the trend in seaborne oil trade, which has grown steadily over the period, except for a fall in the early 1980s during the worldwide economic recession and the dip in 2016 (Figure 9). 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.

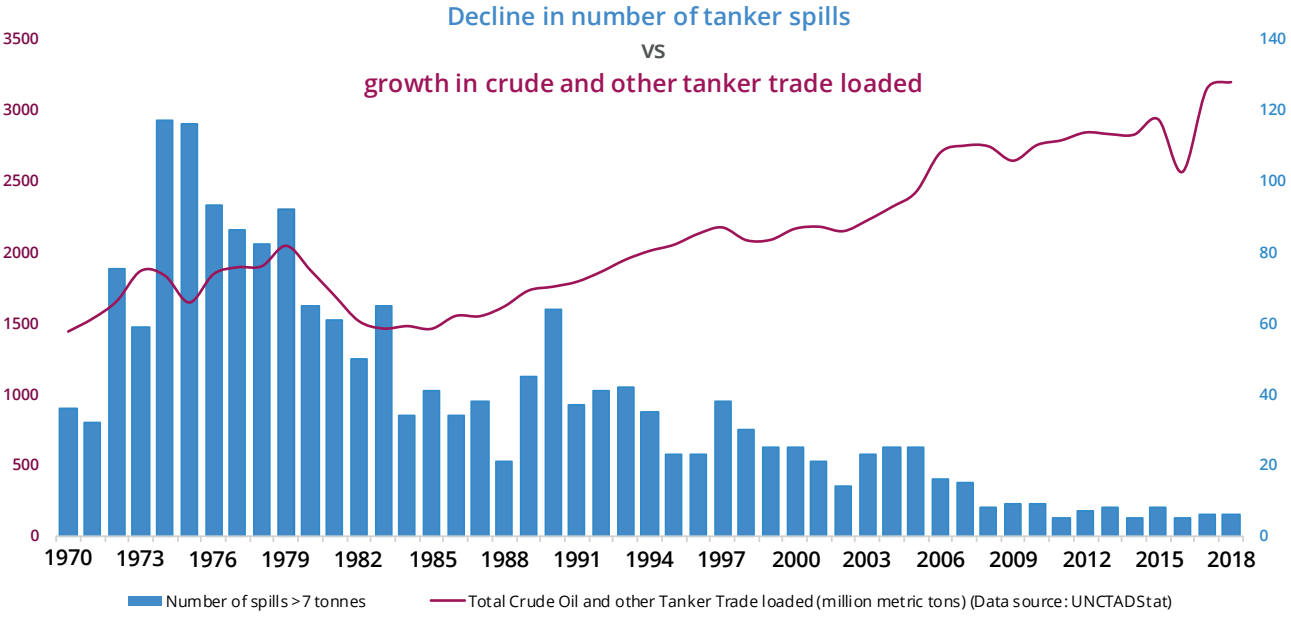


Figure 9: Decline in number of tanker spills vs growth in crude and other tanker trade loaded

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 oil spills over 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.

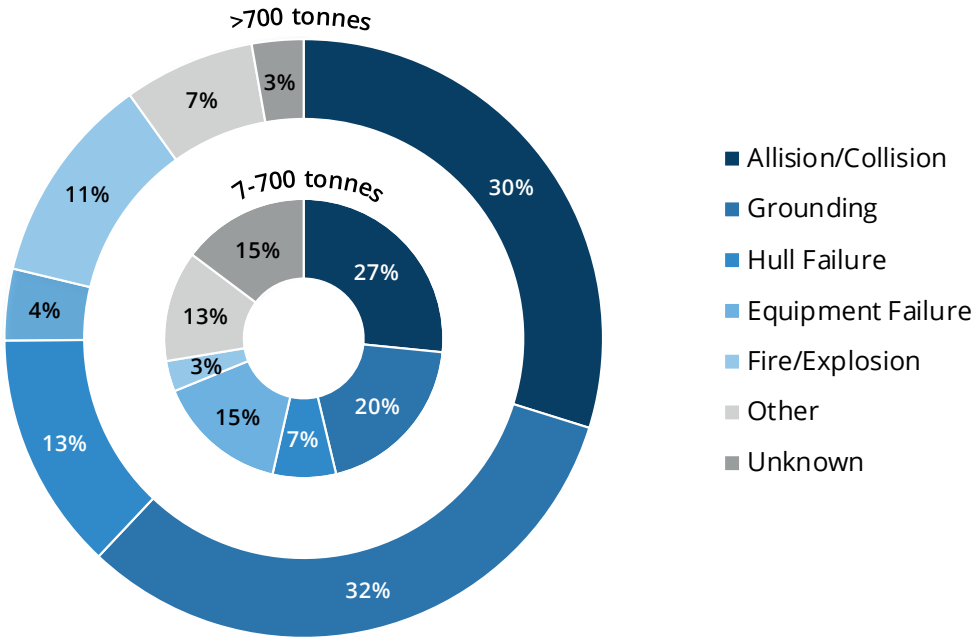


Figure 10: Cause of spills, 1970–2019

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 2019 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 stem 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.

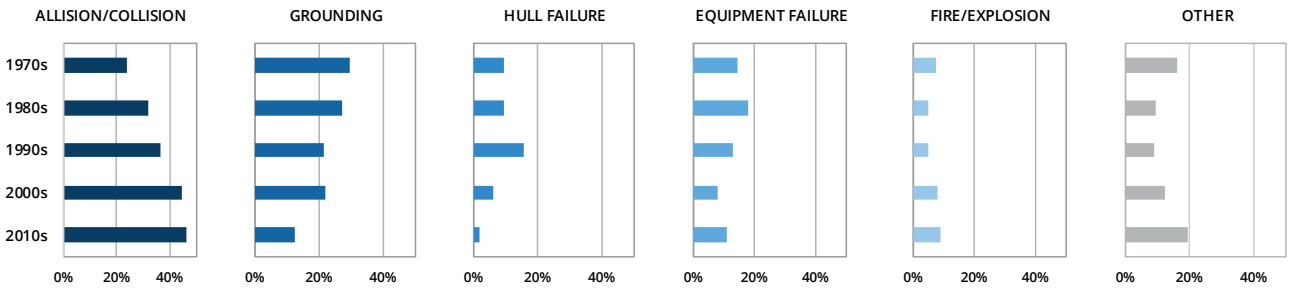


Figure 11: Cause of spills per decade, 1970–2019

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.

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 insufficient. Vessel operations for this spill size class 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.

Large spills account for only about 5% of all the incidents recorded. From Figure 12, 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 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 13 & 14).

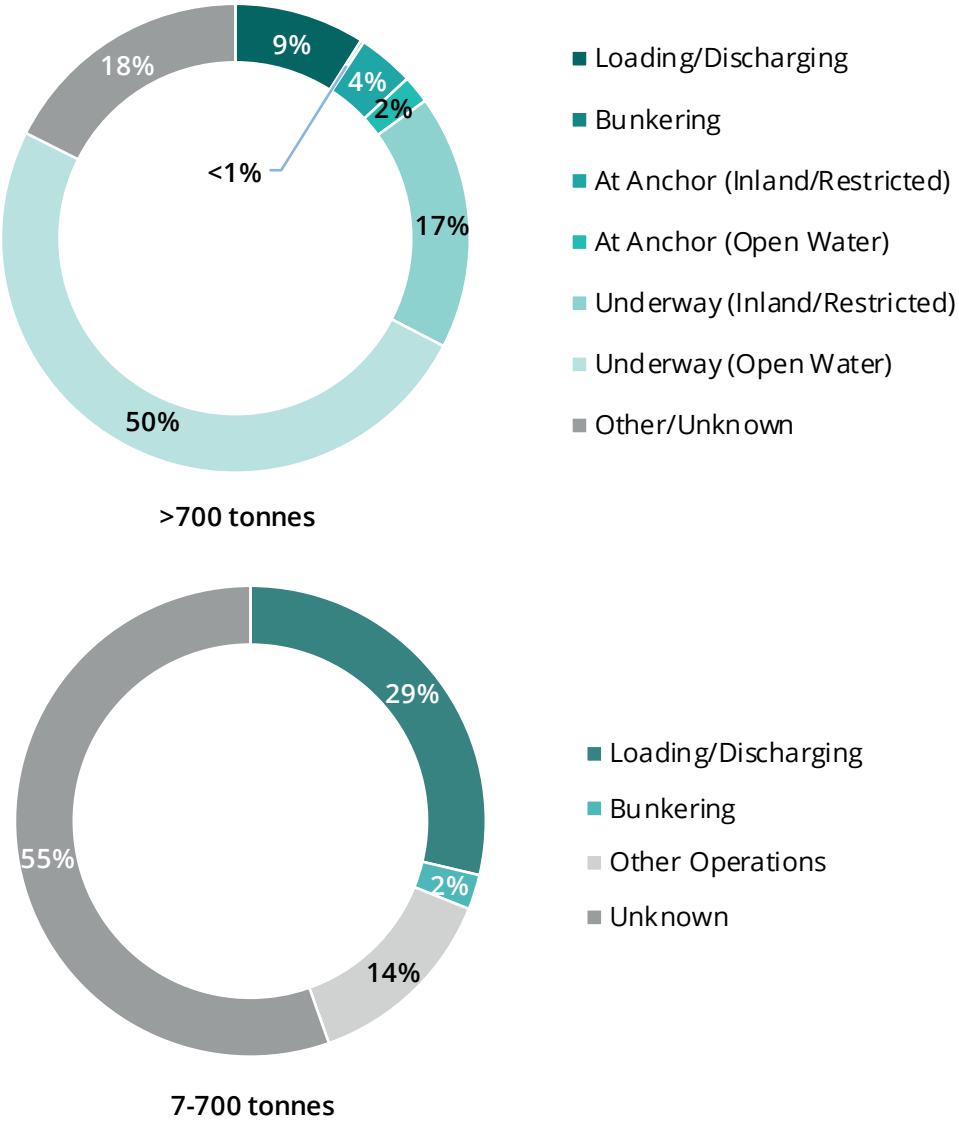
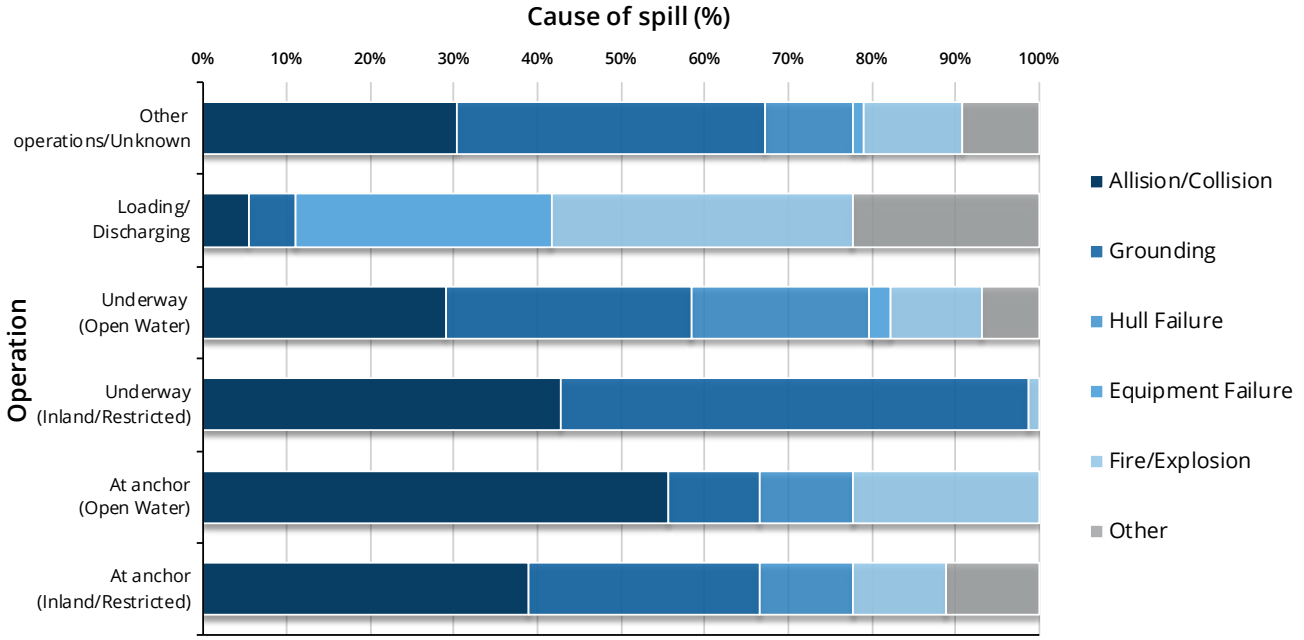


Figure 12: Number of spills by operation at time of incident, 1970–2019



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

Figure 13: Number of spills >700 tonnes by operation at time of incident and primary cause of spill, 1970–2019

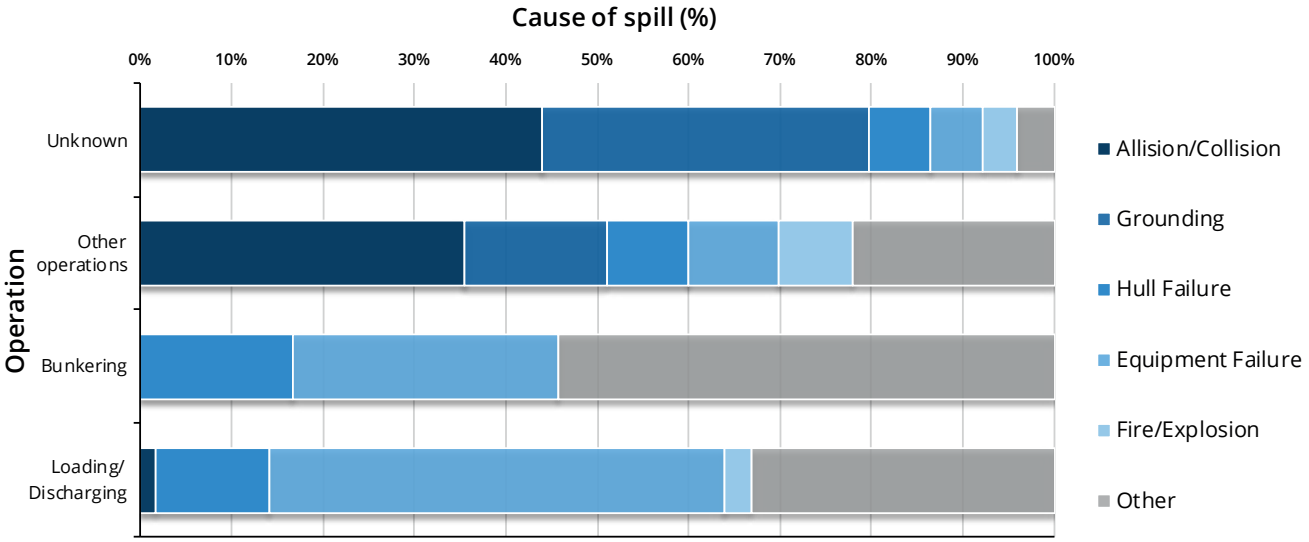


Figure 14: Number of spills 7–700 tonnes by operation at time of incident and primary cause of spill, 1970–2019

Tables 4 and 5 show the number of spills by cause and operation for large and medium spills recorded from 1970 to 2019.

		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, 1970–2019

		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	147	7	17	39	**210**
	Fire/Explosion	9	0	14	26	**49**
	Other	98	13	38	28	**177**
	Unknown	99	9	14	81	**203**
	Total	**395**	**33**	**186**	**763**	**1,377**
	Percentage (%)	29	2	14	55	

Table 5: Number of spills 7-700 tonnes by operation at time of incident and primary cause of spill, 1970–2019

Spills recorded in 2019

3 spills (>7 tonnes) were recorded in 2019

For the year 2019, we recorded one large spill (>700 tonnes) and two medium spills (7–700 tonnes). The large spill occurred in North America in May and resulted from a vessel collision. Both medium spills occurred in South Asia, one resulted from a collision and the other involved a vessel which partially sank in unknown circumstances. Three spills, of size 7 tonnes or more, is the lowest recorded for any particular year in the last five decades.

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

The widely reported oil spill that has contaminated approximately 3,000 km of coastline in eleven states in Brazil is still a mystery and could change this year's statistics if confirmed as a tanker spill.

Current trends – the 2010s

When the frequency of spills for this decade alone is reviewed (Figure 15), the usual 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. It is worth noting that despite the best efforts of government and industry, accidents always remain a possibility and occasionally the worst happens.

The yearly average number of spills for this decade has decreased to a low of 6.2, which marks a 66% drop from last decade's average (Figures 2 & 15).

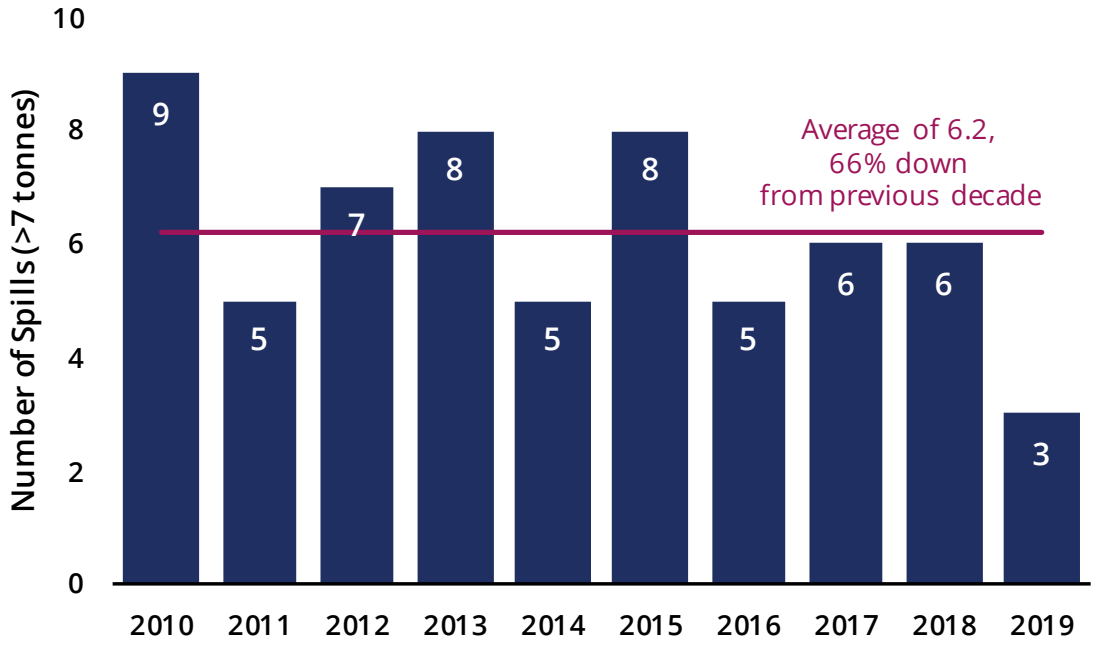


Figure 15: Number of spills (>7 tonnes) from 2010–2019

With regards to volume of oil spilt this decade, low annual quantities compared to previous decades were recorded for most years. However, an accident in 2018 resulted in a major spill, and the largest annual quantity in 24 years was recorded.

The most frequent cause of spills of size 7 tonnes or more this decade is Allisions/Collisions. As shown in Figure 16, 44% of both large and medium 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. This decade, 6% of large spills were as a result of groundings compared to the 32% for all spills recorded in the last 5 decades (Figure 10).

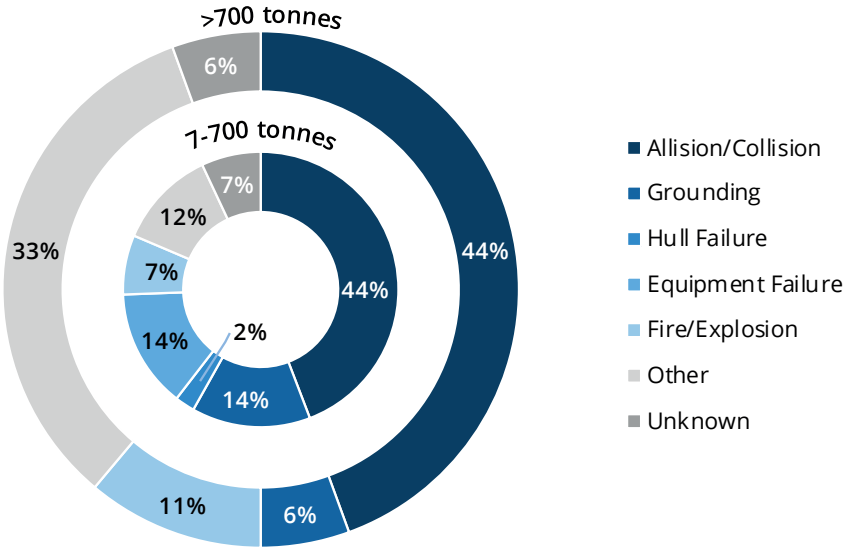
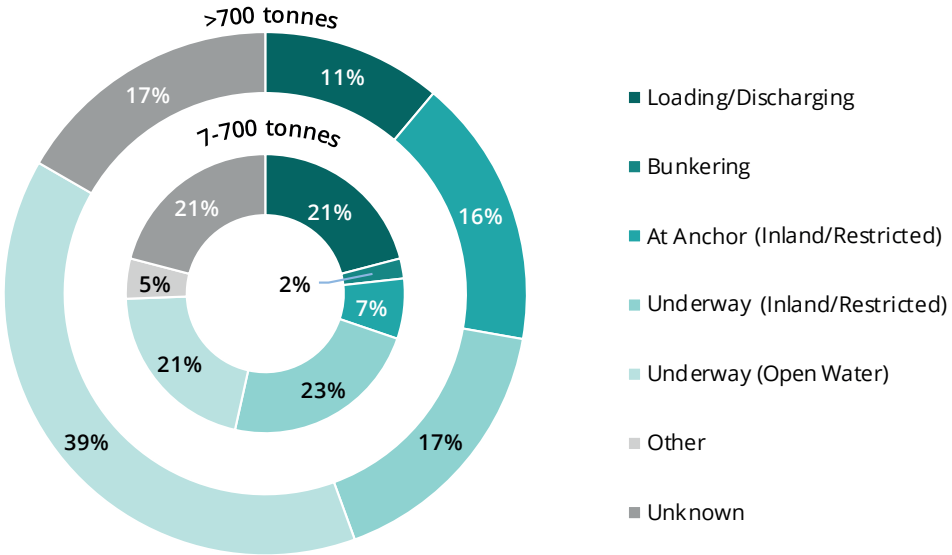


Figure 16: Causes of spills, 2010–2019

From Figure 12, it is shown that for data gathered since 1970, operations that vessels were undertaking at the time of the incidents are largely unknown for medium sized spills (55%). However, data for this decade alone shows the amount unknown to be 21%, close to the 17% recorded for large spills. This suggests that more accurate and consistent information has become available for spills less than 700 tonnes which has allowed further breakdown of vessel operations for medium spills as shown in Figure 17.

Similar to what is reported for the last 50 years, most large spills this decade 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 17).



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

Figure 17: Number of spills by operation at time of incident, 1970–2019

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