European Maritime Safety Agency
Ref. Ares(2020)7389783 – 07/12/2020

ANNUAL OVERVIEW OF MARINE CASUALTIES AND INCIDENTS 2020

Date: 19.11.2020

EMSA

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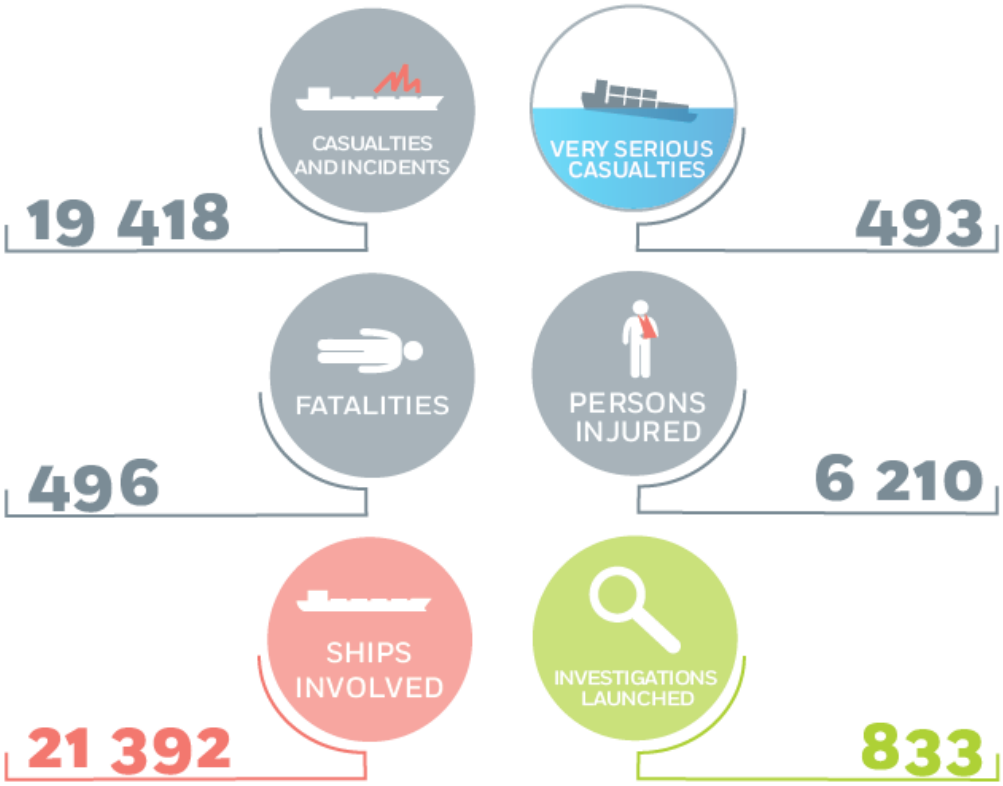
KEY FIGURES for 2014 – 2019



24/11/2019, Capsizing of livestock carrier "Queen Hind"

EXECUTIVE SUMMARY

This publication contains statistics on marine casualties and incidents which: involve ships flying a flag of one of the EU Member States; occur within EU Member States' territorial sea or internal waters as defined in UNCLOS; or involve other substantial interests of EU Member States.

The figures were extracted from the EMCIP database on **20 July 2020** and cover the period from **1 January 2014 to 31 December 2019**.

The year 2019 appeared to have been a positive year considering the improvement or stabilisation of some indicators, such as the number of ships lost, fatalities and injuries.

A number of 3062 occurrences was reported in 2019. A reduction of 200 casualties in comparison with the year 2018 was recorded. The total number of occurrences stored in the EMCIP database has grown to 19500 over 2014-2019. This represents an average of 3236 marine casualties or incidents per year over the period.

A total of 106 very serious casualties reported in 2018, which corresponded to an increase of 68% in comparison with 2017, while the total number decreased back to 63 in 2019. A similar evolution regarding the number of ships lost was noted: after a peak in 2018, a decrease in 2019 was recorded, with 21 ships lost.

During the 2014-2019 period, 320 accidents resulted in a total of 496 lives lost. After a continuous important decrease from 2015 to 2017, a limited increase was recorded for the years 2018 and 2019. 88.3% of the victims were crew members. Fatalities mainly occurred during collisions. When the event is limited to persons, falls were the main cause for losses of life. The main event resulting in fatalities was collisions when it related to a ship and falls when it related to persons.

Over the period 2014-2019, 6210 injuries were recorded, corresponding to 5424 accidents. Again, crew members represent the main category of persons injured at sea with 79.3% of the victims.

In 2019, apart from the passenger ships and, to some extent, the fishing vessels, the number of all other types of ships involved in casualties and incidents recorded a reduction. The same trend was noted over the period 2014-2019.

In 2019, 1382 cargo ships were involved in marine casualties or incidents that resulted in 19 fatalities. It is to be noticed that only one cargo ship was lost.

With a total of 91, fishing vessels remain the category of ships with the highest number of ships lost over the 2014-2019 period. In 2019 the number of occurrences involving fishing vessels slightly increased; however, the number of ships lost reduced to 14 (in comparison with 16 in 2018) and the number of injuries stabilised at 220.

Almost half of the casualties that occurred on board a passenger ship involved a Ro/Ro passenger ship, also known as "ferries". One passenger ship was lost in 2019; the number of fatalities and injuries has nevertheless seen a decreasing trend since 2014.

In 2018, 2 service ships were lost. While the number of injuries continued to decrease since 2015, the number of fatalities increased significantly in 2019 due to the loss of the Bourbon Rhodes, when 4 persons lost their lives, and 7 persons went missing.

In 2019, 60 ships of other types involved in marine casualties and incidents, mainly recreational motorboats and sailing boats. 3 ships were lost, and 7 fatalities were reported.

Accidents of navigational nature, such as contacts, grounding/stranding and collision encountered for 44% of all occurrences related to the ship. It was however noted that the main type of accident to a ship was the loss of propulsion power, that counted for 21.8%. Regarding occurrences to person(s), 37% were attributed to slipping, stumbling and falling of persons. Among the falls, 10% were fall overboard.

The departure phase appeared to be the safest phase of a voyage and the *en route* portion the most unsafe. It was noted that half of the casualties occurred in internal waters, more precisely in port areas.

EU Member States investigation bodies have launched 833 investigations over the 2014-2019 period and 686 reports have the status "finished". From 1801 accident events (i.e. underlying causes) analysed during safety investigations, 54% were attributed to Human Action. More than 2200 actions were taken, or safety recommendations issued. 63.9% related to ship related procedures, in particular for the operation of ships.

23/10/2019, Grounding of fishing vessel "Dillon Owen"

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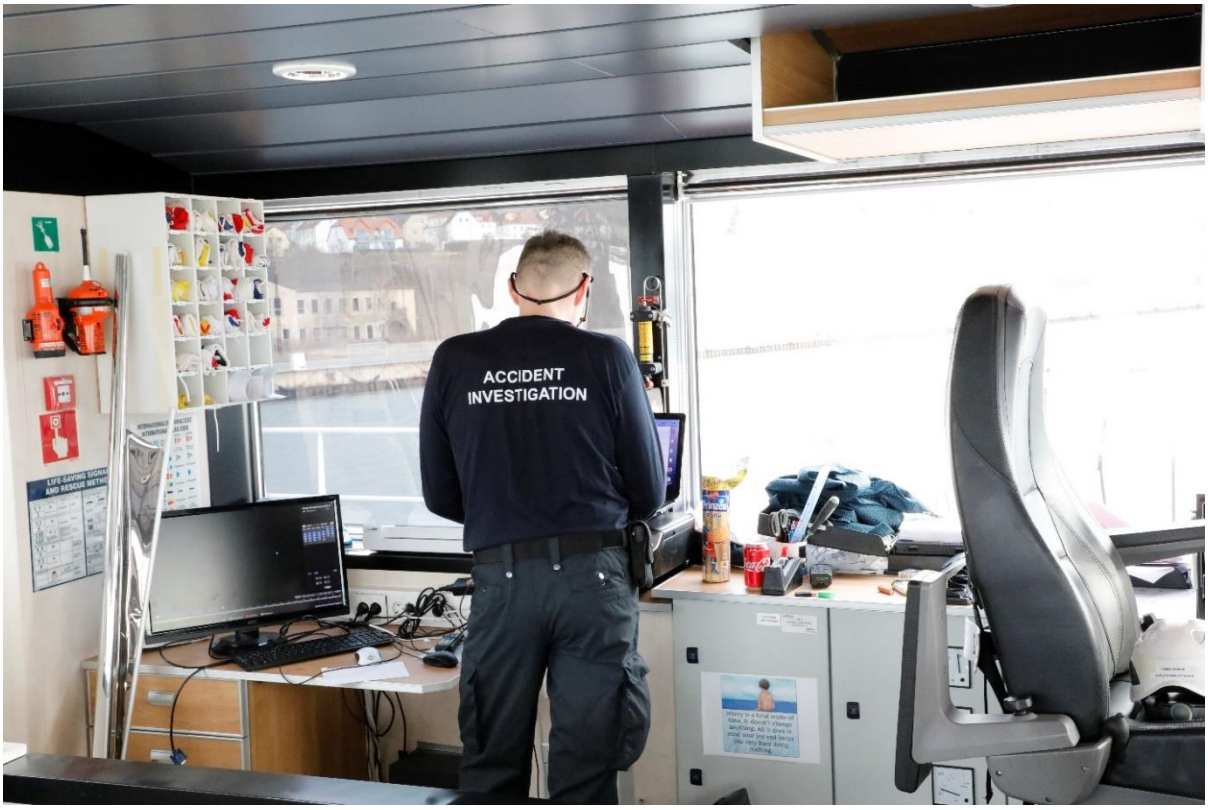


Chapter 1: INTRODUCTION

1.1 Background

The purpose of the European Maritime Safety Agency is to ensure a high, uniform and effective level of maritime safety, maritime security, prevention of and response to pollution caused by ships as well as response to marine pollution caused by ships and by oil and gas installations.

EMSA's activities cover the following main areas:

- providing technical and scientific assistance to the Member States and the European Commission in the proper development and implementation of EU legislation on maritime safety, security, prevention of pollution by ships and maritime transport administrative simplification;

- monitoring the implementation of EU legislation through visits and inspections;

- improving cooperation with and between Member States;

- building capacity of national competent authorities;

- providing operational assistance, including developing, managing and maintaining integrated maritime services related to ships, ship monitoring and enforcement;

- carrying out operational preparedness, detection and response tasks with respect to pollution caused by ships and marine pollution by oil and gas installations; and

- at the request of the European Commission, providing technical operational assistance to non-EU countries around relevant sea basins.

EMSA, as a body of the European Union, sits at the heart of the EU maritime safety and pollution response network and collaborates with many industry stakeholders and public bodies, in close cooperation with the Commission and the Member States.

Following the entry into force of Directive 2009/18/EC[1] establishing the fundamental principles governing the investigation of accidents in the maritime transport sector, EU Member States shall, among other obligations:

- establish independent, impartial and permanent accident investigative bodies.;

- require to be notified of marine casualties and incidents. This obligation covers casualties and incidents that:
  - involve ships flying the flag of one of the Member States;
  - occur within Member States' territorial seas and internal waters;
  - involve other substantial interests of the Member States;

-investigate casualties depending upon their severity. Casualties which are classified as very serious shall be investigated; serious casualties shall be assessed in order to decide whether or not to undertake a safety investigation;

-publish investigation reports; and

-notify the European Commission of marine casualties and incidents via EMCIP.

[1] Directive 2009/18/EC of the European Parliament and of the Council of 23 April 2009 establishing the fundamental principles governing the investigation of accidents in the maritime transport sector and amending Council Directive 1999/35/EC and Directive 2002/59/EC of the European Parliament and of the Council.

EMCIP is the European Marine Casualty Information Platform, a centralised database for EU Member States to store and analyse information on marine casualties and incidents.

EMCIP is populated with data by the competent national authorities. It is this data which forms the basis of the Annual Overview of Marine Casualties and Incidents.

In this publication, the terms “Europe” and “EU Member States” are considered to be the 28 EU Member States plus the EFTA States: Iceland and Norway to which the Directive applies.

1.2 Scope

EMSA has the obligation to provide a yearly overview of marine casualties and incidents under the Agency’s founding Regulation (EC) No 1406/2002, as amended.

This publication contains statistics on marine casualties and incidents which: involve ships flying a flag of one of the EU Member States; occur within EU Member States’ territorial sea or internal waters as defined in UNCLOS[2]; or involve other substantial interests of EU Member States.

This publication covers the period from **1 January 2014 to 31 December 2019**. The data can be subject to changes over time as EU Member States add or update information on older cases. For this reason, the figures extracted from the database on **20 July 2020** and presented in this publication are likely to be slightly different to those presented throughout the year in various fora or in the next editions to be published.

The figures are presented in this publication to provide a general overview of the safety of maritime transport when it comes to European interests. However, it is limited by the quantity and nature of information presently contained in EMCIP and is therefore not intended as a complete overview and comprehensive technical analysis. Should further information about specific cases be required, readers are invited to contact the national competent investigation bodies (whose contact details can be found in Appendix 4 of the publication).

1.3 Content of the review

This publication has been organised to cover the main aspects of maritime safety as given in the Directive and as included in EMSA’s remit. In this edition, chapter 2 covers general figures and the activities of the EU investigative bodies. The following chapters focus on the main types of ships: cargo ships, fishing vessels, passenger ships, service ships and other ships. Each chapter is divided into the following sections: detailed ship types, nature of marine casualties and incidents, location, events and contributing factors and consequences.

More information on EMSA’s activities related to marine accidents can be found at:

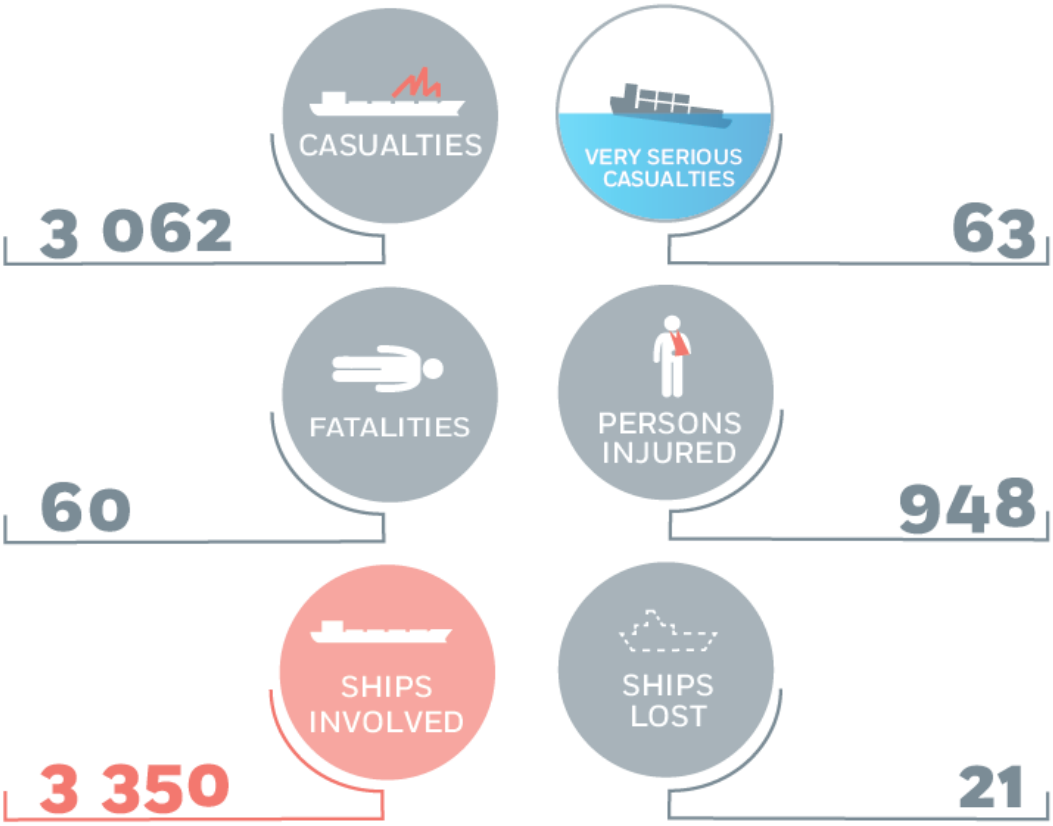
http://www.emsa.europa.eu/implementation-tasks/accident-investigation.html ; and
https://portal.emsa.europa.eu/emcip-public/#/dashboard .

A list of acronyms and definitions as well as extra information on the casualty categories used in publication can be found in Appendix 1. Appendix 2 illustrates the data model supporting the reporting scheme and Appendix 3 contains the detailed list of ships used in EMCIP. The list of investigative bodies in Europe can be found in Appendix 4.

[2] United Nations Convention on the Law of the Sea.

Chapter 2: GENERAL INFORMATION

KEY FIGURES 2019



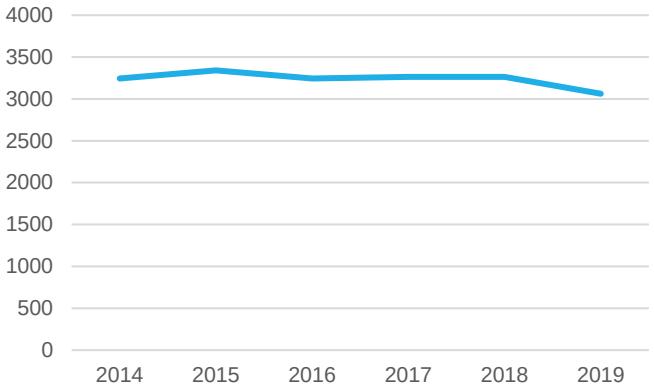
15/09/2019, Contact and foundering of fishing vessel "Narluneq"

A- MARINE CASUALTIES AND INCIDENTS

2.1 Number and Severity

This section provides general information about the number of marine casualties and incidents and their severity.

Figure 2.1: Number of reported marine casualties and incidents

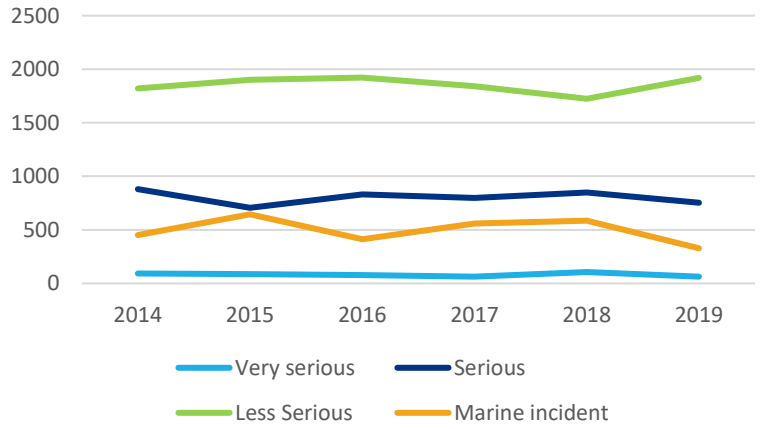


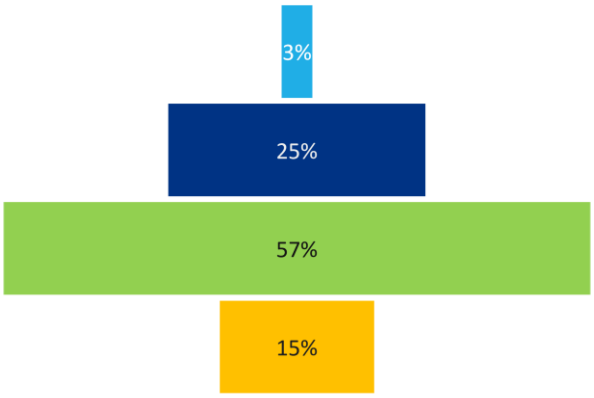
The total number of reported marine casualties and incidents over the period 2014-2019 is 19418. The average number of marine casualties or incidents recorded in EMCIP is 3236.

The total for the year 2019 is, for the first time, below the average.

	2014	2015	2016	2017	2018	2019	Total
Nr. occurrences	3244	3341	3244	3263	3264	3062	19418

Figure 2.2: Number of marine casualties and incidents per severity of the occurrence



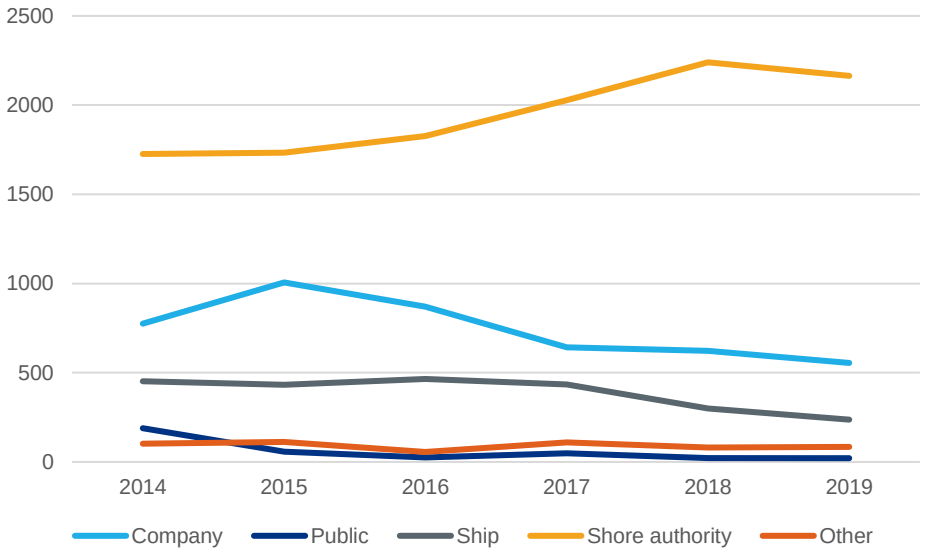


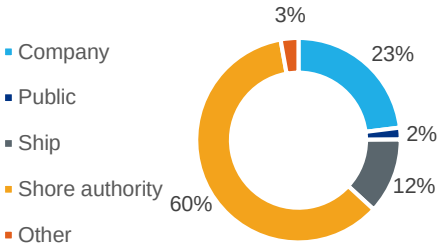
In 2019, the number of very serious casualties has decreased of 40% in comparison with the year 2018. An increase was noted only for the less serious casualties.

With only almost 3000 marine incidents in comparison with almost 5000 serious casualties and more than 11100 less serious, significant underreporting of marine incidents can be assumed.

	2014	2015	2016	2017	2018	2019	Total
Very serious	94	88	79	63	106	63	493
Serious	880	706	832	799	849	752	4818
Less Serious	1819	1902	1922	1842	1724	1919	11128
Marine incident	451	645	411	559	585	328	2979
Total	3244	3341	3244	3263	3264	3062	19418

Figure 2.3: Notifying entities





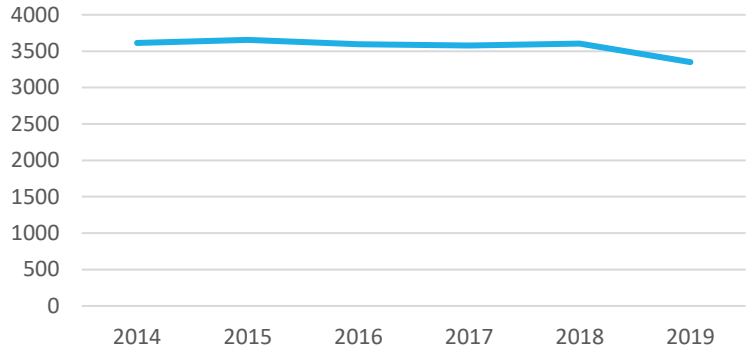
Over the period, the number of marine casualties and incidents reported to the investigation bodies firstly by the shore authorities has continuously increased, while reporting by the ship or the company has also continuously decreased.

	2014	2015	2016	2017	2018	2019	Total
Company	775	1006	871	643	622	555	4472
Public	189	57	26	48	22	21	363
Ship	452	433	465	435	299	237	2321
Shore authority	1726	1733	1826	2028	2240	2164	11717
Other	102	112	56	109	81	85	545
Total	3244	3341	3244	3263	3264	3062	19418

2.2 Main ship types

This section focuses on the ships involved in marine casualties and incidents. Ships have been classified by the main categories: cargo ship, fishing vessel, passenger ship, service ship and other ship.

Figure 2.4: Number of ships involved in marine casualties or incidents

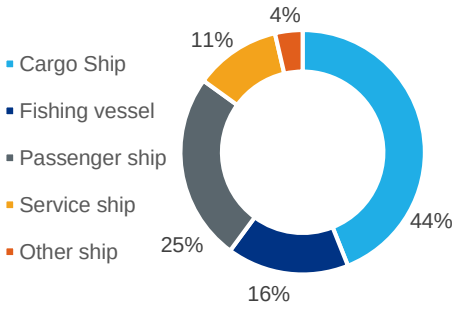


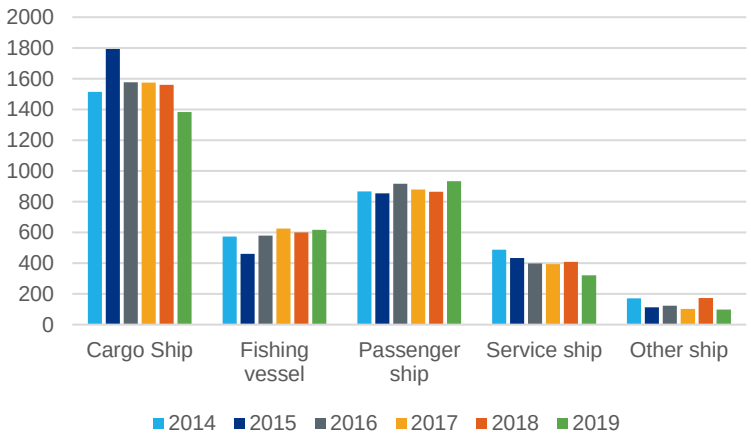
A casualty may involve more than one ship, in particular in the case of collisions between two or more ships.

In the 19418 marine casualties and incidents that happened from 2014 to 2019, the total number of ships involved was 21392. In line with the reduction of accidents in 2019, the number of ships involved has also diminished.

	2014	2015	2016	2017	2018	2019	Total
Nr ships involved	3611	3655	3595	3576	3605	3350	21392

Figure 2.5: Distribution of ships involved by main category

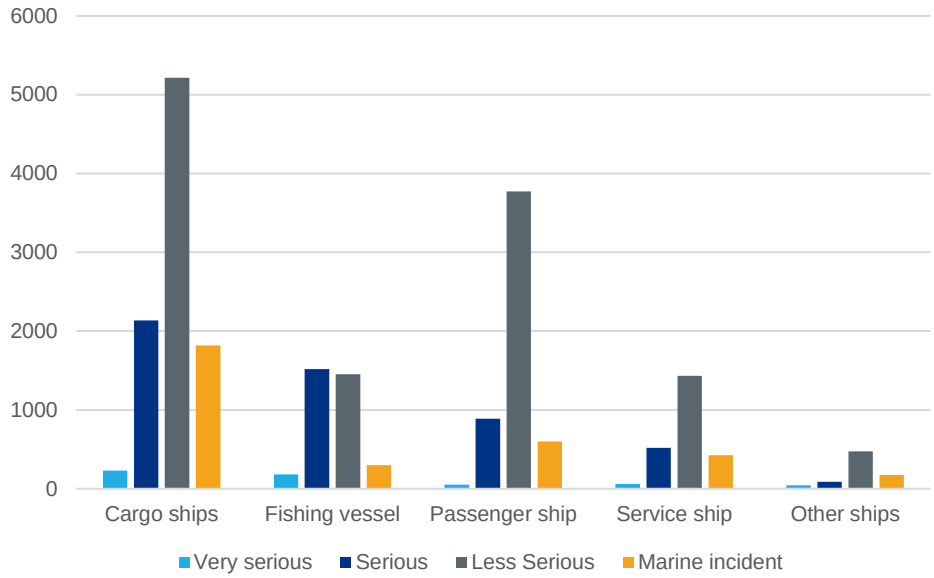




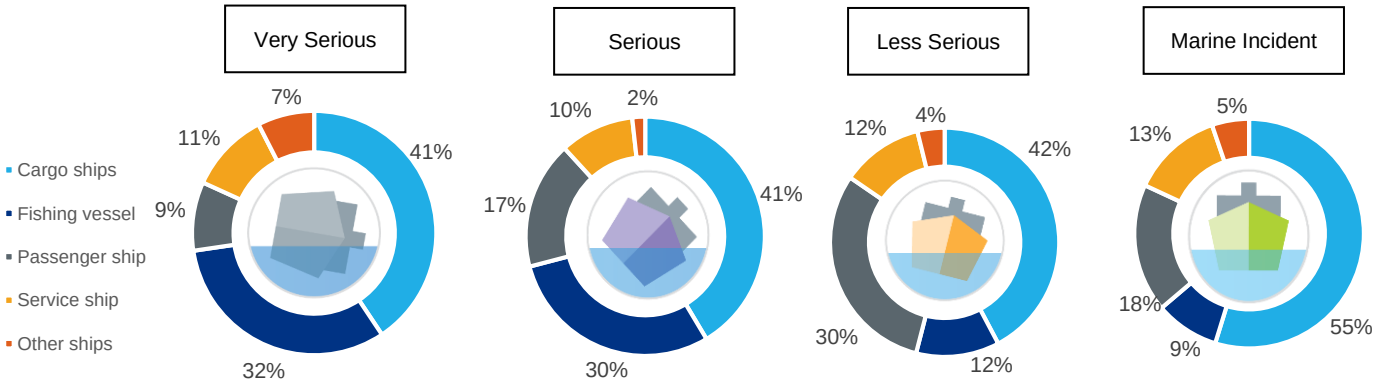
During the 2014-2019 period, general cargo ships were the main category involved in a marine casualty or incident, followed by passenger ships. In 2019, the number of ships involved in an occurrence decreased in all ship categories, except for the passenger ships, where an increase of 8% in comparison with 2018.

	2014	2015	2016	2017	2018	2019	Total
Cargo Ship	1515	1794	1577	1575	1560	1382	9403
Fishing vessel	572	461	580	625	600	617	3455
Passenger ship	867	854	917	880	864	933	5315
Service ship	487	433	397	394	408	320	2439
Other ship	170	113	124	102	173	98	780
Total	3611	3655	3595	3576	3605	3350	21392

Figure 2.6: Distribution of severity per ship type for 2014-2019



The distribution of the casualty severity per ship type is very similar for cargo ships, passenger ships and service ships. The rates of less serious casualties and marine incidents for fishing vessels are significantly low, in comparison to other ship categories, which highlights a greater under reporting in those categories.

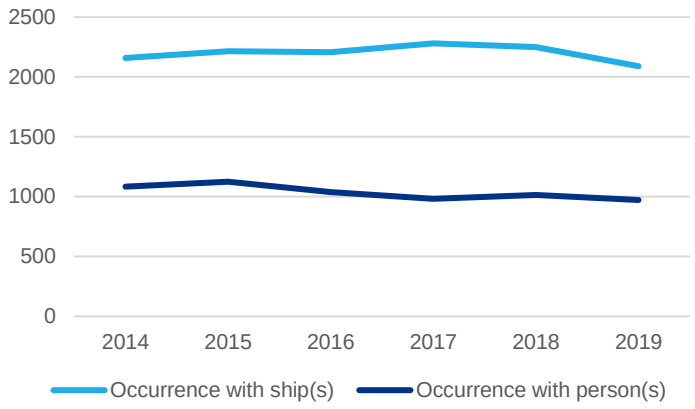


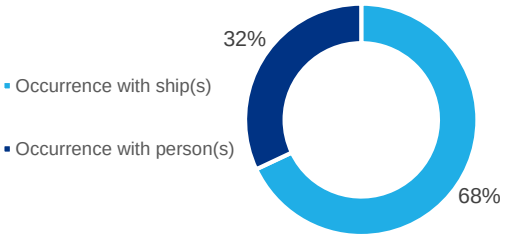
	Very serious	Serious	Less Serious	Marine incident	Total
Cargo ships	232	2136	5215	1820	9403
Fishing vessel	183	1520	1452	300	3455
Passenger ship	52	890	3771	602	5315
Service ship	61	519	1432	427	2439
Other ships	43	90	473	174	780
Total	571	5155	12343	3323	21392

2.3 Nature of marine casualties and incidents

This section examines the different nature of marine casualties and incidents (occurrence with ship(s) and occurrence with person(s)).

Figure 2.7: Marine casualties and incidents by nature type





A total of 13204 casualties or incidents with a ship and 6214 occurrences with person(s) were recorded from 2014 to 2019.

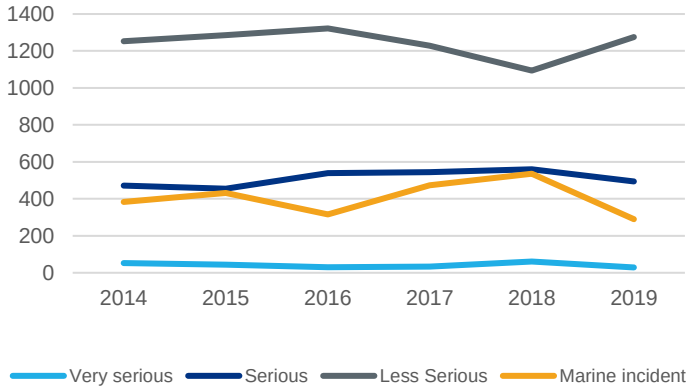
The ratio 2/3 to 1/3 between occurrences with ship(s) and occurrence with person(s) has remained stable since the EU legislation on Accident Investigation has been implemented in 2011.

	2014	2015	2016	2017	2018	2019	Total
Occurrence with ship(s)	2160	2216	2206	2281	2251	2090	13204
Occurrence with person(s)	1084	1125	1038	982	1013	972	6214
Total	3244	3341	3244	3263	3264	3062	19418

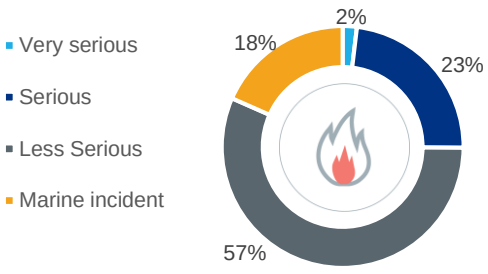
2.3.1 Occurrence with ship(s)

Marine casualties and incidents related to ‘occurrence with ship(s)’ are classified as ‘casualty events’.

Figure 2.8: Severity of occurrence with ship(s)occurrence with ship(s)



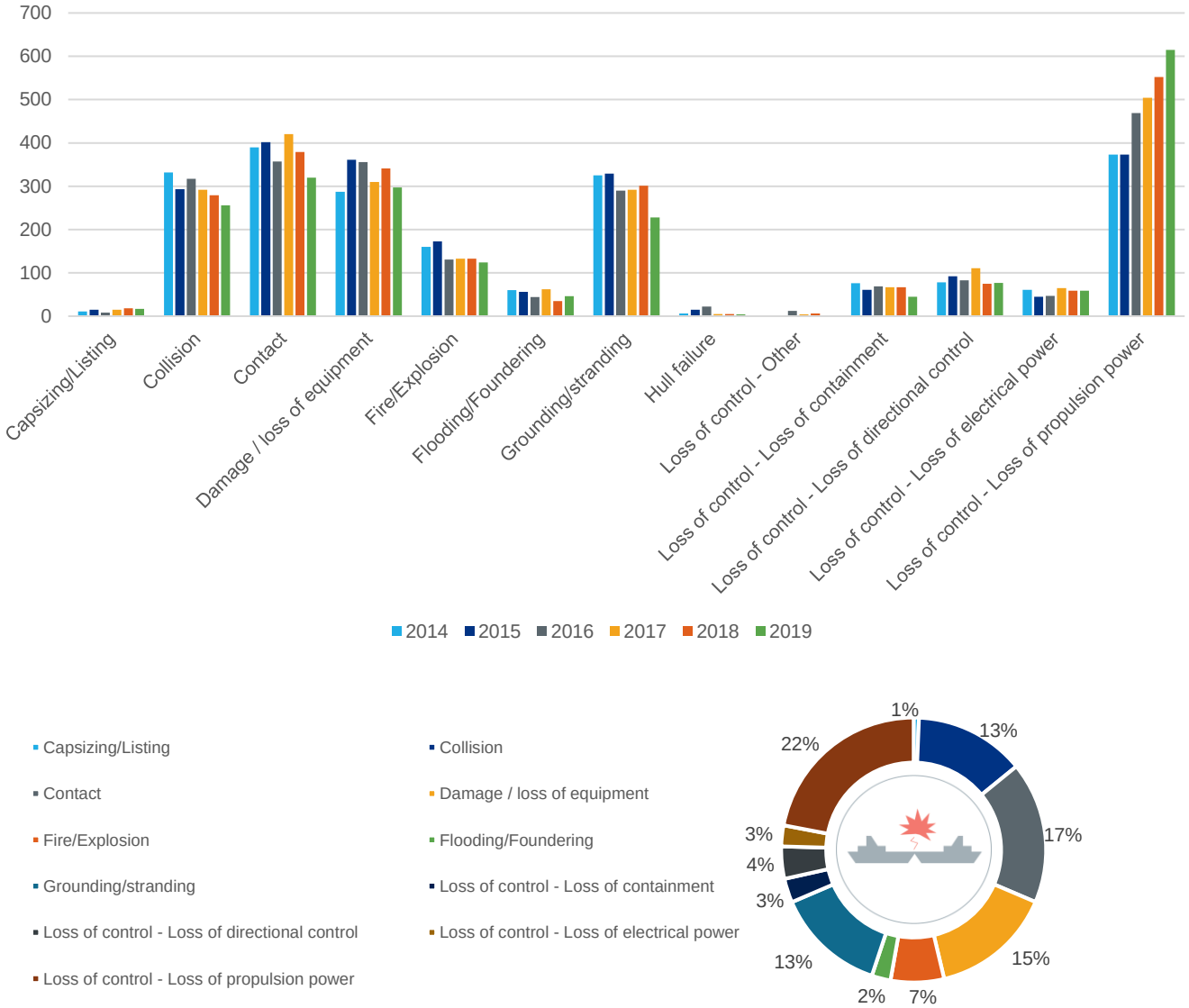
In 2019, a 50% reduction of very serious casualties with a ship was noted.



The repartition of severities in case of casualty with a ship is similar to the one when considering all occurrences. Only 2% of the occurrences with a ship were very serious.

	2014	2015	2016	2017	2018	2019	Total
Very serious	52	44	30	34	61	29	250
Serious	472	455	539	544	560	495	3065
Less Serious	1253	1285	1322	1229	1094	1276	7459
Marine incident	383	432	315	474	536	290	2430
Total	2160	2216	2206	2281	2251	2090	13204

Figure 2.9: Distribution of casualty events with a ship

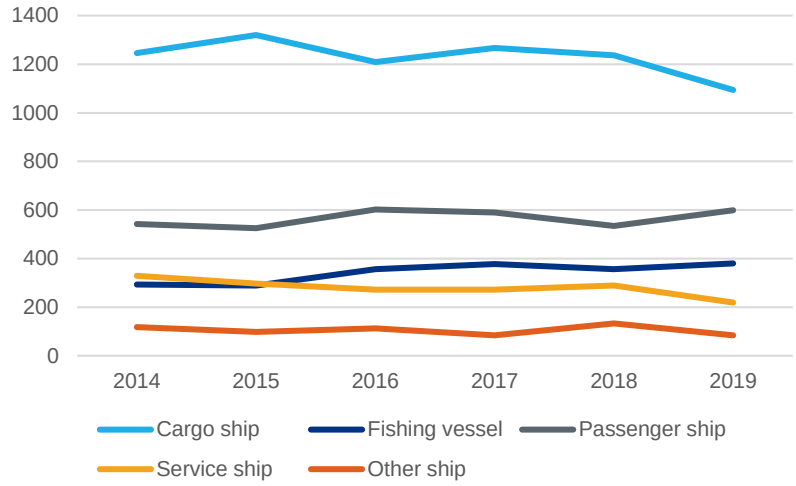


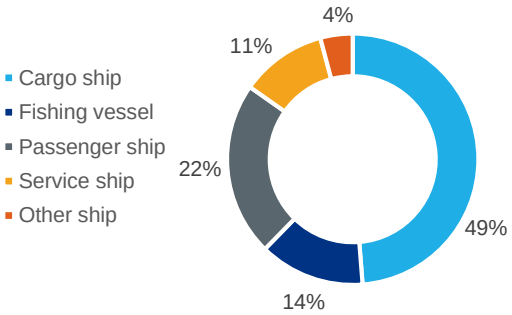
The main casualty event over 2014-2019 is "Loss of control – Loss of propulsion power". It is the only casualty event that increased continuously since 2014.

The navigational casualties, constituted by collision, contact and grounding/stranding, represent 44% of all casualty events.

	2014	2015	2016	2017	2018	2019	Total
Capsizing/Listing	11	15	8	15	18	17	84
Collision	332	293	317	292	279	256	1769
Contact	390	402	357	420	379	320	2268
Damage / loss of equipment	287	361	356	310	341	297	1952
Fire/Explosion	160	173	131	133	133	124	854
Flooding/Foundering	60	56	44	62	35	46	303
Grounding/stranding	325	329	290	292	301	228	1765
Hull failure	6	15	22	5	5	4	57
Loss of control - Other	1	1	12	4	6	0	24
Loss of control - Loss of containment	76	61	69	67	67	45	385
Loss of control - Loss of directional control	78	92	83	111	75	77	516
Loss of control - Loss of electrical power	61	45	47	65	59	59	336
Loss of control - Loss of propulsion power	373	373	469	504	552	615	2886
Missing	0	0	1	1	1	2	5
Total	2160	2216	2206	2281	2251	2090	13204

Figure 2.10: Distribution of ships involved in a ‘occurrence with ship(s)’ by ship category





During the 2014-2019 period, cargo ship was the most frequent ship type involved in an occurrence with ship(s), followed by passenger ship.

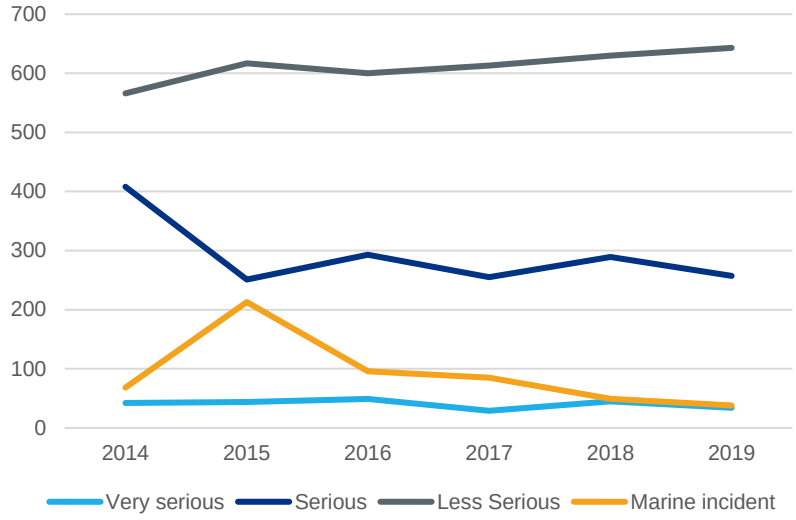
15214 ships were involved in a ‘occurrence with ship(s)occurrence with ship(s)’.

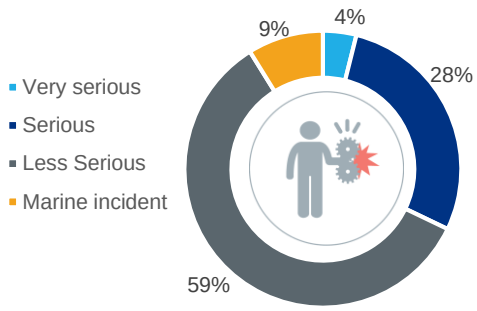
	2014	2015	2016	2017	2018	2019	Total
Cargo ship	1246	1320	1209	1267	1236	1094	7372
Fishing vessel	293	289	357	377	357	380	2053
Passenger ship	542	525	602	590	534	599	3392
Service ship	329	297	272	272	289	219	1678
Other ship	118	98	112	84	133	84	629
Total	2528	2529	2552	2590	2549	2376	15124

2.3.2 Occurrence with person(s)

Marine casualties and incidents related to 'occurrence with person(s)occurrence with person(s)' are classified as 'deviations'.

Figure 2.11: Type of severity in the case of an occurrence with person(s) accident

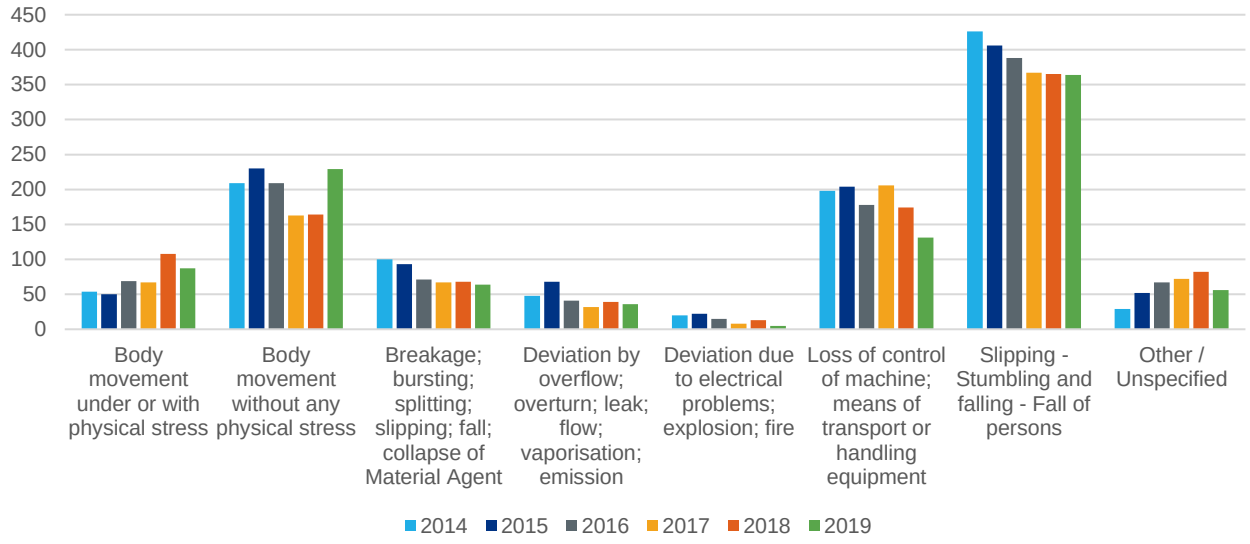


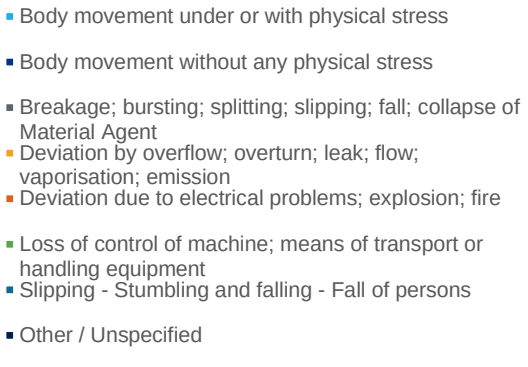


From 2014 to 2019, 4% of the occurrence with person(s) were very serious. An increase of less serious occurrences was noted, while all other categories have decreased.

Figure 2.12: Distribution of deviations

	2014	2015	2016	2017	2018	2019	Total
Very serious	42	44	49	29	45	34	243
Serious	408	251	293	255	289	257	1753
Less Serious	566	617	600	613	630	643	3669
Marine incident	68	213	96	85	49	38	549
Total	1084	1125	1038	982	1013	972	6214

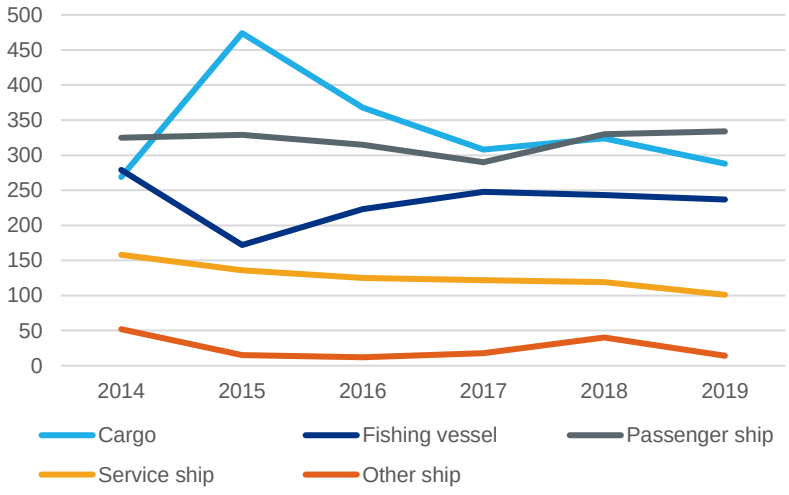


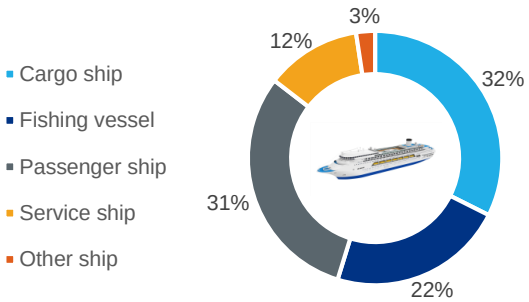


Slipping - Stumbling and falling of persons was the most frequent event, followed by body movement without physical stress and loss of control of machine. Falling of persons overboard represents 10 % of all falls.

	2014	2015	2016	2017	2018	2019	Total
Body movement under or with physical stress	54	50	69	67	108	87	435
Body movement without any physical stress	209	230	209	163	164	229	1204
Breakage; bursting; splitting; slipping; fall; collapse of Material Agent	100	93	71	67	68	64	463
Deviation by overflow; overturn; leak; flow; vaporisation; emission	48	68	41	32	39	36	264
Deviation due to electrical problems; explosion; fire	20	22	15	8	13	5	83
Loss of control of machine; means of transport or handling equipment	198	204	178	206	174	131	1091
Slipping - Stumbling and falling - Fall of persons	426	406	388	367	365	364	2316
Other / Unspecified	29	52	67	72	82	56	358
Total	1084	1125	1038	982	1013	972	6214

Figure 2.13: Distribution of ships involved in an occurrence with person(s) by ship category





Apart from on-board passenger ships where a small increase was noted, occurrence with person(s) on all other ship types reduced.

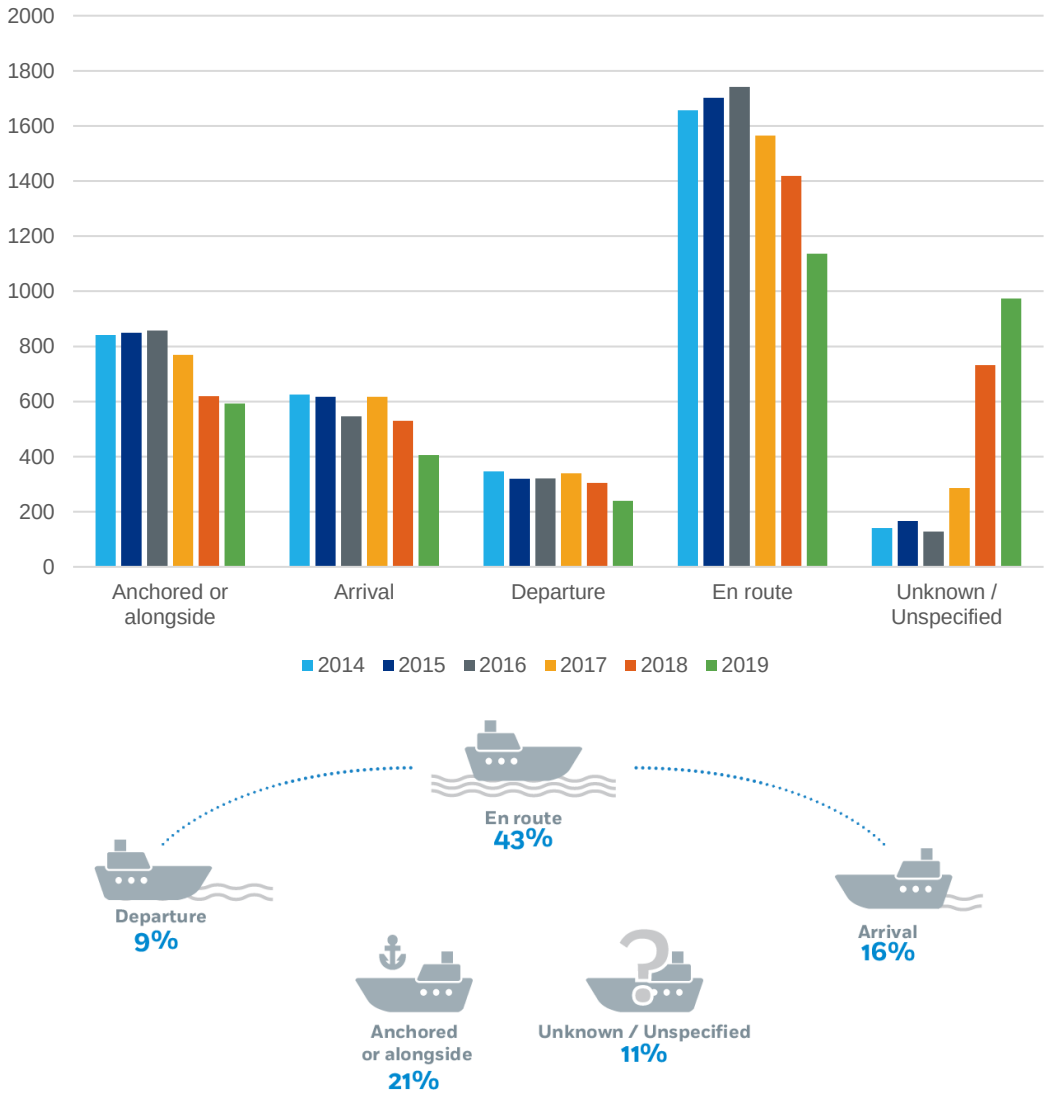
In 2019, the number of occurrences with person(s) has decreased and reached its lowest level since 2014.

	2014	2015	2016	2017	2018	2019	Total
Cargo	269	474	368	308	324	288	2031
Fishing vessel	279	172	223	248	243	237	1402
Passenger ship	325	329	315	290	330	334	1923
Service ship	158	136	125	122	119	101	761
Other ship	52	15	12	18	40	14	151
Total	1083	1126	1043	986	1056	974	6268

2.4 Location of marine casualties and incidents

2.4.1 Voyage segments

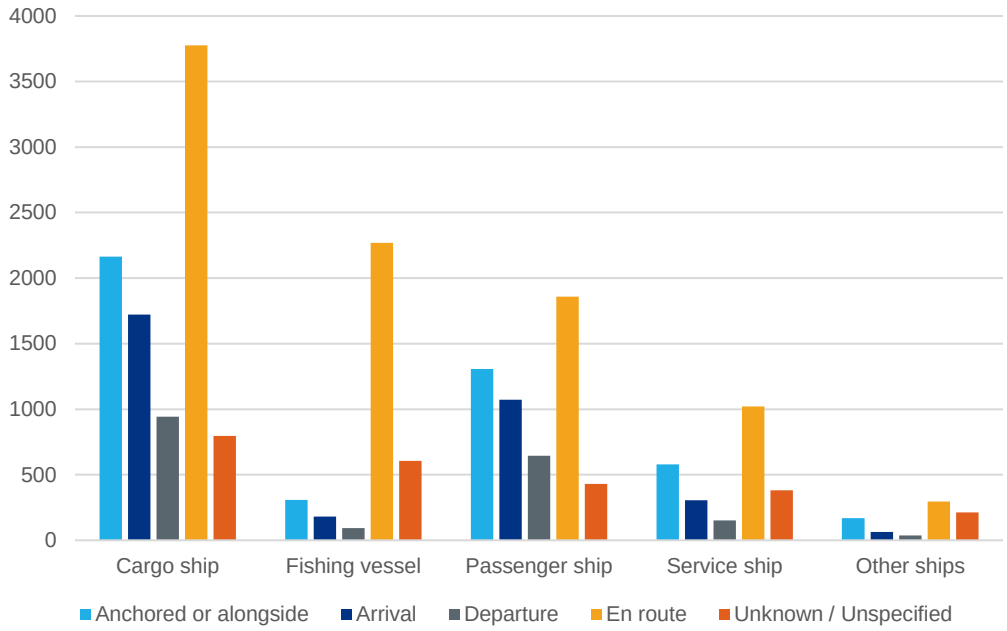
Figure 2.14: Distribution of voyage segments



While the departure is the safest segment for all types of ship, the "en route" phase is the least safe in general (43%). The high rate of occurrences during the arrival segment is also remarkable, in comparison with the departure one.

	2014	2015	2016	2017	2018	2019	Total
Anchored or alongside	841	850	858	769	619	593	4530
Arrival	625	617	546	617	530	406	3341
Departure	347	320	321	339	305	240	1872
En route	1657	1702	1742	1565	1419	1137	9222
Unknown / Unspecified	141	166	128	286	732	974	2427
Total	3611	3655	3595	3576	3605	3350	21392

Figure 2.15: Distribution of voyage segments per ship type 2014-2019

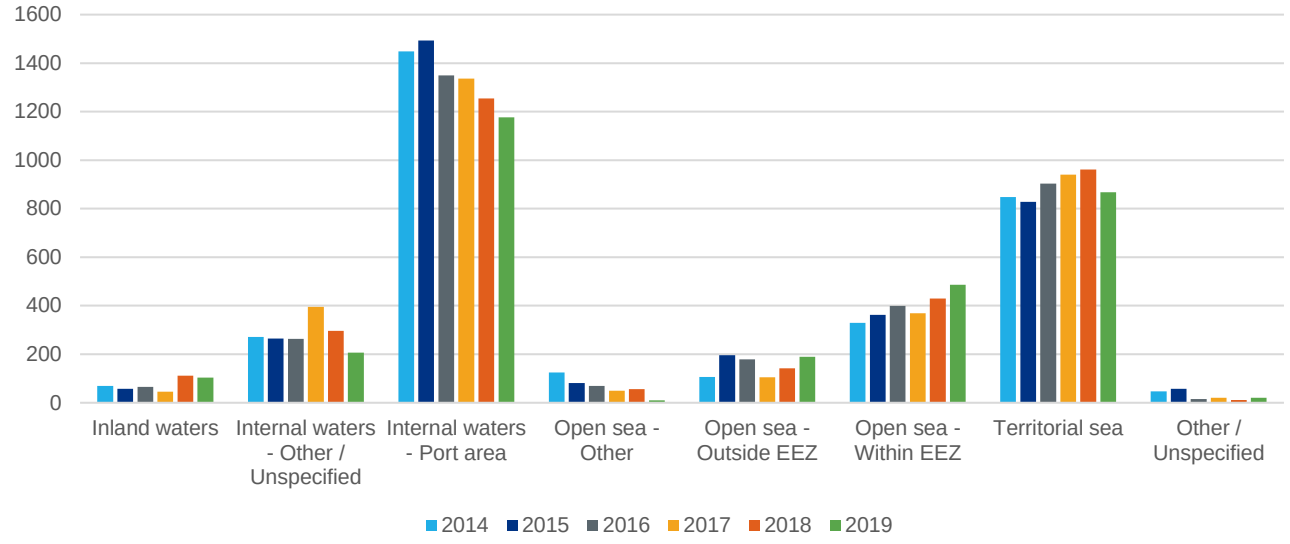


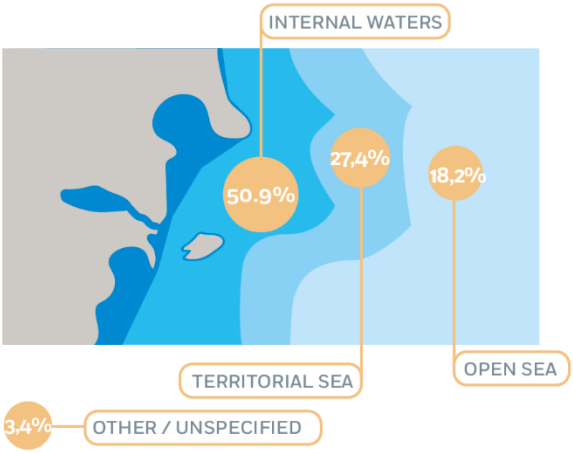
The most unsafe area for fishing vessels is by far the "en route", where fishing operations take place. For all ship types, the departure segment is the safest one.

	Anchored or alongside	Arrival	Departure	En route	Unknown / Unspecified	Total
Cargo ship	2165	1721	944	3777	796	9403
Fishing vessel	309	180	92	2268	606	3455
Passenger ship	1307	1072	646	1860	430	5315
Service ship	579	305	152	1022	381	2439
Other ships	170	63	38	295	214	780
Total	4530	3341	1872	9222	2427	21392

2.4.2 Location of occurrences

Figure 2.16: Distribution by location of marine casualties and incidents



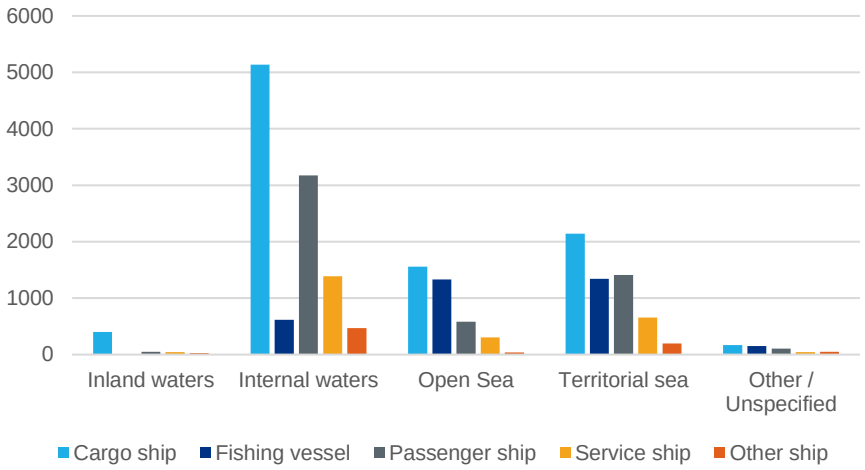


Internal waters are the location where more than half of the casualties take place. The sub-category port area represented 41.5% of all accidents.

However, a reduction of accidents in port areas was noted since 2015. In the same time, an increase of casualties in open seas was recorded.

	2014	2015	2016	2017	2018	2019	Total
Inland waters	69	58	66	46	112	104	455
Internal waters - Other / Unspecified	271	265	264	396	297	207	1700
Internal waters - Port area	1448	1493	1349	1336	1254	1176	8056
Open sea - Other	125	81	69	50	56	10	391
Open sea - Outside EEZ	107	196	179	105	142	190	919
Open sea - Within EEZ	329	362	399	369	429	486	2374
Territorial sea	848	828	903	940	962	868	5349
Other / Unspecified	47	58	15	21	12	21	174
Grand Total	3244	3341	3244	3263	3264	3062	19418

Figure 2.17: Location of marine casualties and incidents per ship type for 2014-2019



	Inland waters	Internal waters	Open Sea	Territorial sea	Other / Unspecified	Total
Cargo ship	403	5135	1555	2142	168	9403
Fishing vessel	8	619	1332	1343	153	3455
Passenger ship	47	3173	581	1409	105	5315
Service ship	45	1385	306	657	46	2439
Other ship	27	471	38	194	50	780
Grand Total	530	10783	3812	5745	522	21392

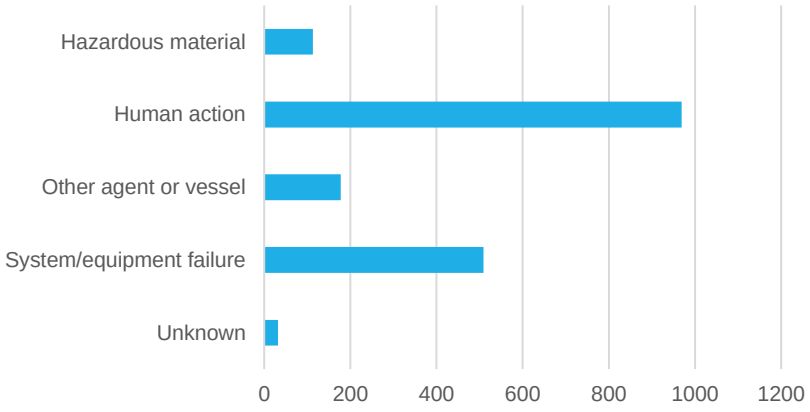
Except fishing vessels, all types of ships have the highest numbers of casualties and incidents within internal waters. The main sea areas for fishing vessels were equally shared between internal waters 38.6% and open sea 38.8%.

18/04/2019, Collision in port between bulk carriers "Gulnak" and "Cape Mathilde"

2.5 Accident events and Contributing factors

Investigators look for the root causes of the casualty or incident. Such causes are made up of 'accident events' (underlying factors) and 'contributing factors'. The reporting scheme used in EMCIP follows this approach. A detailed model of EMCIP can be found in Appendix 2. More than one accident events can be associated to a casualty event.

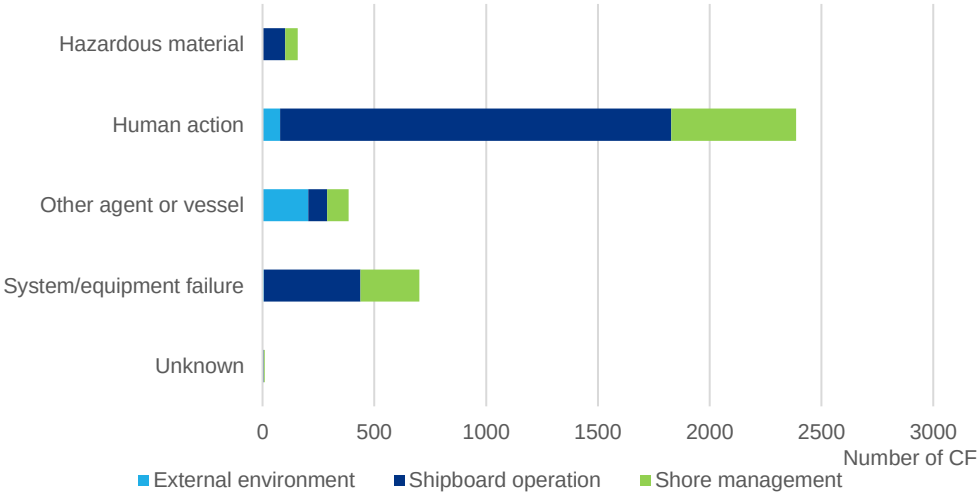
Figure 2.18: Distribution of accident events for the period 2014-2019



Accident events types	Number of accident events
Hazardous material	113
Human action	969
Other agent or vessel	178
System/equipment failure	509
Unknown	32
Total accident events	1801

From a total of 1801 accident events analysed during the investigations, 54% were attributed to 'human action' category and 28% to 'system/equipment failures'.

Figure 2.21: Relationship between accident events and the contributing factors for 2014-2019



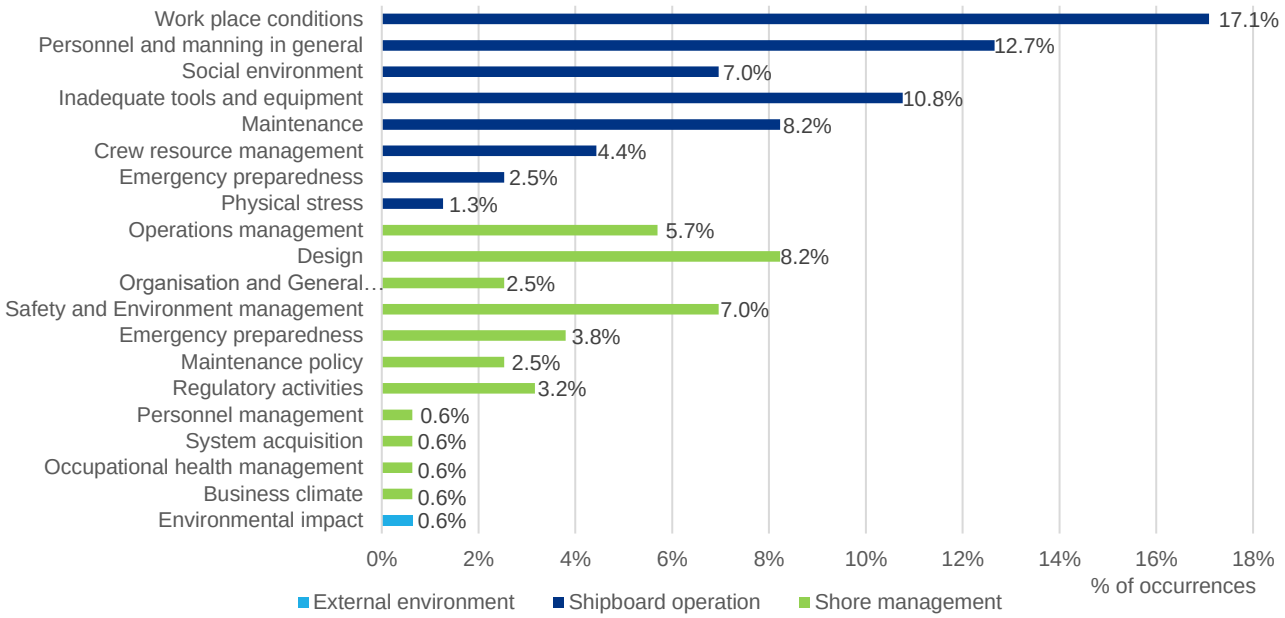
3640 contributing factors were associated to 1801 accident events. The medium value of contributing factors per accident event is 2.29 when a cargo ship is involved.

The shipboard operation is the contributing factor the most frequently associated to accident events (65.2%).

General				
Accident events types	**Number of contributing factors**	**Contributing factors categories involved in each accident events type**		
		External environment	**Shipboard operation**	**Shore management**
Hazardous material	158	1	101	56
Human action	2386	79	1749	558
Other agent or vessel	385	204	85	96
System/equipment failure	701	6	432	263
Unknown	10	0	5	5
Total	3640	290	2372	978

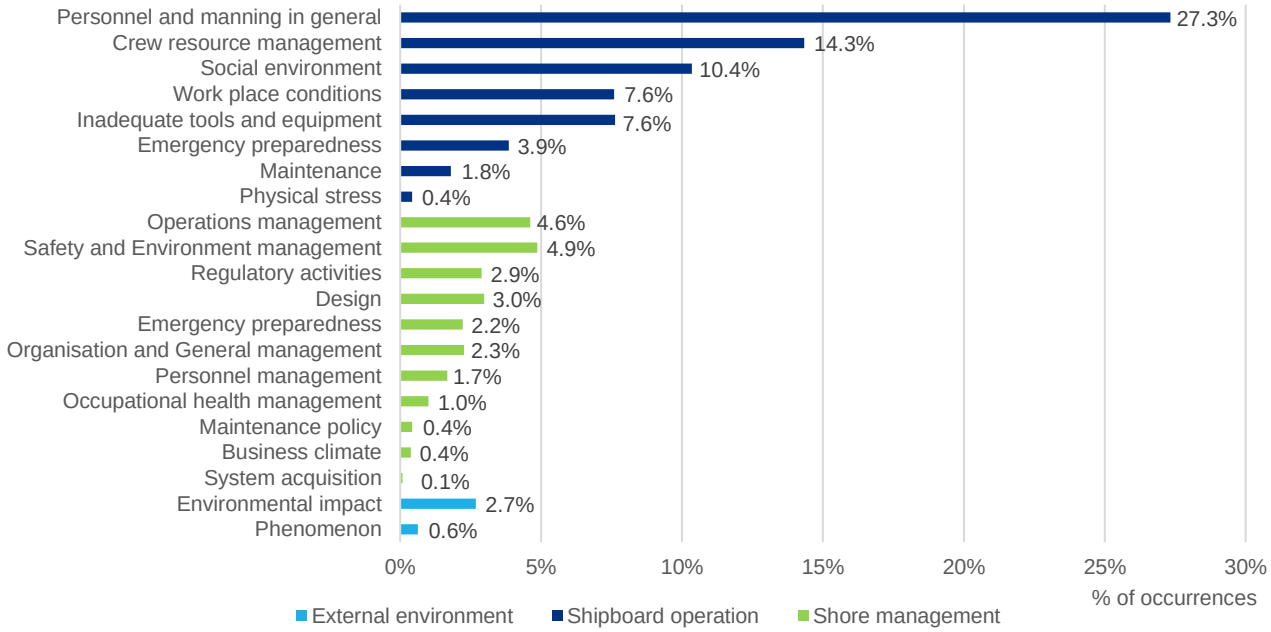
Each main category of contributing factors is divided in second level categories. Second level contributing factors for each accident event type are grouped for main contributing factors categories in the following charts and tables.

Figure 2.19: Contributing factors involved in "Hazardous Material" accident events, distributed by categories



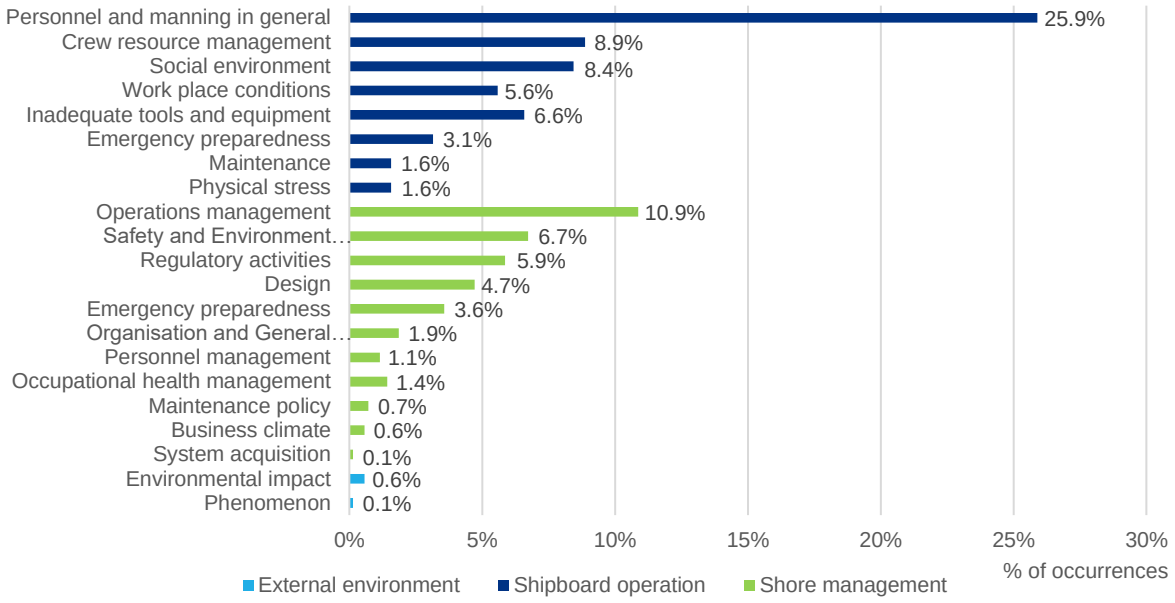
In the area of Hazardous Material, 'workplace conditions' and 'personnel and manning in general' are the main contributing factors related to shipboard operation. When it is linked to shore management, 'design' and 'safety and environment management' are the most reported.

Figure 2.20: Contributing factors involved in "Human Action" accident events, distributed by categories



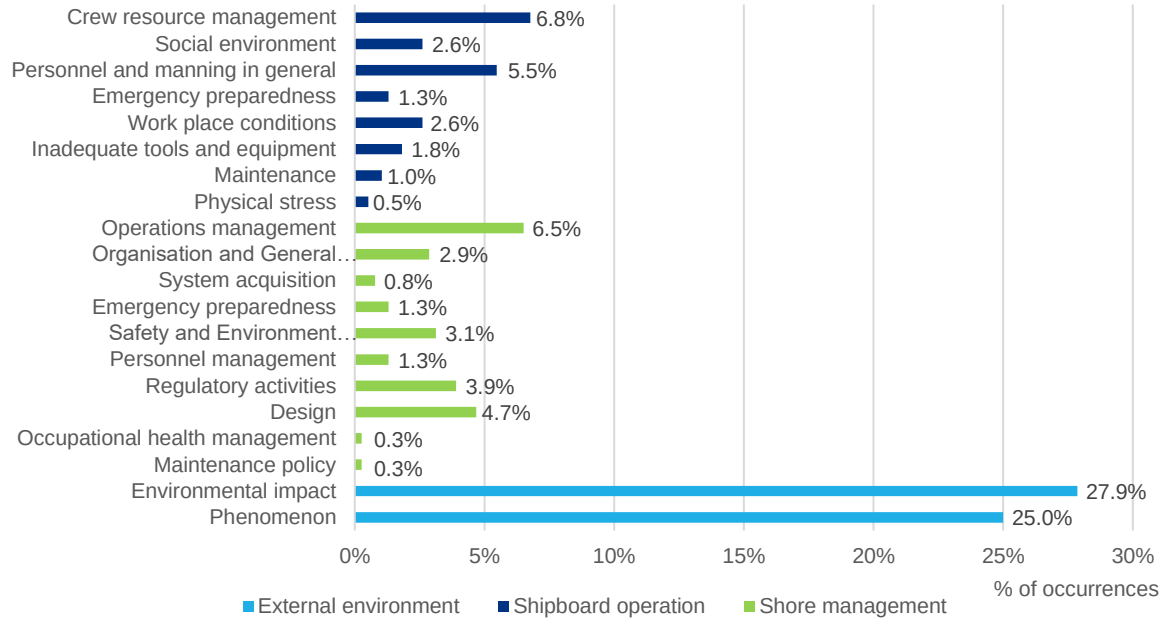
In the category 'Human Action', 'personnel and manning and general' is by far the main contributing factor associated to shipboard operation.

Figure 2.21: Contributing factors involved in "System / Equipment Failure" accident events, distributed by categories



With regards 'System / Equipment Failure', 'personnel and manning in general' is again the most reported factor' when it related to shipboard operation. 'Operations management' is the main factor when linked with shore management.

Figure 2.22: Contributing factors involved in "Other Agent or Vessel" accident events, distributed by categories



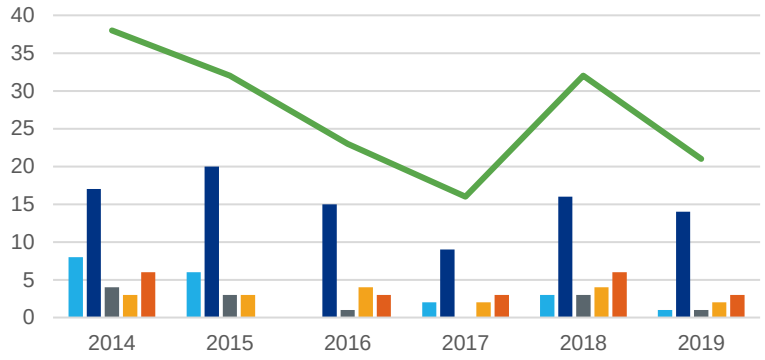
'External environment' is the most important contributing factor in the 'other agent or vessel' events analysed. 'Environmental impact' and 'Phenomenon' are almost equally reported.
The factors in categories 'shipboard operation' and 'shore management' were fairly distributed within each category.

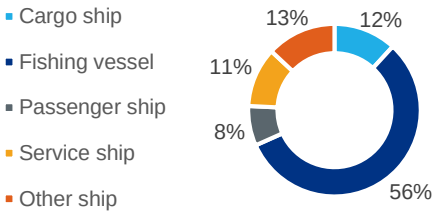
2.6 Consequences

This section contains information about the consequences of casualties to ships, persons and the environment.

2.6.1 Consequences to ship

Figure 2.23: Number of ships lost



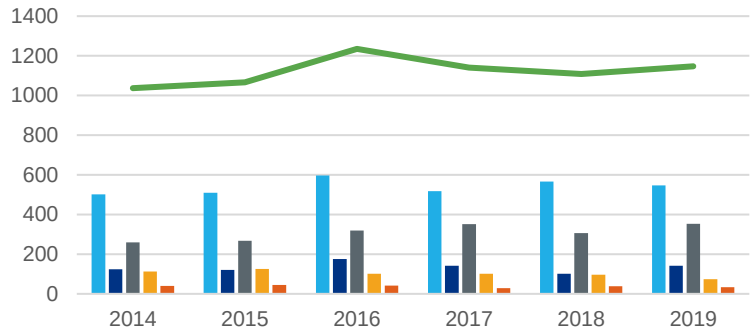


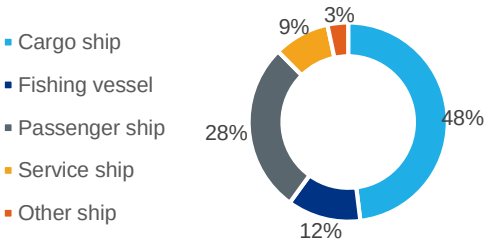
A total of 162 ships were lost over the 2014-2019 period.

The number of ships lost doubled in 2018 when compared with 2017. It reduced again in 2019 with 21 ships lost, but remained higher than in 2017, meaning the downward trend is not yet restored.

	2014	2015	2016	2017	2018	2019	Total
Cargo ship	8	6	0	2	3	1	20
Fishing vessel	17	20	15	9	16	14	91
Passenger ship	4	3	1	0	3	1	12
Service ship	3	3	4	2	4	2	18
Other ship	6	0	3	3	6	3	21
Total	38	32	23	16	32	21	162

Figure 2.24: Number of ships damaged

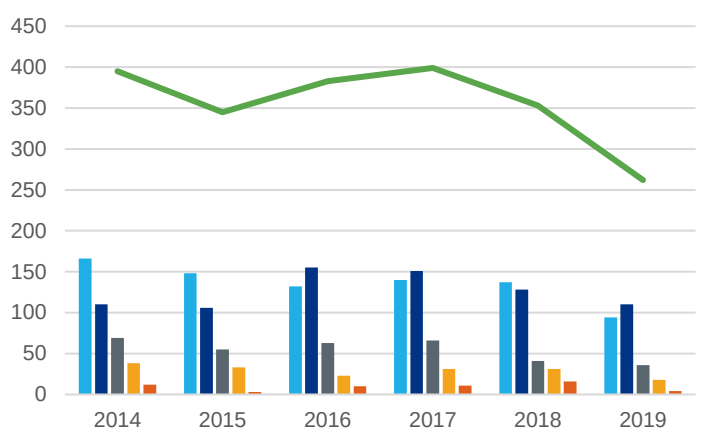


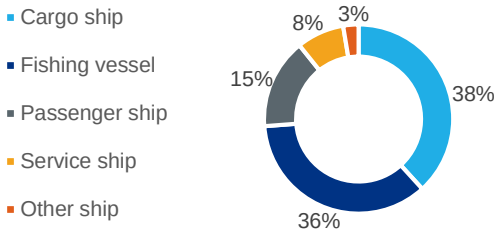


	2014	2015	2016	2017	2018	2019	Total
Cargo ship	501	509	597	517	566	546	3236
Fishing vessel	124	120	175	142	102	141	804
Passenger ship	260	267	319	352	306	353	1857
Service ship	112	126	102	102	96	74	612
Other ship	40	45	42	28	38	33	226
Total	1037	1067	1235	1141	1108	1147	6735

In the period 2014 to 2019, 6735 ships reported some damage, the largest category being cargo ships (48%).

Figure 2.25: Number of ships considered unfit to proceed



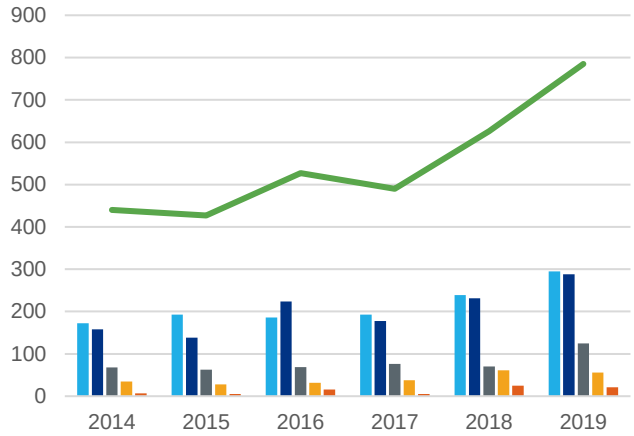


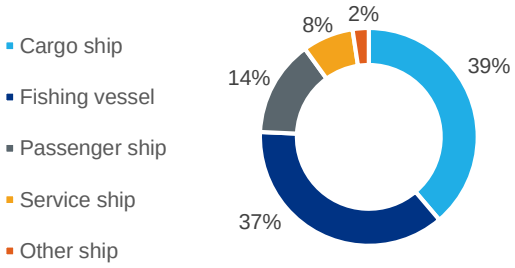
The number of ships unfit to proceed significantly decreased since 2017.

Fishing vessels and cargo ships were the categories more often affected.

	2014	2015	2016	2017	2018	2019	Total
Cargo ship	166	148	132	140	137	94	817
Fishing vessel	110	106	155	151	128	110	760
Passenger ship	69	55	63	66	41	36	330
Service ship	38	33	23	31	31	18	174
Other ship	12	3	10	11	16	4	56
Total	395	345	383	399	353	262	2137

Figure 2.26: Number of ships requiring shore assistance

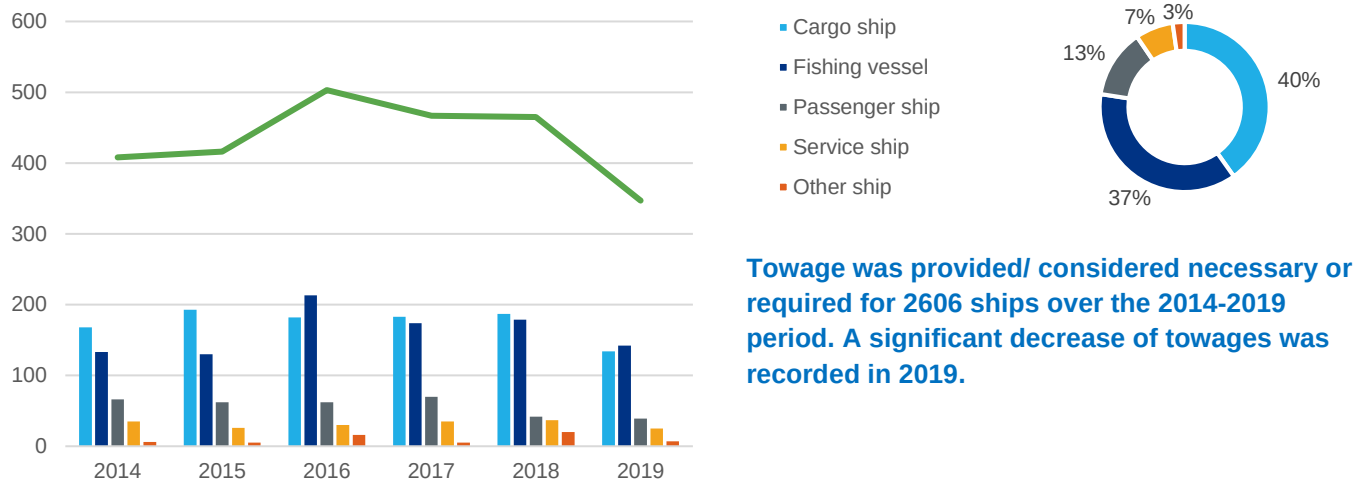




Shore assistance was provided/ considered necessary or required by 3295 ships over the 2014-2019 period. Cargo ships and fishing vessels were the two main categories involved. The number of assistances continued increasing since 2017.

	2014	2015	2016	2017	2018	2019	Total
Cargo ship	172	193	186	193	239	295	1278
Fishing vessel	158	138	224	178	231	288	1217
Passenger ship	68	63	69	76	70	125	471
Service ship	35	28	32	38	61	56	250
Other ship	7	5	16	5	25	21	79
Total	440	427	527	490	626	785	3295

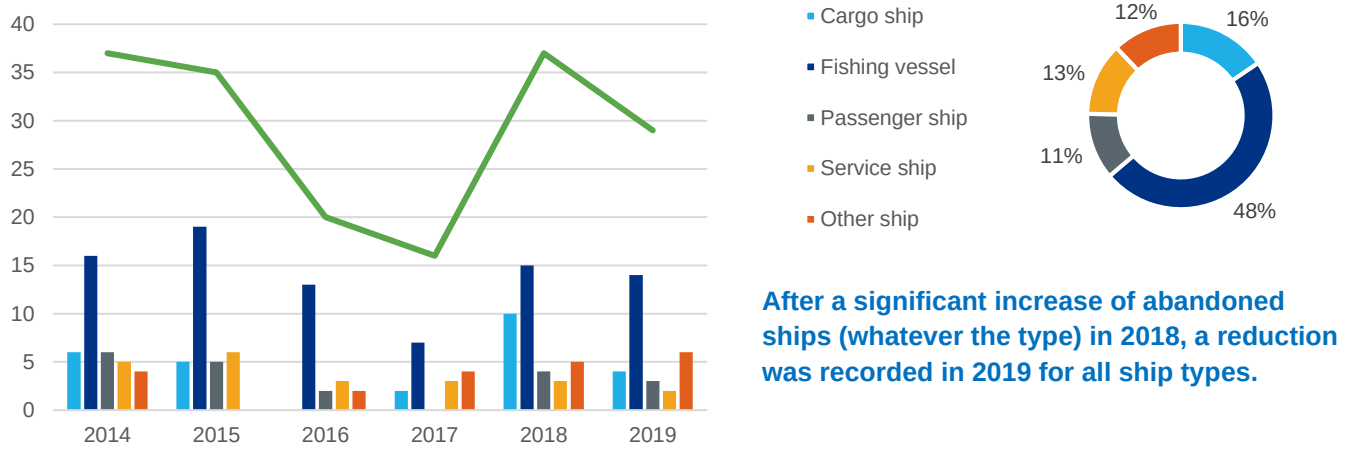
Figure 2.27: Number of ships requiring towage



Towage was provided/ considered necessary or required for 2606 ships over the 2014-2019 period. A significant decrease of towages was recorded in 2019.

	2014	2015	2016	2017	2018	2019	Total
Cargo ship	168	193	182	183	187	134	1047
Fishing vessel	133	130	213	174	179	142	971
Passenger ship	66	62	62	70	42	39	341
Service ship	35	26	30	35	37	25	188
Other ship	6	5	16	5	20	7	59
Total	408	416	503	467	465	347	2606

Figure 2.28: Number of abandoned ships



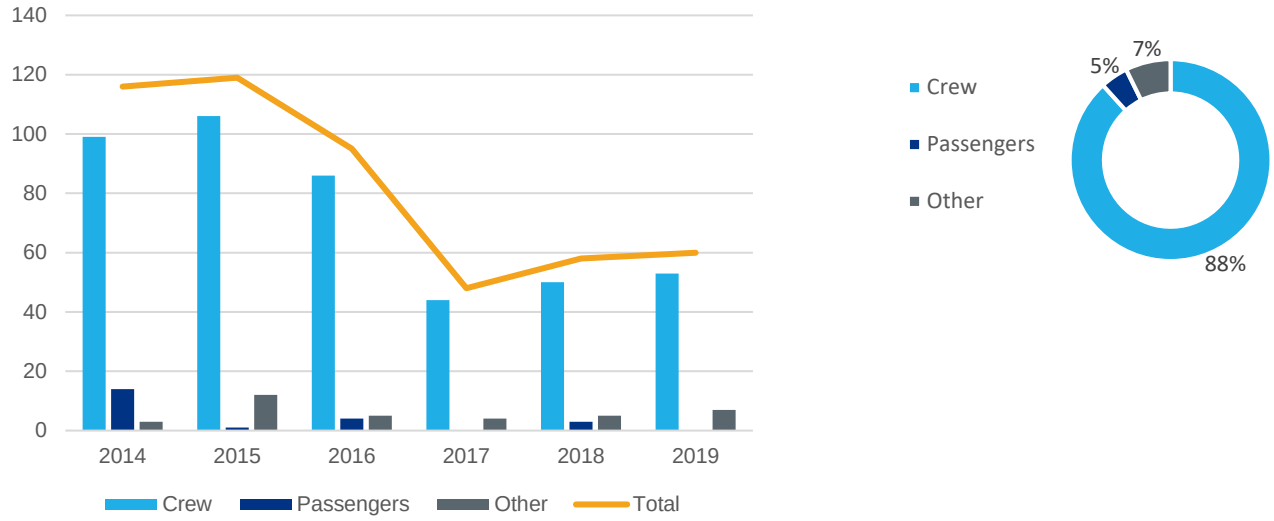
After a significant increase of abandoned ships (whatever the type) in 2018, a reduction was recorded in 2019 for all ship types.

	2014	2015	2016	2017	2018	2019	Total
Cargo ship	6	5	0	2	10	4	27
Fishing vessel	16	19	13	7	15	14	84
Passenger ship	6	5	2	0	4	3	20
Service ship	5	6	3	3	3	2	22
Other ship	4	0	2	4	5	6	21
Total	37	35	20	16	37	29	174

2.6.2 Consequences to persons

2.6.2.1 Fatalities

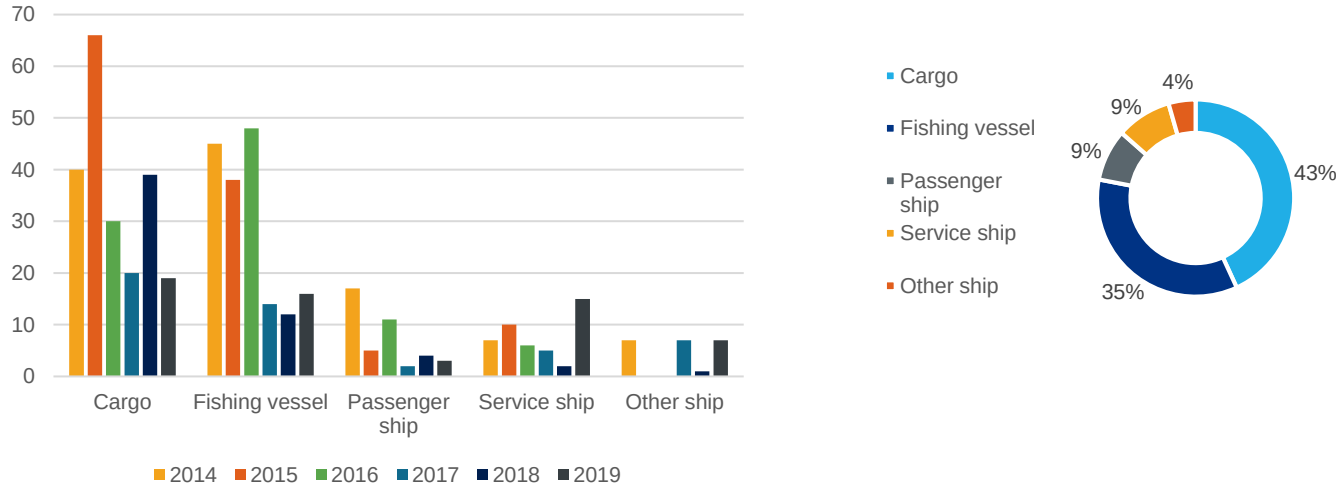
Figure 2.29: Distribution of fatalities by categories of person



	2014	2015	2016	2017	2018	2019	Total
Crew	99	106	86	44	50	53	438
Passengers	14	1	4	0	3	0	22
Other	3	12	5	4	5	7	36
Total	116	119	95	48	58	60	496

Despite a great reduction of fatalities between 2014 to 2017, the increase noted in 2018 continued in 2019. With 438 fatalities, crew is the most affected category of persons.

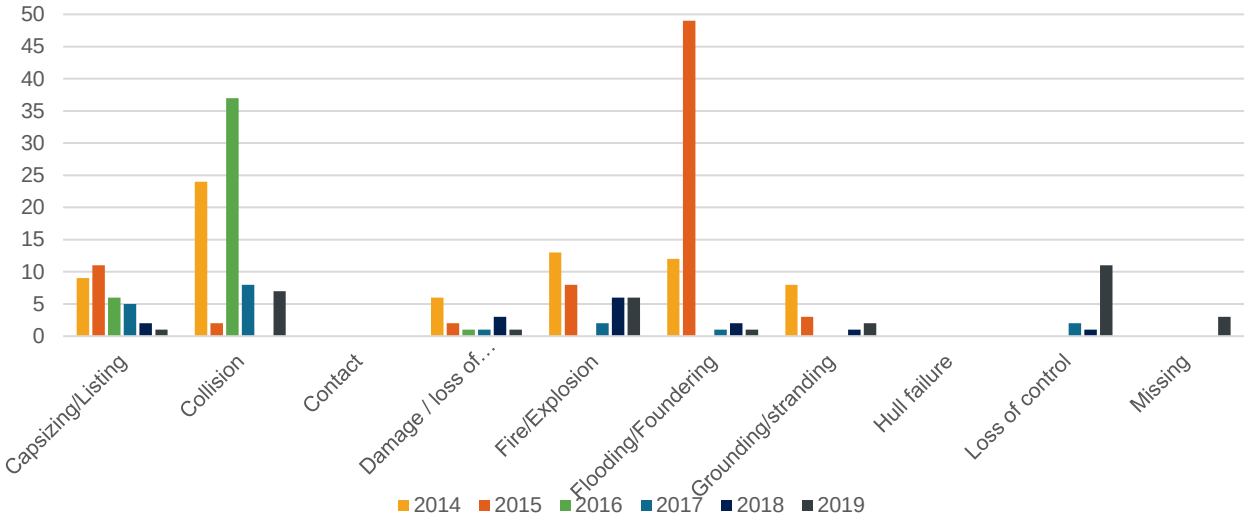
Figure 2.30: Distribution of fatalities by ship category

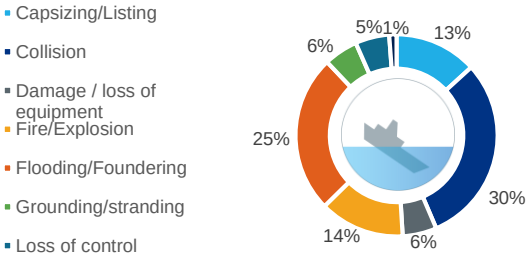


The evolution of fatalities per ship type has been irregular over 2014-2019 period. While it was stable for service ships until 2018, the year 2014 was the worst for fishing vessels and passenger ships. 2015 was the worst one for cargo ships.

	2014	2015	2016	2017	2018	2019	Total
Cargo	40	66	30	20	39	19	214
Fishing vessel	45	38	48	14	12	16	173
Passenger ship	17	5	11	2	4	3	42
Service ship	7	10	6	5	2	15	45
Other ship	7	0	0	7	1	7	22
Total	116	119	95	48	58	60	496

Figure 2.31: Distribution of fatalities by casualty events

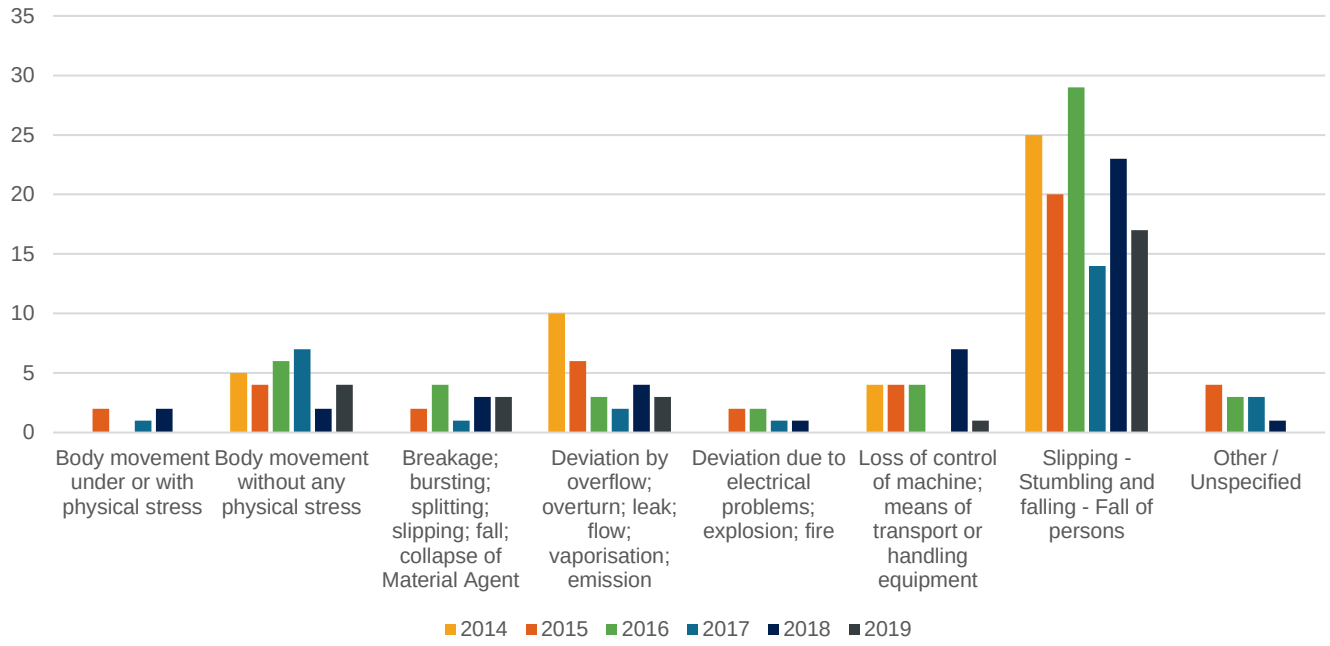


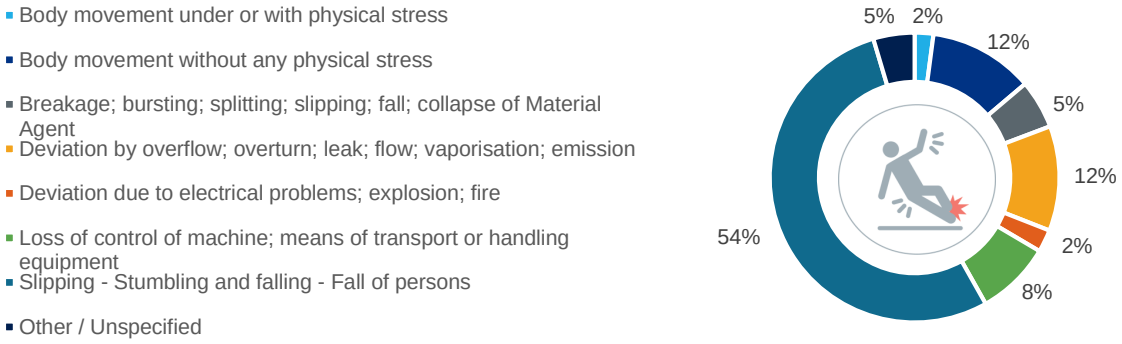


Fatalities mainly occurred during collisions and flooding/foundering, representing more than half of the casualty events (55%).

	2014	2015	2016	2017	2018	2019	Total
Capsizing/Listing	9	11	6	5	2	1	34
Collision	24	2	37	8	0	7	78
Contact	0	0	0	0	0	0	0
Damage / loss of equipment	6	2	1	1	3	1	14
Fire/Explosion	13	8	0	2	6	6	35
Flooding/Foundering	12	49	0	1	2	1	65
Grounding/stranding	8	3	0	0	1	2	14
Hull failure	0	0	0	0	0	0	0
Loss of control	0	0	0	2	1	11	14
Missing	0	0	0	0	0	3	3
Total	72	75	44	19	15	32	257

Figure 2.32: Distribution of fatalities by deviation[3]





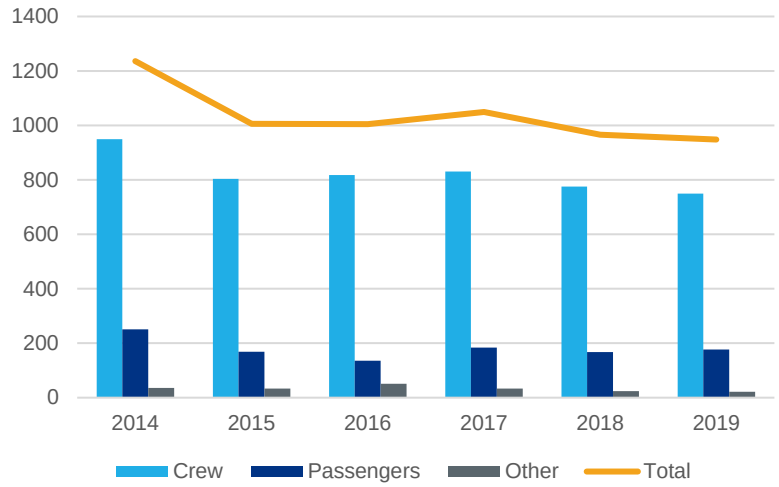
Slipping/falling of persons is by far the main deviation. It caused 174 fatalities. Among the falls, the subcategory "fall overboard" was responsible for 100 fatalities.

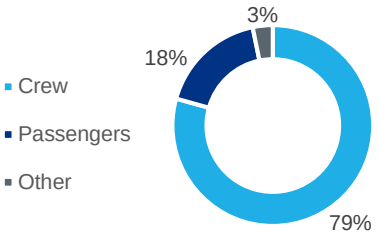
	2014	2015	2016	2017	2018	2019	Total
Body movement under or with physical stress	0	2	0	1	2	0	5
Body movement without any physical stress	5	4	6	7	2	4	28
Breakage; bursting; splitting; slipping; fall; collapse of Material Agent	0	2	4	1	3	3	13
Deviation by overflow; overturn; leak; flow; vaporisation; emission	10	6	3	2	4	3	28
Deviation due to electrical problems; explosion; fire	0	2	2	1	1	0	6
Loss of control of machine; means of transport or handling equipment	4	4	4	0	7	1	20
Slipping - Stumbling and falling - Fall of persons	25	20	29	14	23	17	128
Other / Unspecified	0	4	3	3	1	0	11
Total	44	44	51	29	43	28	239

[3] **Occurrence with person(s)** are grouped under ***deviations***, which consist in the description of the event deviating from normality leading to the accident to a person in a working environment.

2.6.2.2 Injuries

Figure 2.33: Distribution of injuries by category of person

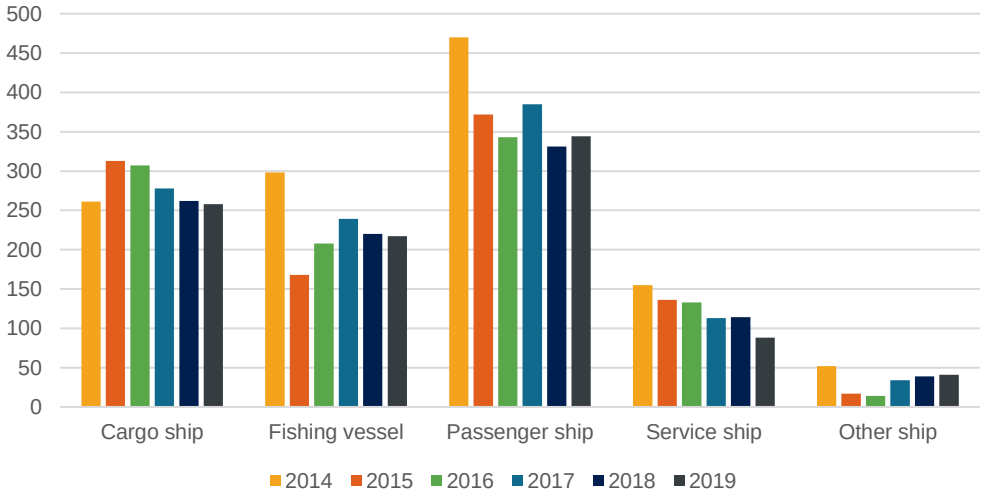


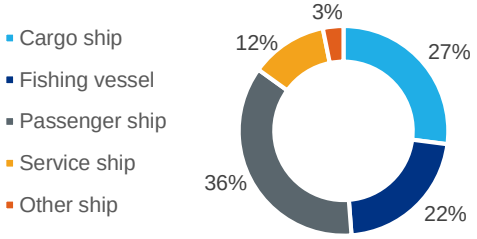


In 2019 the number of injuries continued decreasing. Crew represented the main category of persons injured at sea (79.3% of the total) during the 2014-2019 period.

	2014	2015	2016	2017	2018	2019	Total
Crew	949	804	818	831	775	749	4926
Passengers	251	169	136	184	167	177	1084
Other	36	33	51	34	24	22	200
Total	1236	1006	1005	1049	966	948	6210

Figure 2.34: Distribution of injured people by ship type



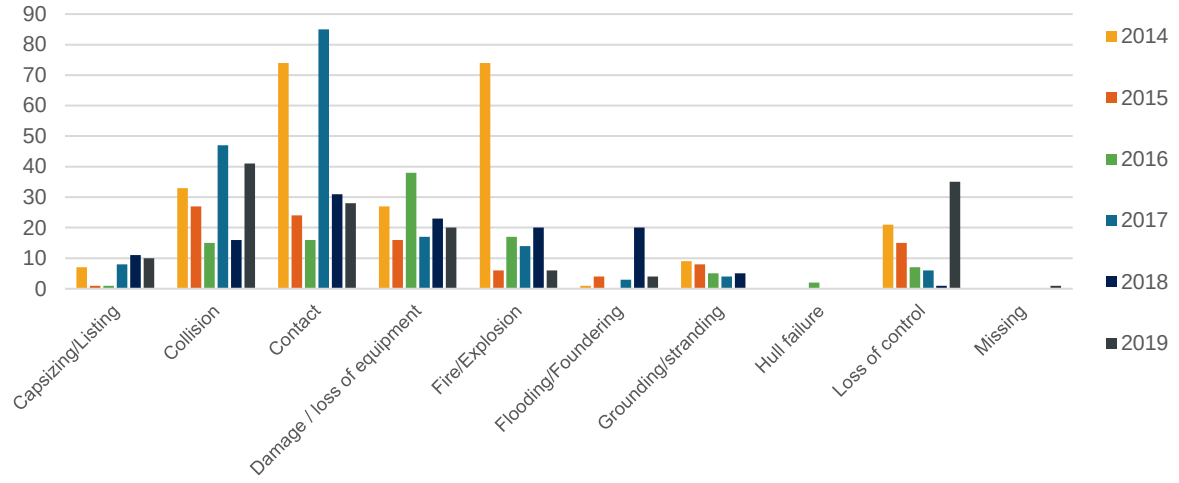


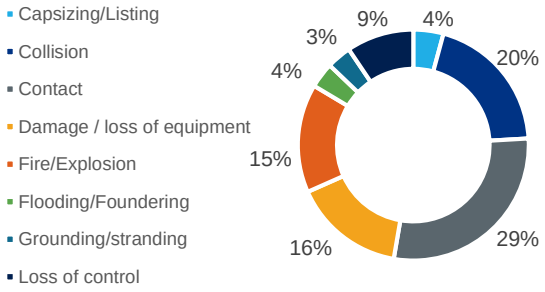
Injuries took foremost place on board passenger ships.

Apart this type of ship which recorded an increase of injuries, a limited decrease was noted for all other types of ship.

	2014	2015	2016	2017	2018	2019	Total
Cargo ship	261	313	307	278	262	258	1679
Fishing vessel	298	168	208	239	220	217	1350
Passenger ship	470	372	343	385	331	344	2245
Service ship	155	136	133	113	114	88	739
Other ship	52	17	14	34	39	41	197
Total	1236	1006	1005	1049	966	948	6210

Figure 2.35: Distribution of injuries by casualty event

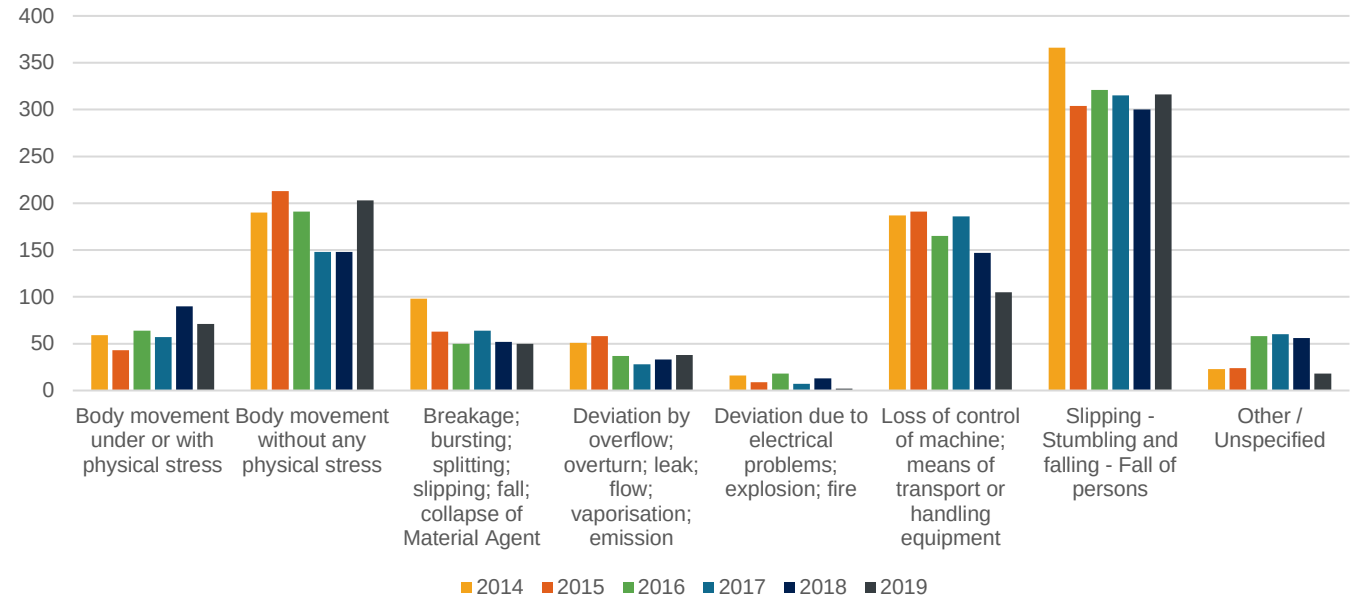


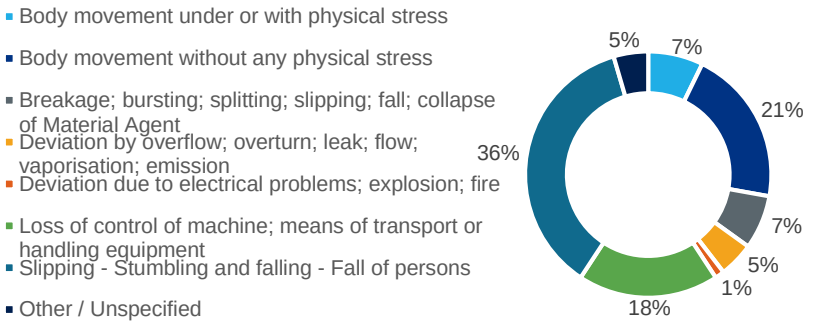


In the period 2014 to 2019, 51.7% of the injuries took place during navigational events (contact, collision and grounding/standing). Fire and damage of equipment also recorded significant value (15.5% each).

	2014	2015	2016	2017	2018	2019	Total
Capsizing/Listing	7	1	1	8	11	10	38
Collision	33	27	15	47	16	41	179
Contact	74	24	16	85	31	28	258
Damage / loss of equipment	27	16	38	17	23	20	141
Fire/Explosion	74	6	17	14	20	6	137
Flooding/Foundering	1	4	0	3	20	4	32
Grounding/stranding	9	8	5	4	5	0	31
Hull failure	0	0	2	0	0	0	2
Loss of control	21	15	7	6	1	35	85
Missing	0	0	0	0	0	1	1
Total	246	101	101	184	127	145	904

Figure 2.36: Distribution of injuries by deviation



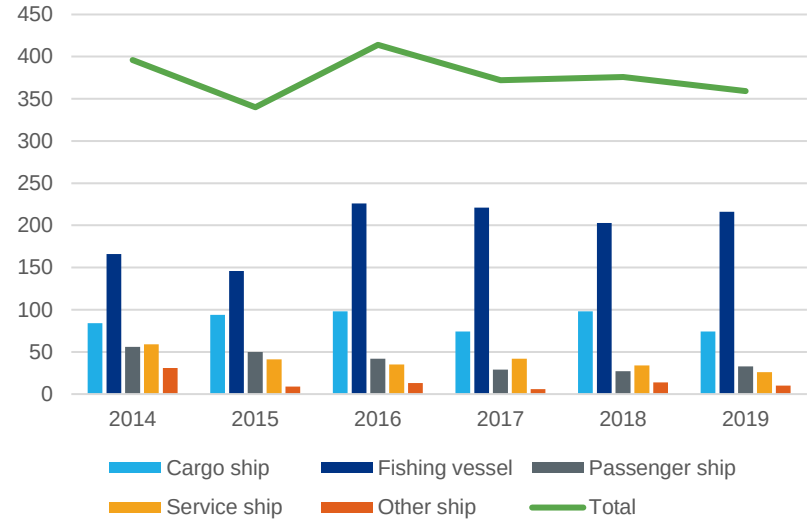


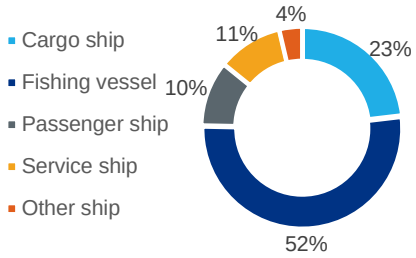
Most of the injuries 2468 (36.2%) occurred during slipping/falls of persons. Subcategories of fall at the same and to a lower level represent respectively 52% and 41.5% of that category.

	2014	2015	2016	2017	2018	2019	Total
Body movement under or with physical stress	59	43	64	57	90	71	384
Body movement without any physical stress	190	213	191	148	148	203	1093
Breakage; bursting; splitting; slipping; fall; collapse of Material Agent	98	63	50	64	52	50	377
Deviation by overflow; overturn; leak; flow; vaporisation; emission	51	58	37	28	33	38	245
Deviation due to electrical problems; explosion; fire	16	9	18	7	13	2	65
Loss of control of machine; means of transport or handling equipment	187	191	165	186	147	105	981
Slipping - Stumbling and falling - Fall of persons	366	304	321	315	300	316	1922
Other / Unspecified	23	24	58	60	56	18	239
Total	990	905	904	865	839	803	5306

2.6.3 Other consequences

Figure 2.37: Distribution of Search and Rescue (SAR) operations by ship type



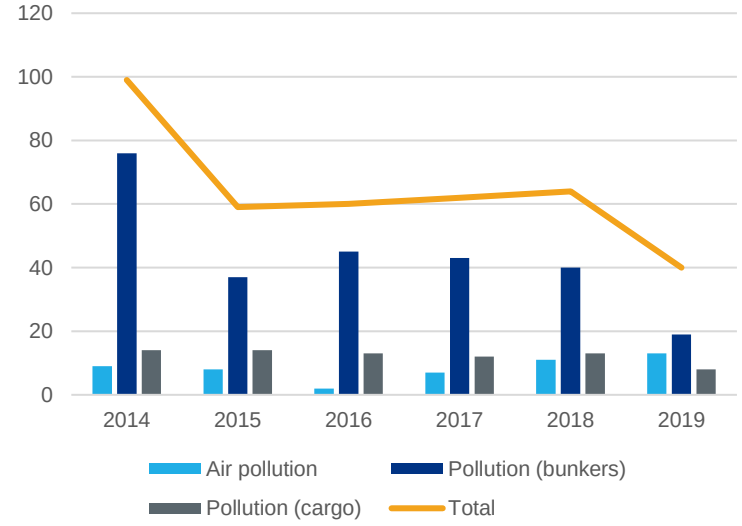


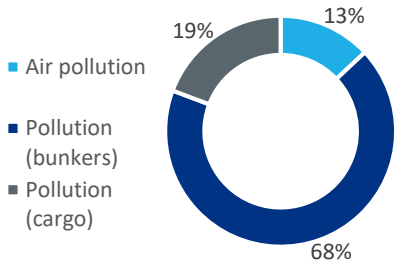
A slight decrease of SAR operations was noted in 2019. Half of the SAR operations concerned fishing vessels.

71% of the SAR operations related to ship casualties and 29% to occurrence with person(s).

	2014	2015	2016	2017	2018	2019	Total
Cargo ship	84	94	98	74	98	74	522
Fishing vessel	166	146	226	221	203	216	1178
Passenger ship	56	50	42	29	27	33	237
Service ship	59	41	35	42	34	26	237
Other ship	31	9	13	6	14	10	83
Total	396	340	414	372	376	359	2257

Figure 2.38: Types of pollution



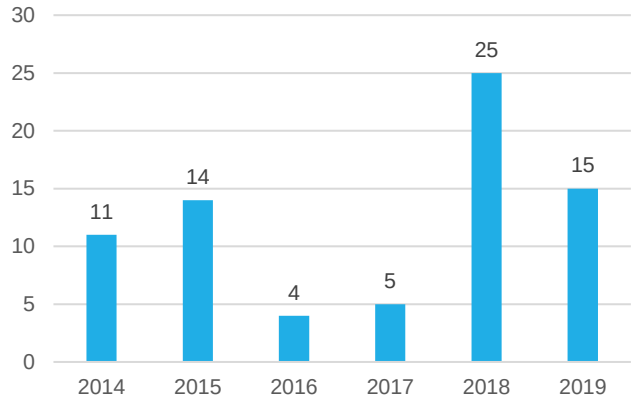


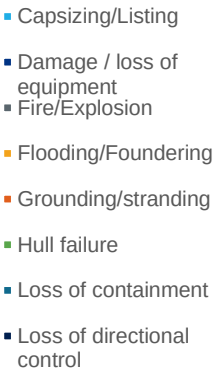
In the period of 2014-2019, 384 cases of pollution were reported. Marine pollution by the release of ship's bunkers (fuel) and other pollutants (e.g. cargo residues, lubricating or hydraulic oils) corresponded to 87% of all pollutions. A significant decrease in the reported number of pollutions was noted in 2019.

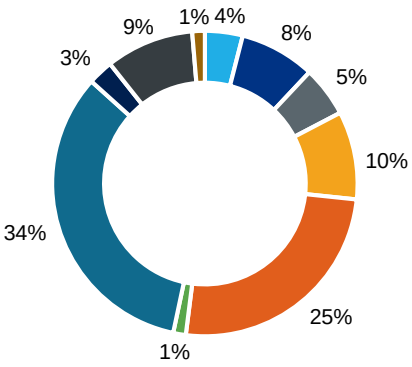
	2014	2015	2016	2017	2018	2019	Total
Air pollution	9	8	2	7	11	13	50
Pollution (bunkers)	76	37	45	43	40	19	260
Pollution (cargo)	14	14	13	12	13	8	74
Total	99	59	60	62	64	40	384

MSC Zoe, loss of cargo, 02/01/2019, 342 containers overboard

Figure 2.39: Distribution of oil pollution response





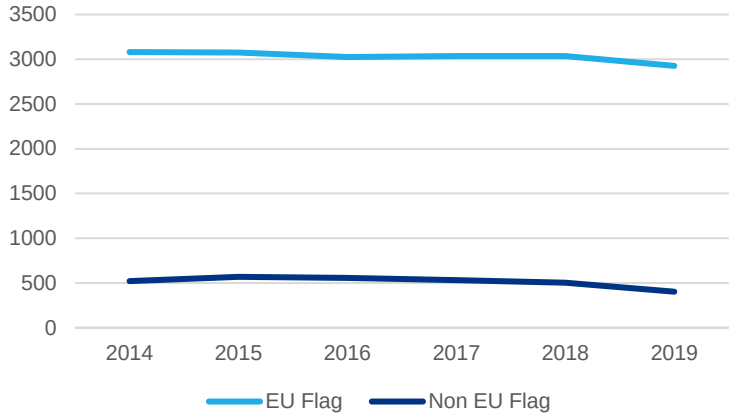


	Total
Capsizing/Listing	3
Damage / loss of equipment	6
Fire/Explosion	4
Flooding/Foundering	7
Grounding/stranding	19
Hull failure	1
Loss of containment	25
Loss of directional control	2
Loss of propulsion power	7
Unspecified	1
Total	92

Oil pollution response was mainly deployed following loss of containment (cargo) or grounding / stranding of a ship. After the reported significant increase in 2018, a reduction was noted in 2019.

2.7 Involvement in a marine casualty or incident of EU/EEA Member States as Flag State, Coastal State or Substantially Interested State

Figure 2.40: Distribution of ship flags



In the period 2014 to 2019, 18180 ships flagged under an EU/EEA Member State were involved in a marine casualty or incident.

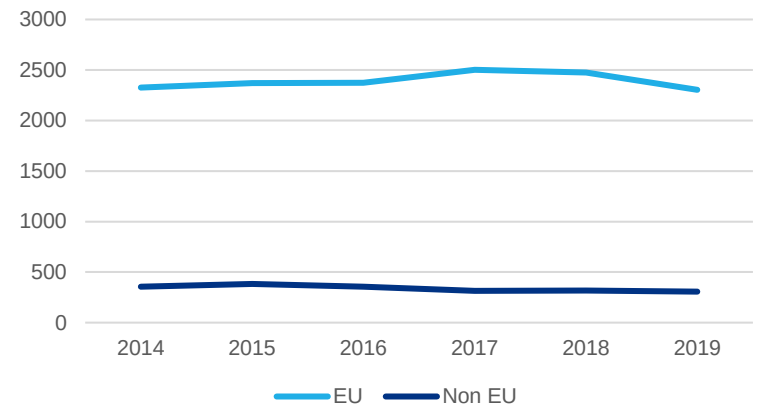
28 EU/EEA Member States were involved as flag of the ship over the 2014–2019 period.

3085 ships flagged under a non-EU/EEA Member State were involved in a marine casualty or incident reported in EMCIP, corresponding to 115 non-EU/EEA flags.

The higher ratio of EU/EEA flag States affected by a marine casualty or incident in comparison with non-EU/EEA flag States is due to the scope (geographical and in terms of vessels and accidents) of the Accident Investigation (AI) Directive. Marine casualties and incidents on-board ships flagged in non-EU/EEA countries which do not involve substantial EU/EEA interests, and which do not occur in EU/EEA waters are not within the scope of the Directive and therefore not reported in EMCIP.

	2014	2015	2016	2017	2018	2019	Total
EU Flag	3080	3076	3024	3037	3037	2926	18180
Non EU Flag	521	569	557	532	503	403	3085
Unknown	10	10	14	7	65	21	127
Total	3611	3655	3595	3576	3605	3350	21392

Figure 2.41: Distribution of coastal States



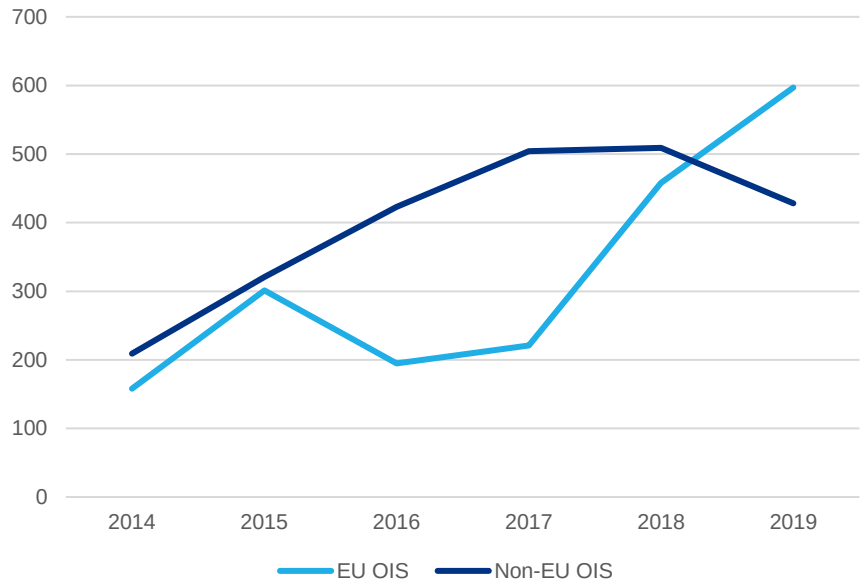
In 16363 occurrences, at least one coastal State was reported to be affected by a marine casualty or incident. Considering the total number of reported marine casualties or incidents, 84.3% of the casualties related to territorial sea or internal waters.

25 EU Member States were involved as a coastal State 14353 times. 140 non-EU countries were reported as coastal State 2032 times.

	2014	2015	2016	2017	2018	2019	Total
EU Coastal State	2327	2371	2375	2502	2474	2304	14353
Non EU Coastal State	356	383	356	313	317	307	2032
Total reported Coastal State	2683	2754	2731	2815	2791	2611	16385

As with EU/EEA flag ships, there is a higher ratio of EU/EEA coastal States affected by a marine casualty or incident in comparison with non-EU coastal States. Again, it should be noted that marine casualties and incidents in coastal waters of non-EU countries and not involving EU flagged vessels or substantial EU interests are not covered by the AI Directive.

Figure 2.42: Distribution of substantially interested States (SIS) other than flag or coastal States



In 4129 marine casualties and incidents, at least one other substantially interested State was reported. Considering the total number of marine casualties and incidents, a State different from the flag or the coastal State was involved in 21.2% of marine casualties and incidents.

A total of 4324 substantially interested States were reported, bearing in mind that a single occurrence can involve more than one substantially interested State. 28 EU/EEA Member States were involved as SIS 1930 times, while Czech Republic and Slovakia were not involved at all. 114 non-EU/EEA countries were SIS 2394 times.

	2014	2015	2016	2017	2018	2019	Total
EU SIS	158	301	195	221	458	597	1930
Non-EU SIS	209	321	423	504	509	428	2394
Total SIS	367	622	618	725	967	1025	4324

B- MARINE CASUALTIES AND INCIDENTS

This chapter describes the activities undertaken by the investigative bodies of EU/EEA Member States regarding the investigations performed, reports published, and safety recommendations issued.

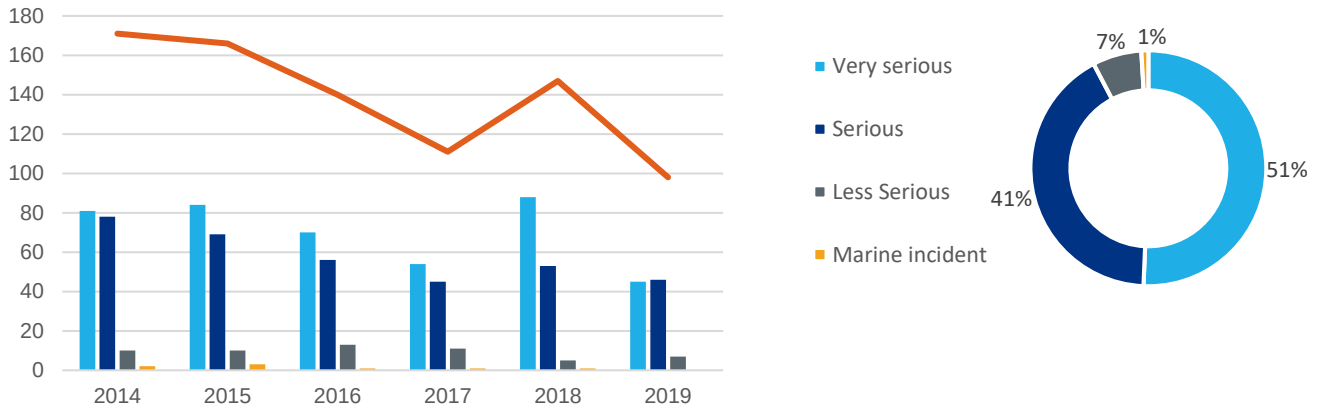
Art. 2.4 of Reg.(EC) 1406/2002 as amended, provides that the Agency shall carry out analysis of safety investigation reports with a view to identifying added value at Union level in terms of any relevant lessons to be drawn.

Based on the content of the investigation reports in EMCIP, EMSA has carried out three analysis studies on: marine casualties and incidents involving, respectively, Fishing vessels, Ro-Ro ships and Container ships.

These studies are available on the EMSA website at: http://www.emsa.europa.eu/publications/technical-reports-studies-and-plans.html

2.8 Safety Investigations

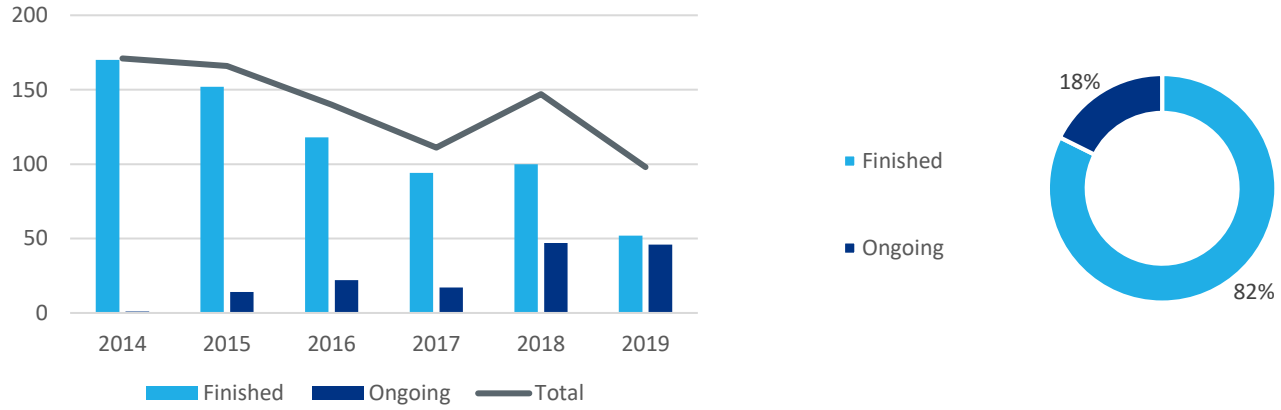
Figure 2.43: Number of safety investigations launched by severity of marine casualties and incidents



	2014	2015	2016	2017	2018	2019	Total
Very serious	81	84	70	54	88	45	422
Serious	78	69	56	45	53	46	347
Less Serious	10	10	13	11	5	7	56
Marine incident	2	3	1	1	1	0	8
Grand Total	171	166	140	111	147	98	833

A total of 833 investigations were launched, during 2014 - 2019 period, 50.6% of these being related to very serious casualties and 41.6% to serious casualties. Except in 2018, a reduction of the number of investigations launched was noted 2014.

Figure 2.44: Status of investigations launched

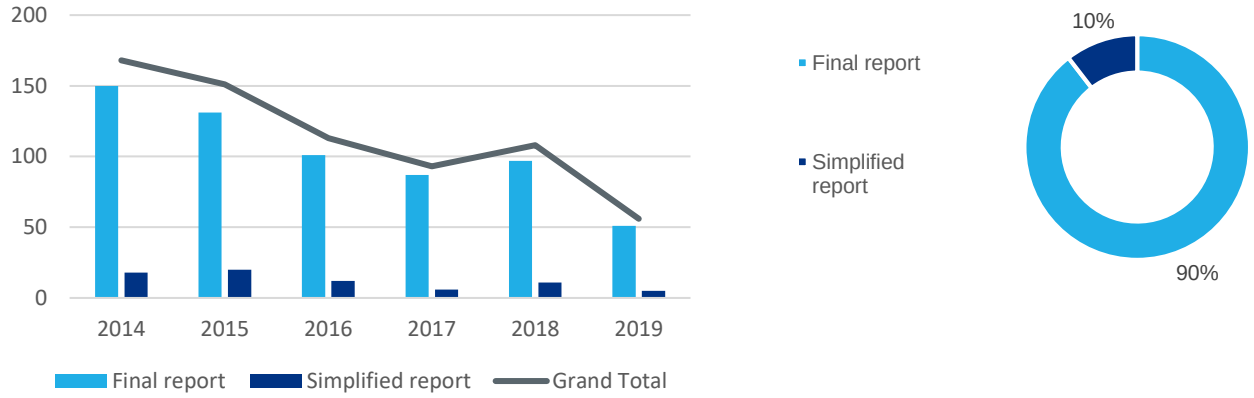


	2014	2015	2016	2017	2018	2019	Total
Finished	170	152	118	94	100	52	686
Ongoing	1	14	22	17	47	46	147
Total	171	166	140	111	147	98	833

In period 2014 to 2019, a total of 686 investigations were reported in the EMCIP database by the investigative bodies as finished.

2.9 Investigation reports

Figure 2.45: Number of investigation reports per type



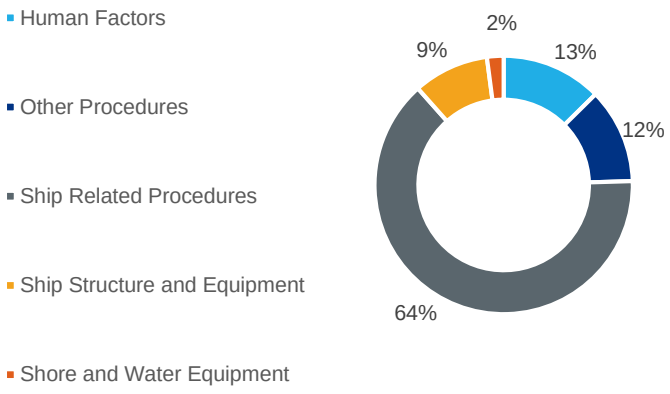
	2014	2015	2016	2017	2018	2019	Total
Final report	150	131	101	87	97	51	617
Simplified report	18	20	12	6	11	5	72
Total	168	151	113	93	108	56	689

In period 2014 to 2019, 617 reports were classified as final and 72 as simplified, in occurrences with status finished. The type of report, whether final or simplified, is decided by the investigative bodies depending on the severity of the casualty and/or the potential to prevent future casualties.

A list of all investigation reports published in EMCIP as per Article 17 of the Accident Investigation Directive 2009/18/EC can be found on the EMCIP Portal at the following address: **https://portal.emsa.europa.eu/emcip-public/#/dashboard**

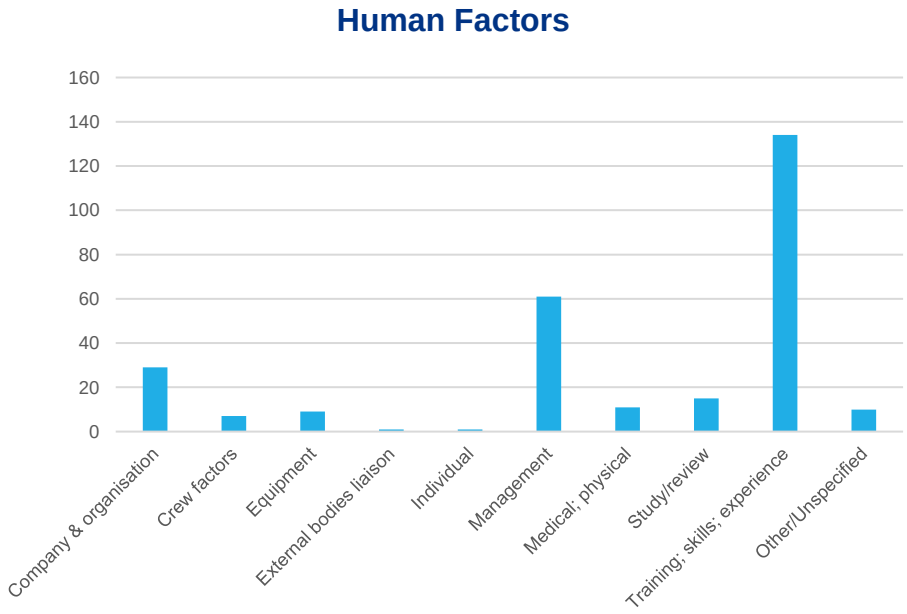
2.10 Safety Recommendations

Figure 2.46: Distribution of safety recommendations / actions taken issued per focus area for 2014-2019



Human Factors	278
Other Procedures	263
Ship Related Procedures	1410
Ship Structure and Equipment	209
Shore and Water Equipment	46
Total	2206

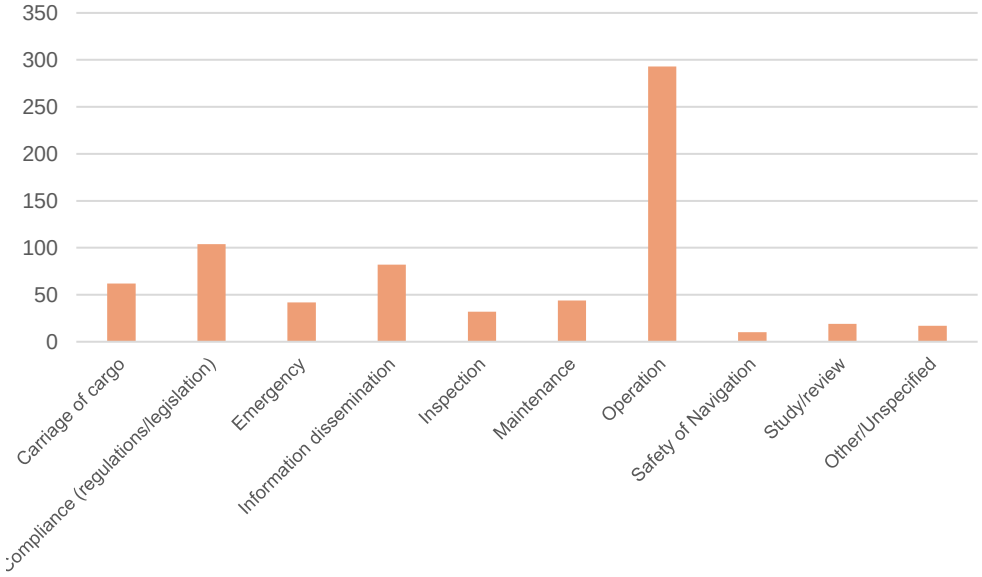
63.9% of the safety recommendations / actions taken (SR/AT) issued related to "ship procedures".



Company & organisation	29
Crew factors	7
Equipment	9
External bodies liaison	1
Individual	1
Management	61
Medical; physical	11
Study/review	15
Training; skills; experience	134
Other/Unspecified	10
Total Human Factors SR/AT	278

In the area of human factors, training, skills and experience was by far the first area that was targeted by SR/AT.

Ship Related Procedures

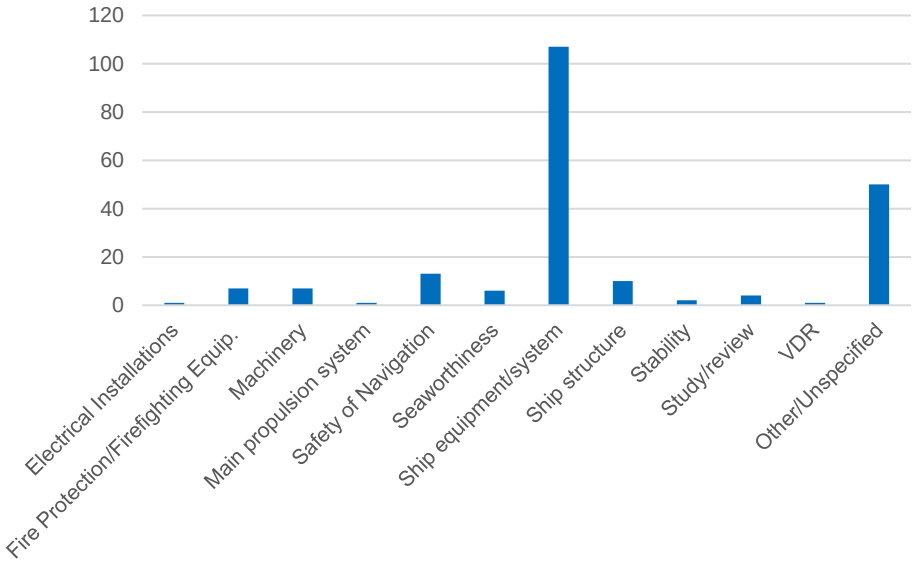


Carriage of cargo	62
Compliance (regulations/legislation)	104
Emergency	42
Information dissemination	82
Inspection	32
Maintenance	44
Operation	293
Safety of Navigation	10
Study/review	19
Other/Unspecified	17
Total SR/AT	705

When it related to ship procedures, almost half of the SR/AT were targeting the operations of the ship.

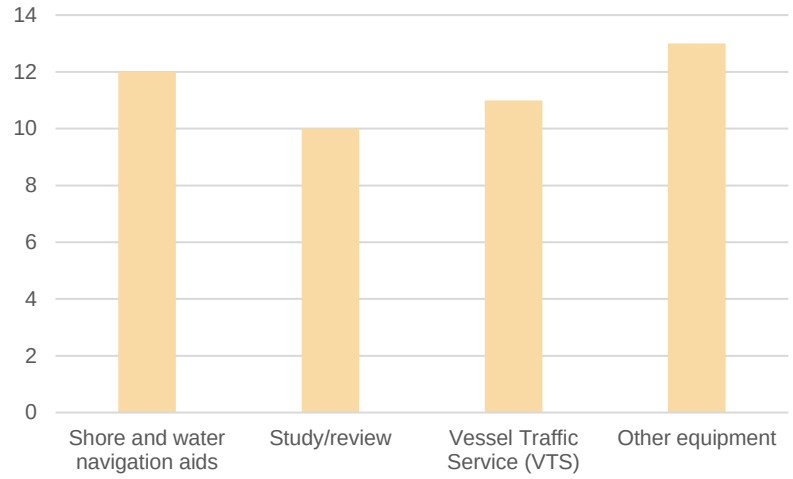
Electrical Installations	1
Fire Protection / Firefighting Equip.	7
Machinery	7
Main propulsion system	1
Safety of Navigation	13
Seaworthiness	6
Ship equipment/system	107
Ship structure	10
Stability	2
Study/review	4
VDR	1
Other/Unspecified	50
Total SSE SR/AT	209

Ship Structure and Equipment



More than half of the safety recommendations or actions taken were related to equipment and systems of the ship when issues were found with regards the “ship structure and equipment”.

Shore & Water Equipment

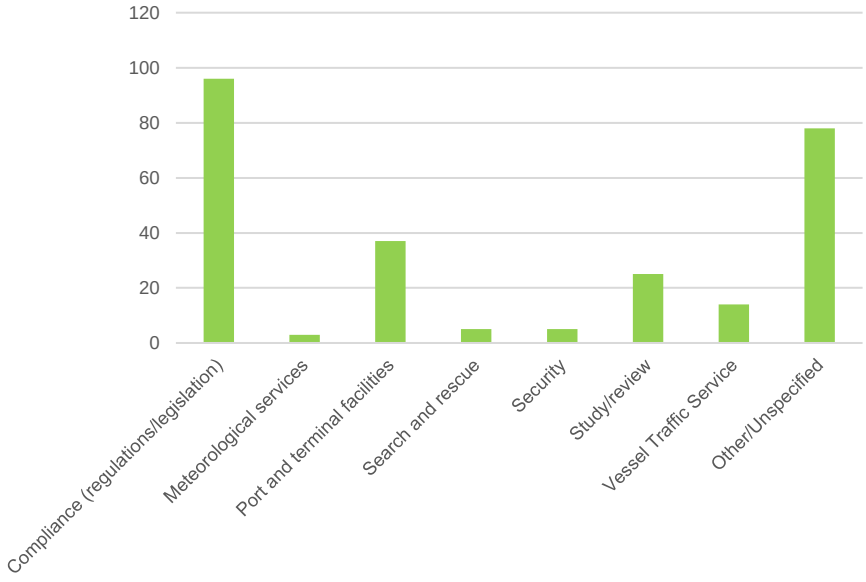


Shore and water navigation aids	12
Study/review	10
Vessel Traffic Service (VTS)	11
Other equipment	13
Total SWE SR/AT	46

SR/AT addressed equally the various subcategories covered by the "shore & water equipment".

Compliance (regulations/legislation)	96
Meteorological services	3
Port and terminal facilities	37
Search and rescue	5
Security	5
Study/review	25
Vessel Traffic Service	14
Other/Unspecified	78
Total Other Procedures	263

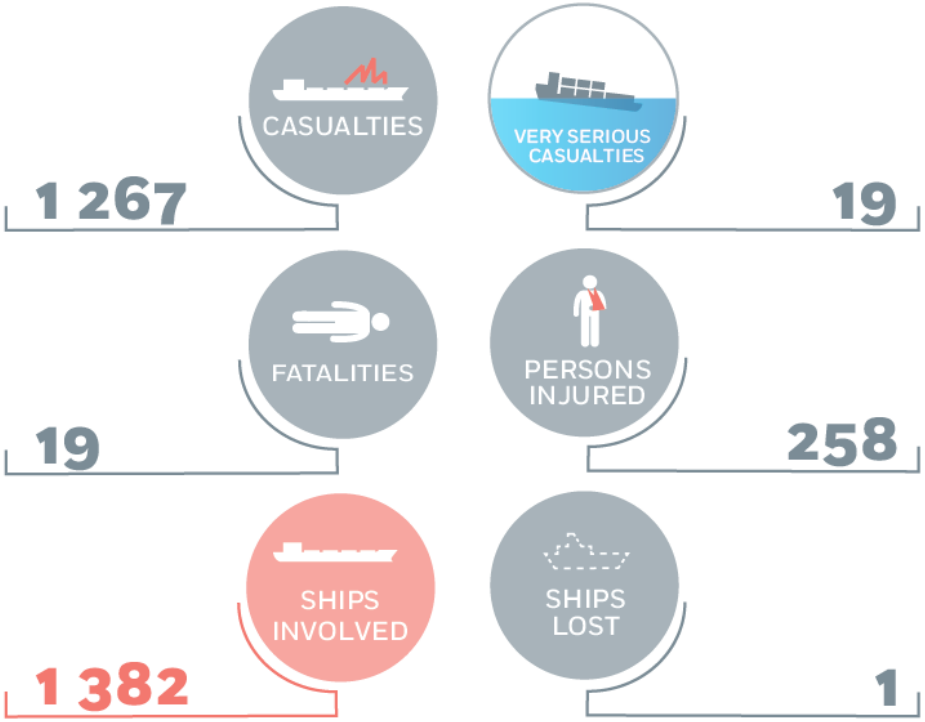
Other Procedures

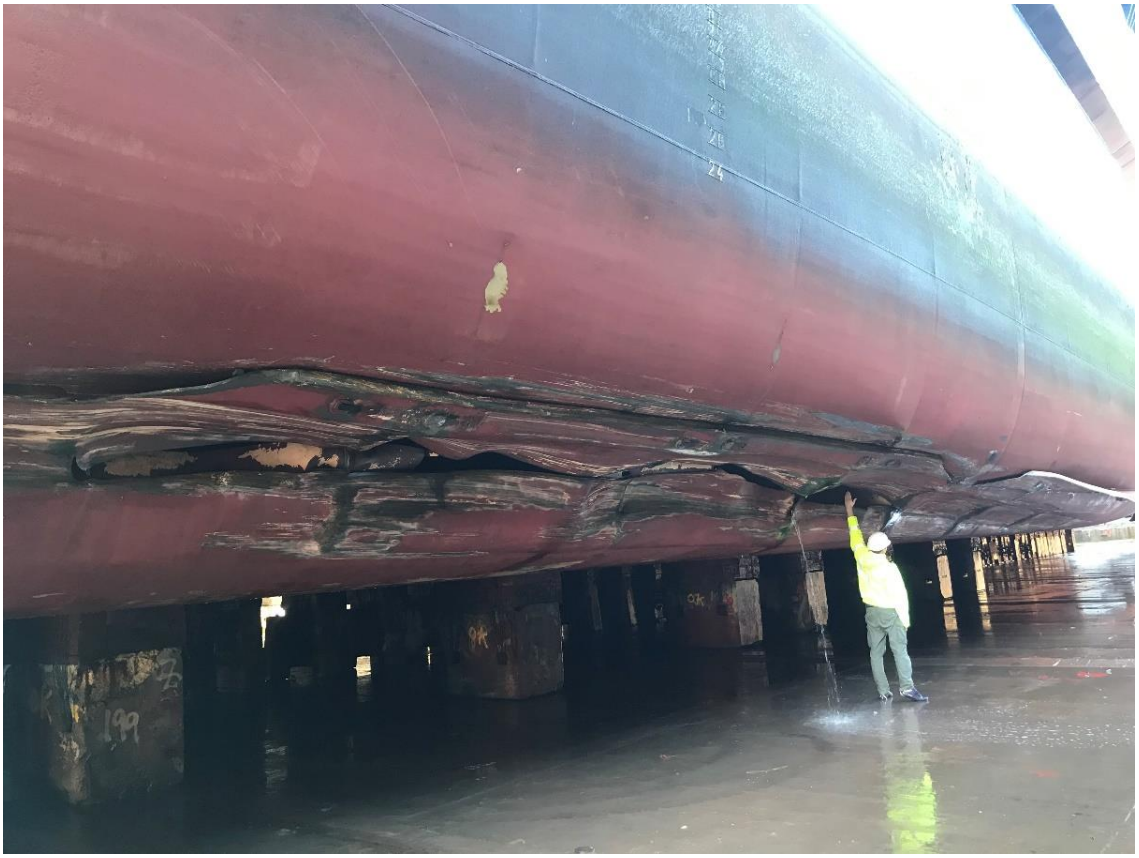


Compliance (regulations/legislation)
was the most targeted area when addressing issues with procedures other than the one directly applied on-board ships.

Chapter 3: CARGO SHIPS

KEY FIGURES 2019





08/05/2019, Grounding of Ro-Ro cargo ship "Seatruck Performance"

3.0 Executive summary about Cargo Ships

Positive results were recorded in 2019 in the category of Cargo Ships.

A total number of 9403 cargo ships were involved in a marine casualty or incident over the period 2014-2019, which represented almost half of all occurrences. Since 2015, the number of cargo ships involved decreased from 1794 to 1382 in 2019, the average number of the period being 1567.

When comparing with the evolution of the EU flag cargo ship fleet since 2015, the diminution of casualties involving a cargo ship is confirmed, as the ratio 'ship involved' / 1000xEU flag cargo ship' decreased from 184 to 147.

Among the cargo ships, General Cargo ships represented the main type with 32% of all cargo ships involved.

The rate of Very Serious casualties is 1.15%, and 20.7% when the severity is Serious. In both cases, the severity of occurrences affecting cargo ships is lower compared to the overall fleet, where Very Serious occurrences represent 3% and the Serious ones 25%.

More than half of the casualties with a ship (52.6%) were related to issues of a navigational nature, such as contacts, grounding/stranding and collision. As concerns occurrences to person(s), 27.5% were attributed to slipping, stumbling and falling of persons.

In 2019, 1 cargo ship was lost. Over the period, out of a total of 19 cargo ships lost, 11 were General Cargo.

During the 2014-2019 period, 162 accidents involving cargo ships resulted in a total of 214 lives lost. The decrease observed since 2015 was reversed in 2018, but the year 2019 saw the lowest number of fatalities with 19 lives reported lost. Crew have been the most impacted category of victims over this period with 189 fatalities.

In 2019 there were 258 injured persons reported. This number has continuously decreased in the last 5 years, with the highest number being 313 in 2015. Again, crew represent the main category of persons injured at sea (1558, out of a total of 1679 during the 2014-2019 period).

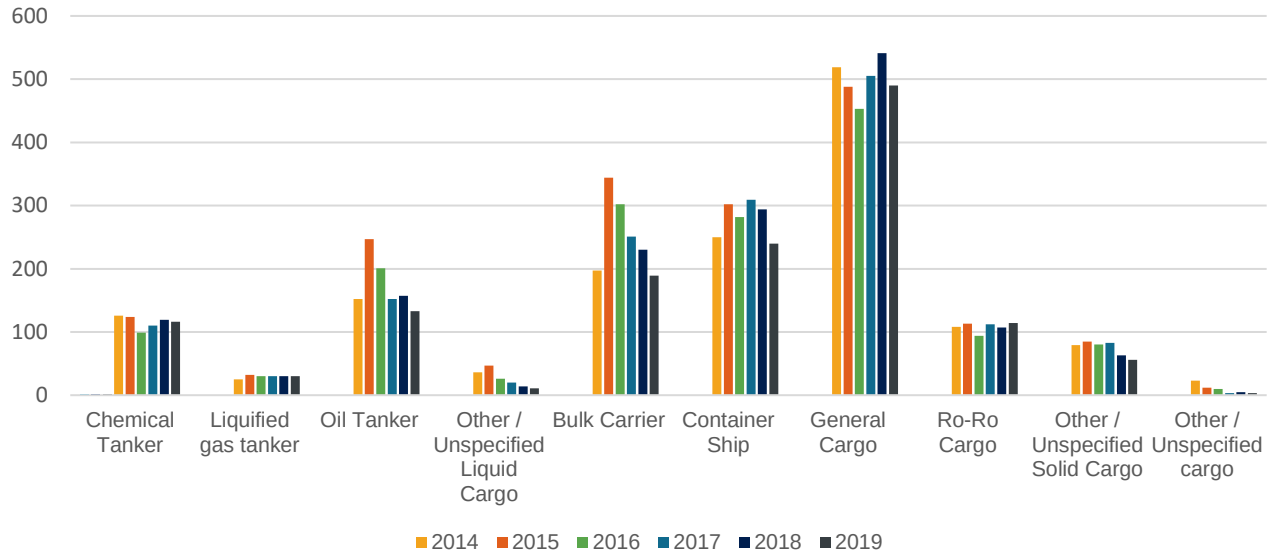
The departure phase appeared to be the safest phase of a voyage and "en route" the most unsafe. It was noted that 77% of the casualties occurred in internal waters and coastal waters.

The main underlying factor leading to casualties was "Human Action", which represented 53.6% of all accident events. In this category of events, 61.2% of the contributing factors were related to shipboard operations. Such figures are similar to the ones when all ship types are considered.

In conclusion, the year 2019 appeared to be more positive than the previous ones in terms of marine casualties. Most of the indicators confirmed the continuous decrease, which was first noted 5 years ago.

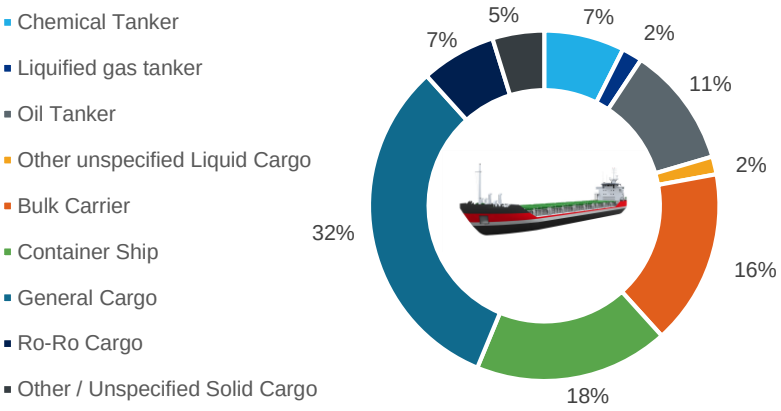
3.1 Detailed distribution

Figure 3.1: Distribution of cargo ship types involved



Over the period, the sub-category most frequently involved was general cargo, followed by container ships and bulk carriers.

Since 2015, the number of cargo ships involved has continuously decreased from 1794 to 1382 in 2019.

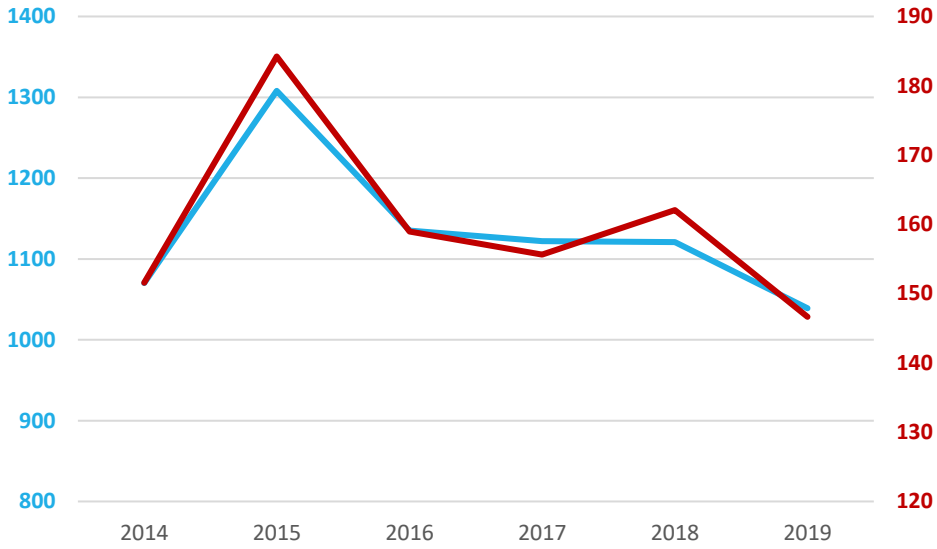


	2014	2015	2016	2017	2018	2019	Total
Chemical Tanker	126	124	99	110	119	116	694
Liquified gas tanker	25	32	30	30	30	30	177
Oil Tanker	152	247	201	152	157	133	1042
Other Liquid Cargo	36	47	26	20	14	11	154
Bulk Carrier	197	344	302	251	230	189	1513
Container Ship	250	302	282	309	294	240	1677
General Cargo	519	488	453	505	541	490	2996
Ro-Ro Cargo	108	113	94	112	107	114	648
Other Solid Cargo	79	85	80	83	63	56	446
Other / Unspecified cargo	23	12	10	3	5	3	56
Total	1515	1794	1577	1575	1560	1382	9403

Figure 3.2: Safety indicators: number of occurrences versus fleet evolution

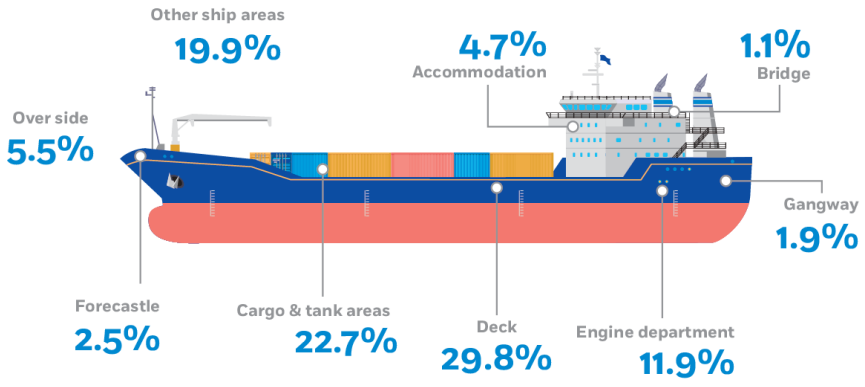
In 2019, one cargo ship flying an EU MS Flag out of a total 6.6 was involved in a casualty.

Over the period 2014-2019, by comparing the evolution of the fleet of cargo ships flying an EU MS Flag and the number of accidents that affected an EU MS Flag ship, it is noted that the continuous decrease of occurrences since 2015 is confirmed. The diminution between 2015 and 2019 is slightly greater at ratios levels (184 in 2015 versus 147 in 2019).



	2014	2015	2016	2017	2018	2019
Occurrences involving an EU Flag ship	1070	1308	1135	1122	1121	1039
EU Cargo Ship Fleet	7059	7100	7140	7210	6918	7085
Ratio EU occ / EU fleet (x1,000)	152	184	159	156	162	147

Figure 3.3: Main places of occurrence with person(s) on board cargo ships for 2014-2019



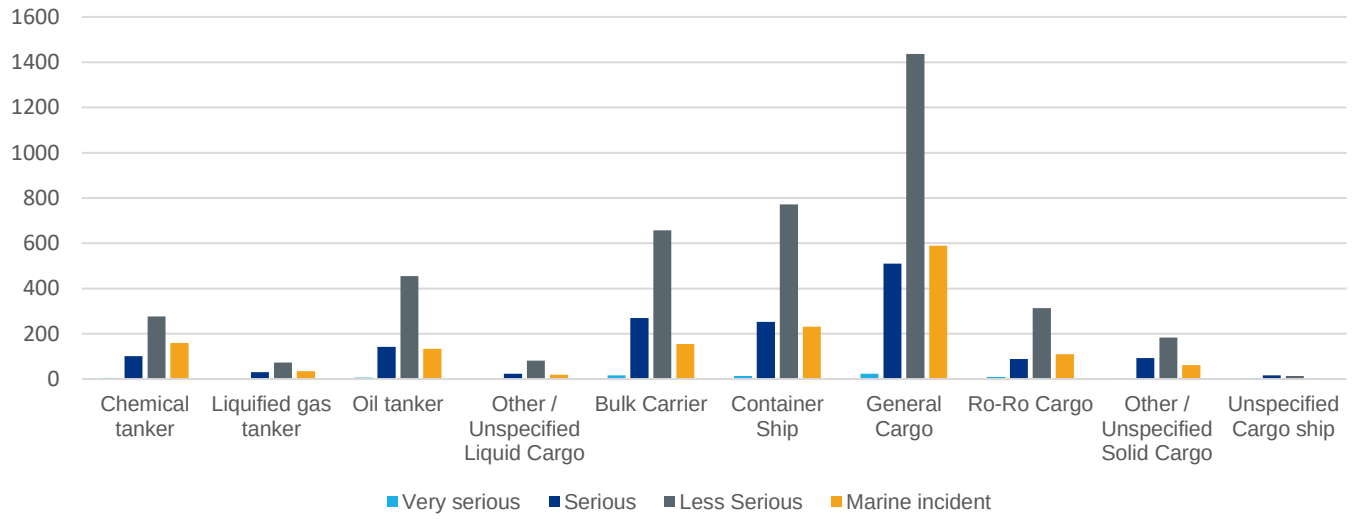
Accommodation	17
Bridge	4
Cargo & tank areas	82
Engine department	43
Deck	108
Forecastle	9
Gangway	7
Over side	20
Other ship areas	72
Total places reported	362

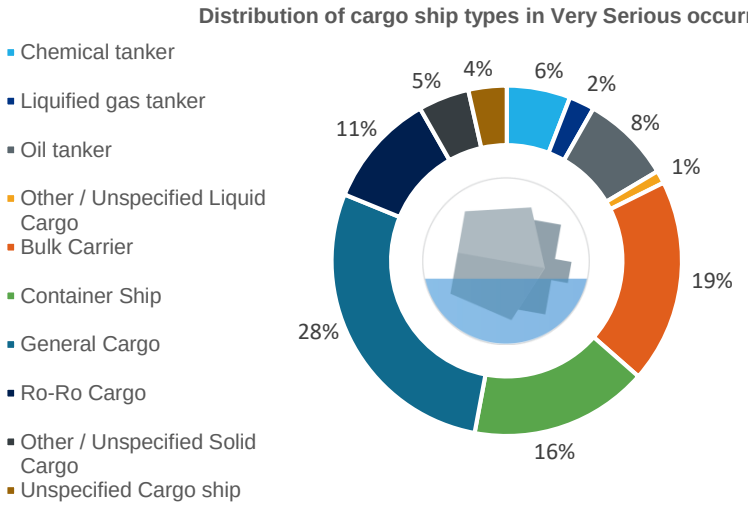
Accidents took place mainly on ship decks, followed by cargo hold and tank areas and over side.

3.2 Nature of marine casualties and incidents

3.2.1 Occurrence with ship(s)

Figure 3.4: Distribution of severity per cargo ship type for 2014-2019



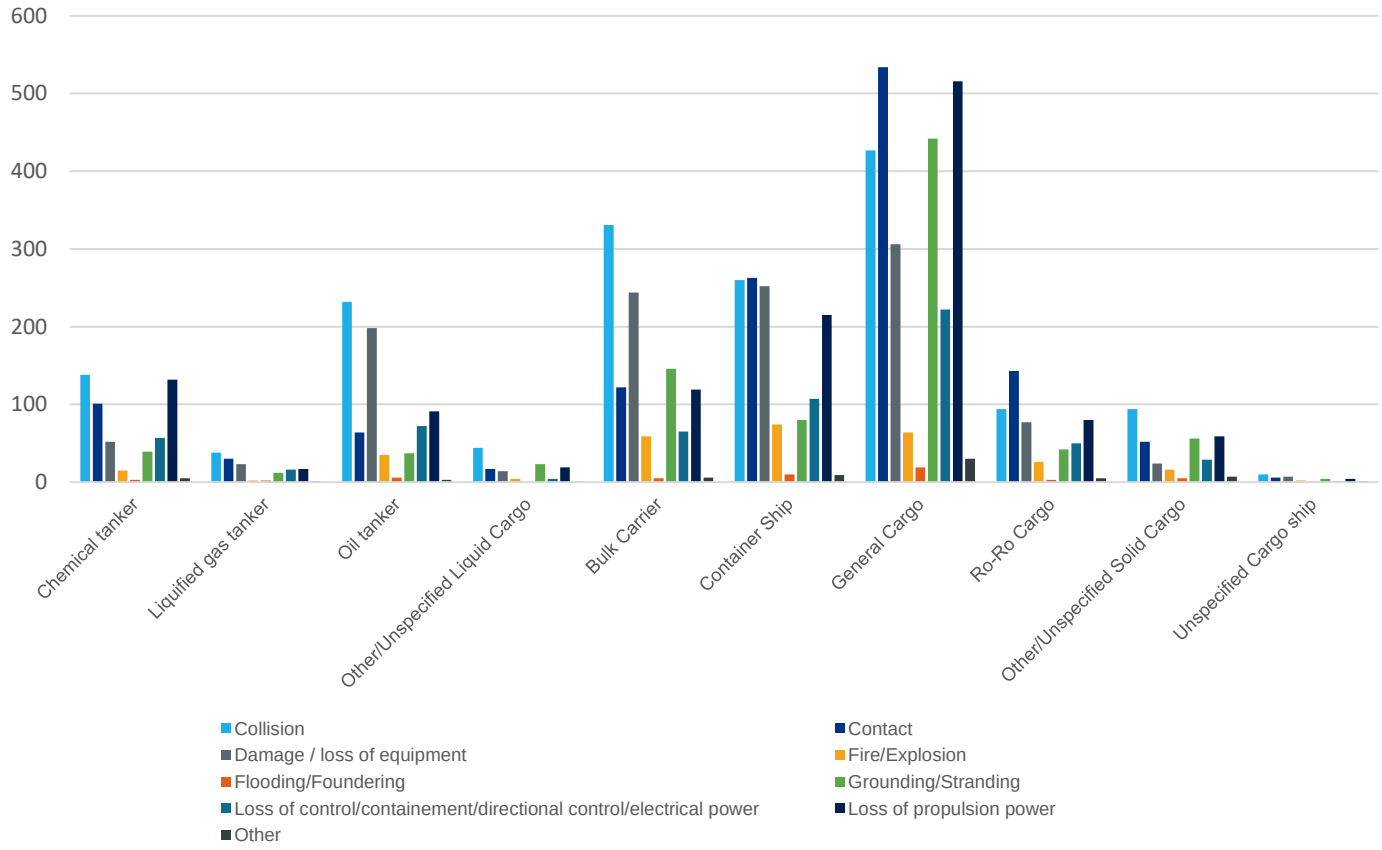


"General cargo", "bulk carriers" and "containers ships" are all together accountable for 63.5% of the very serious casualties related to the ship (and for 67.6% of the serious ones).

34.7% of the casualties and incidents were related to general cargo ships.

	Very serious	Serious	Less Serious	Marine incident	Total
Chemical tanker	5	101	277	159	542
Liquified gas tanker	2	31	73	35	141
Oil tanker	7	142	455	134	738
Other / Unspecified Liquid Cargo	1	24	82	19	126
Bulk Carrier	16	269	657	155	1097
Container Ship	14	252	772	232	1270
General Cargo	24	510	1437	589	2560
Ro-Ro Cargo	9	88	314	109	520
Other / Unspecified Solid Cargo	4	93	183	62	342
Unspecified Cargo ship	3	16	14	3	36
Total	85	1526	4264	1497	7372

Figure 3.5: Distribution of casualty events per cargo ship type for 2014-2019

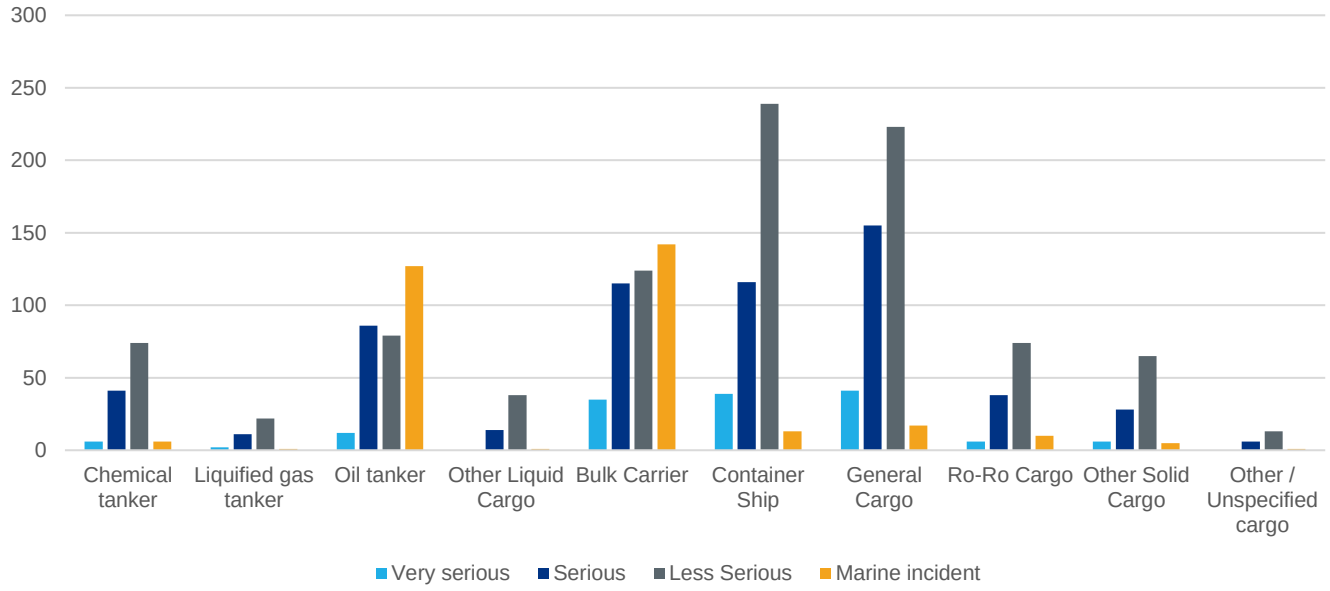


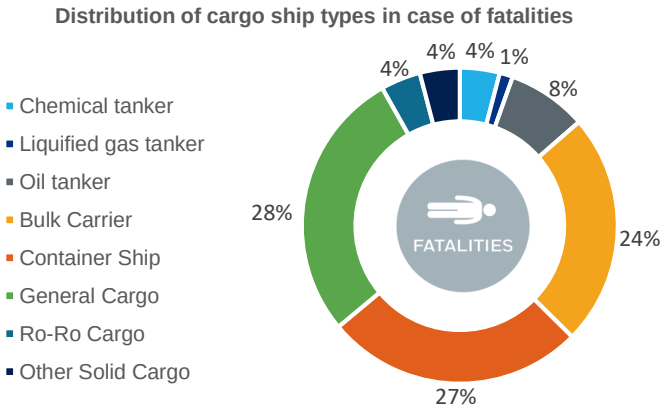
Collisions represent 22.6% of all events, followed by contacts (18%) and loss of propulsion power (17%). Grouping of navigation events (collisions, contacts and grounding/stranding) represents more than 52% of casualty events to cargo ships.

	Collision	Contact	Damage / loss of equipment	Fire / Explosion	Flooding / Foundering	Grounding / Stranding	Loss of control / containment / directional control / electrical power	Loss of propulsion power	Other	Total
Chemical tanker	138	101	52	15	3	39	57	132	5	542
Liquified gas tanker	38	30	23	2	2	12	16	17	1	141
Oil tanker	232	64	198	35	6	37	72	91	3	738
Other/Unspecified Liquid Cargo	44	17	14	4	0	23	4	19	1	126
Bulk Carrier	331	122	244	59	5	146	65	119	6	1097
Container Ship	260	263	252	74	10	80	107	215	9	1270
General Cargo	427	534	306	64	19	442	222	516	30	2560
Ro-Ro Cargo	94	143	77	26	3	42	50	80	5	520
Other/Unspecified Solid Cargo	94	52	24	16	5	56	29	59	7	342
Other / Unspecified Cargo ship	10	6	7	2	1	4	1	4	1	36
Total	1668	1332	1197	297	54	881	623	1252	68	7372

3.2.2 Occurrence with person(s)

Figure 3.6: Severity of occurrence with person(s)s per cargo ship type for 2014-2019

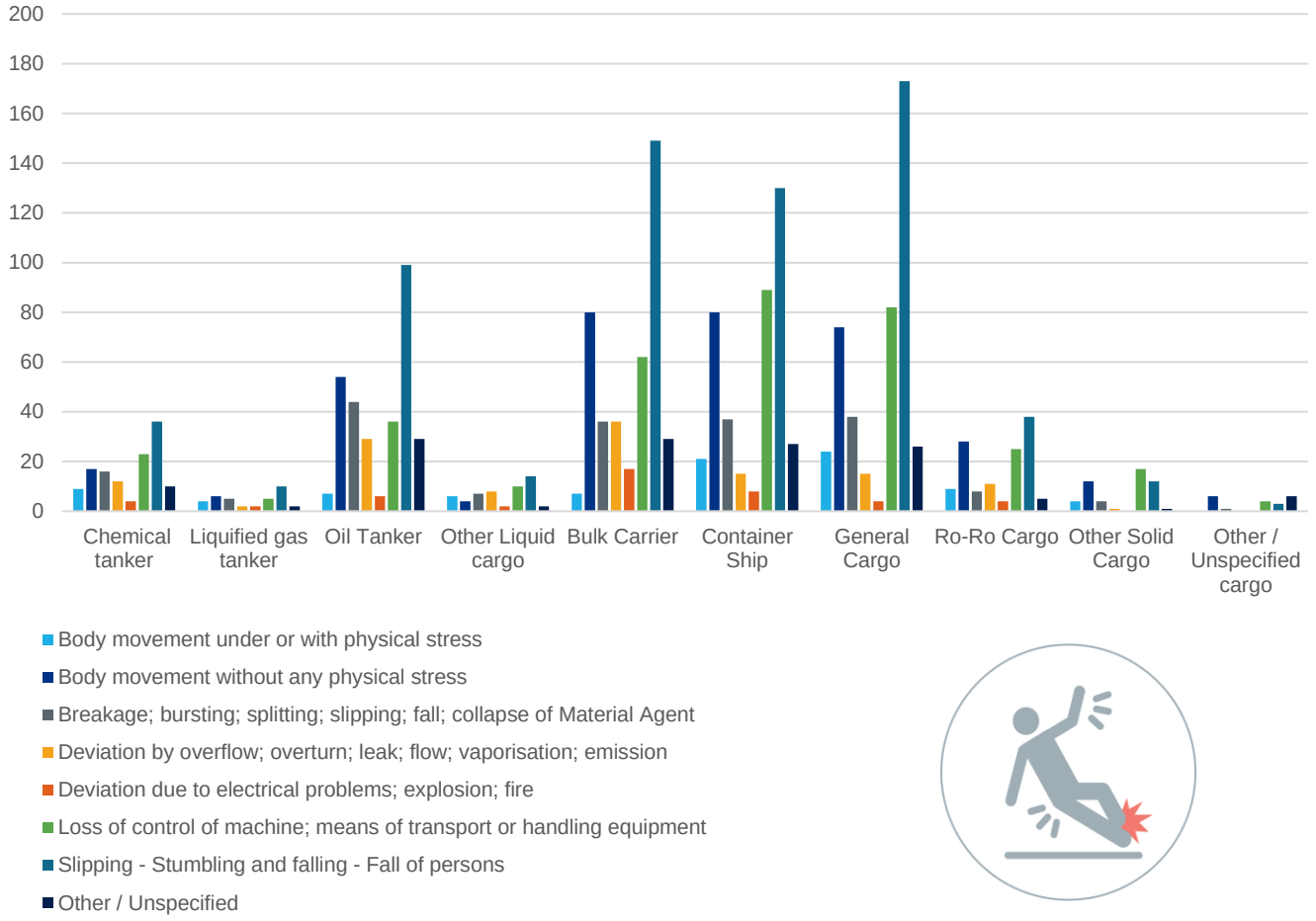




Almost 80% of very serious accidents with person(s), meaning a fatality, occurred on board a "general cargo", a "container ship" or a "bulk carrier".

	Very serious	Serious	Less Serious	Marine incident	Total
Chemical tanker	6	41	74	6	127
Liquified gas tanker	2	11	22	1	36
Oil tanker	12	86	79	127	304
Other Liquid Cargo	0	14	38	1	53
Bulk Carrier	35	115	124	142	416
Container Ship	39	116	239	13	407
General Cargo	41	155	223	17	436
Ro-Ro Cargo	6	38	74	10	128
Other Solid Cargo	6	28	65	5	104
Other / Unspecified cargo	0	6	13	1	20
Total	147	610	951	323	2031

Figure 3.7: Distribution of deviations per cargo ship type for 2014-2019



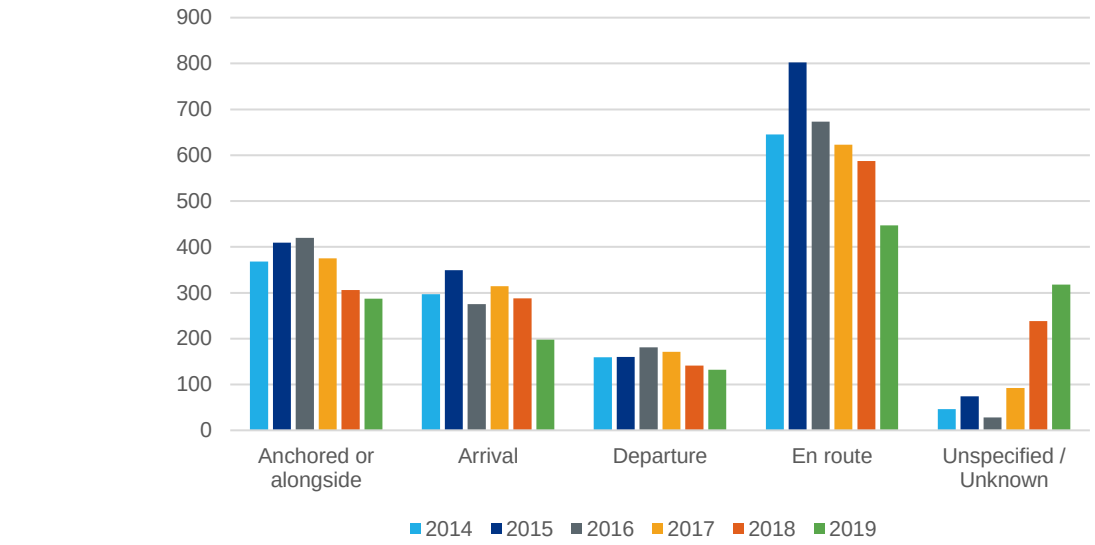
Slipping and falls of persons was the most frequent deviation (27.5%).

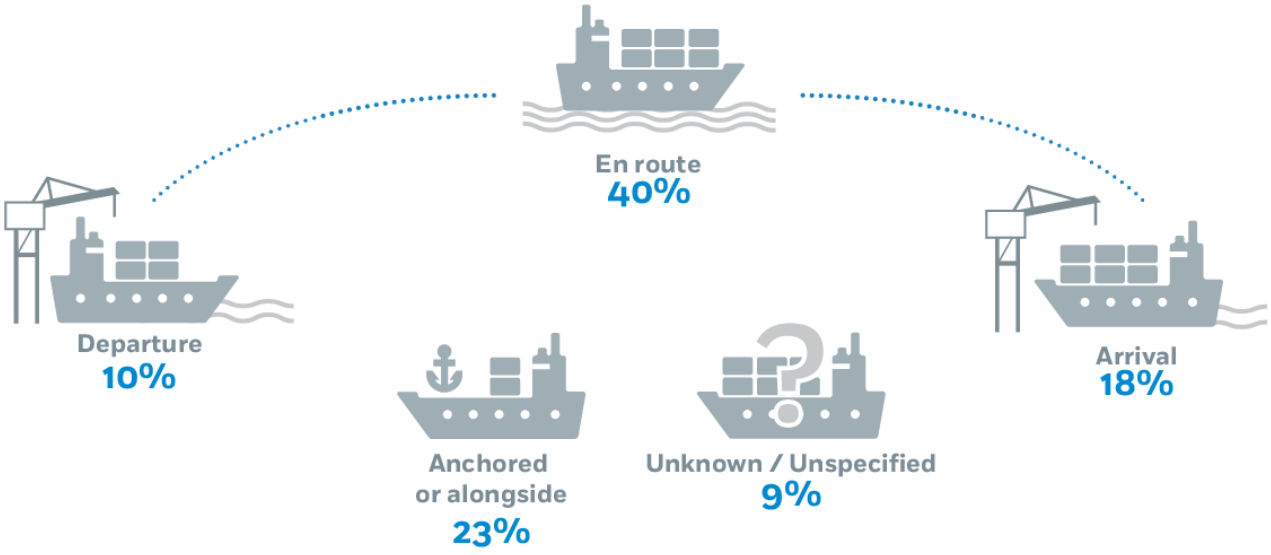
	Body movement under or with physical stress	Body movement without any physical stress	Breakage; bursting; splitting; slipping; fall; collapse of Material Agent	Deviation by overflow; overturn; leak; flow; vaporisation; emission	Deviation due to electrical problems; explosion; fire	Loss of control of machine; means of transport or handling equipment	Slipping - Stumbling and falling - Fall of persons	Other / Unspe.	Total
Chemical tanker	9	17	16	12	4	23	36	10	127
Liquified gas tanker	4	6	5	2	2	5	10	2	36
Oil Tanker	7	54	44	29	6	36	99	29	304
Other Liquid cargo	6	4	7	8	2	10	14	2	53
Bulk Carrier	7	80	36	36	17	62	149	29	416
Container Ship	21	80	37	15	8	89	130	27	407
General Cargo	24	74	38	15	4	82	173	26	436
Ro-Ro Cargo	9	28	8	11	4	25	38	5	128
Other Solid Cargo	4	12	4	1	0	17	12	1	51
Other / Unspecified cargo	0	6	1	0	0	4	3	6	20
Total	93	369	200	131	47	372	679	140	2468

3.3 Location of the marine casualties and incidents

3.3.1 Voyage segments

Figure 3.8: Distribution by voyage segment

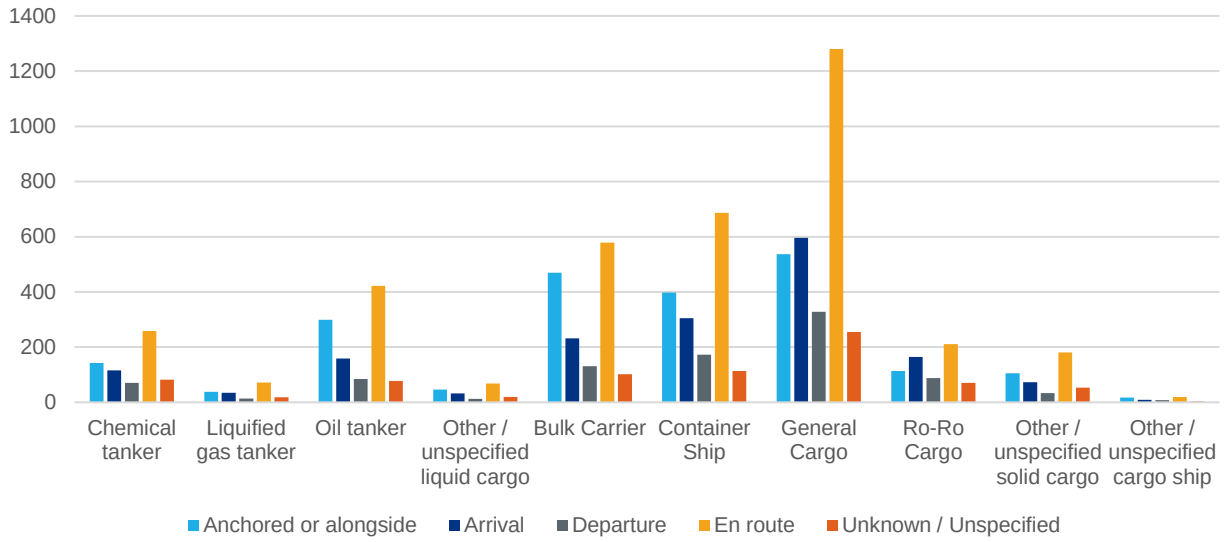




	2014	2015	2016	2017	2018	2019	Total
Anchored or alongside	368	409	420	375	306	287	2165
Arrival	297	349	275	314	288	198	1721
Departure	159	160	181	171	141	132	944
En route	645	802	673	623	587	447	3777
Unspecified / Unknown	46	74	28	92	238	318	796
Total	1515	1794	1577	1575	1560	1382	9403

The departure phase is the safest voyage segment over the period. The “en route” phase represents 40% of the total occurrences. All phases benefited from the reduction of occurrences since 2015.

Figure 3.9: Distribution by voyage segment per cargo ship type for 2014-2019



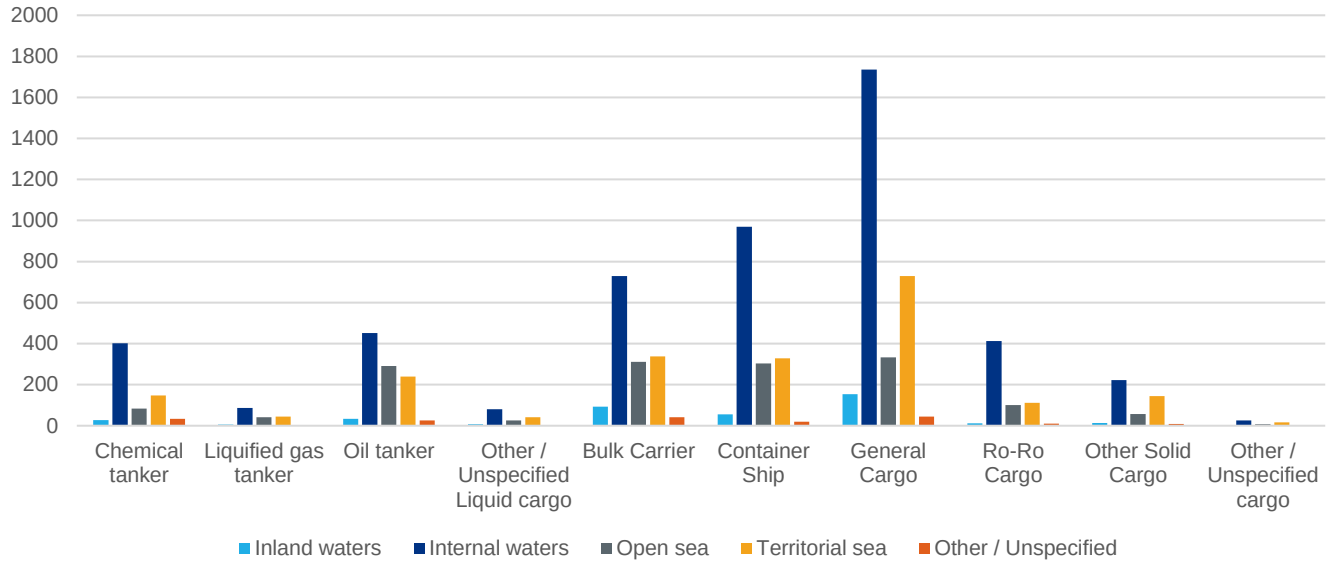
	Anchored or alongside	Arrival	Departure	En route	Unknown / Unspecified	Total
Chemical tanker	142	116	71	258	82	669
Liquified gas tanker	38	35	14	72	18	177
Oil tanker	299	159	84	422	78	1042
Other / unspecified liquid cargo	46	32	13	68	20	179
Bulk Carrier	469	232	131	579	102	1513
Container Ship	398	305	173	687	114	1677
General Cargo	537	596	328	1280	255	2996
Ro-Ro Cargo	114	164	88	211	71	648
Other / unspecified solid cargo	105	73	34	181	53	446
Other / Unspecified cargo ship	17	9	8	19	3	56
Total	2165	1721	944	3777	796	9403

It is noted that for all cargo ship types, the arrival phase remains less safe than the departure one.

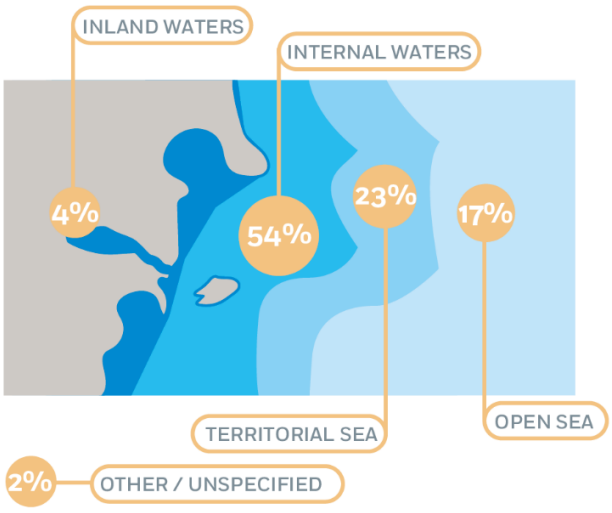
25/03/2019, collision between Liquified Gas Tanker "Aasem" and Oil Tanker "Shinyo Ocean"

3.3.2 Location

Figure 3.10: Distribution by location of marine casualties and incidents per cargo ship type for 2014-2019



	Inland waters	Internal waters	Open sea	Territorial sea	Other / Unspecified	Total
Chemical tanker	28	401	84	147	34	694
Liquified gas tanker	5	86	41	44	1	177
Oil tanker	34	452	291	240	25	1042
Other / Unspecified Liquid cargo	7	81	25	41	0	154
Bulk Carrier	93	729	312	338	41	1513
Container Ship	55	969	304	329	20	1677
General Cargo	153	1736	333	729	45	2996
Ro-Ro Cargo	12	413	101	112	10	648
Other Solid Cargo	13	222	57	145	9	446
Other / Unspecified cargo	3	26	7	17	3	56
Total	403	5115	1555	2142	188	9403

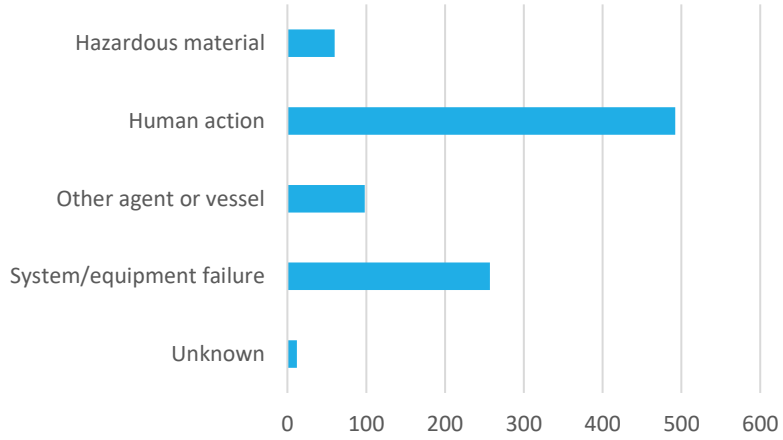


All types of cargo ships have the highest numbers of casualties and incidents within internal waters.

3.4 Accidental Events and Contributing Factors

Investigators look for the root causes of the casualty or incident. Such causes are made up of 'accident events' and 'contributing factors'. Accident events types are: 'human action', 'system or equipment failure', 'other agent or vessel', 'hazardous material' and 'unknown'.

Figure 3.11: Distribution of accident events in cargo ships related events for the period 2014-2019

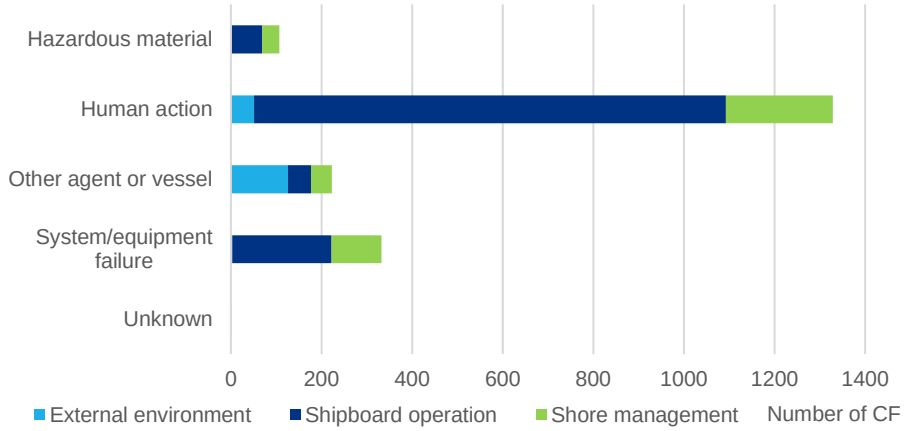


Accident events type	Number of accident events
Hazardous material	60
Human action	492
Other agent or vessel	98
System/equipment failure	257
Unknown	12
Total accident events	919

From a total of 919 accident events in cargo ships analysed during the investigations, 53.6% were attributed to 'human action' category and 28% to 'system/equipment failure'.

Cargo ships have the same trend for accident event distribution than marine casualties in general.

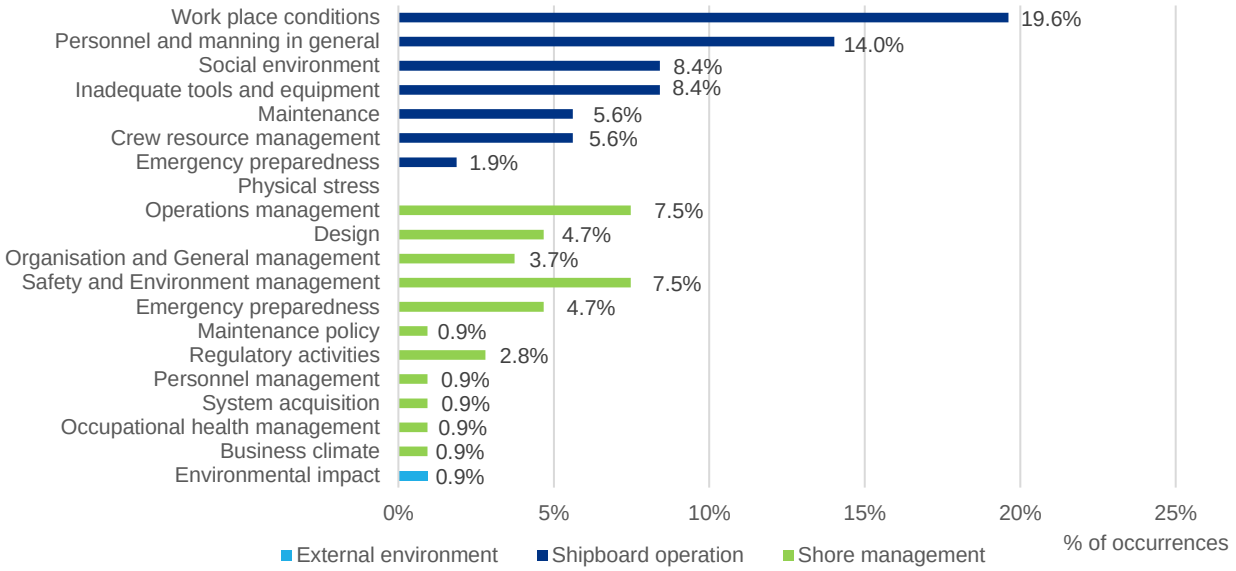
Figure 3.12: Relationship between accident events and the contributing factors in cargo ships for 2014-2019



1992 contributing factors associated to 919 accident events represent a medium value of 2.17 contributing factors per accident event in cargo ships.
The main accident events type was human action failure associated with the factor shipboard operation.

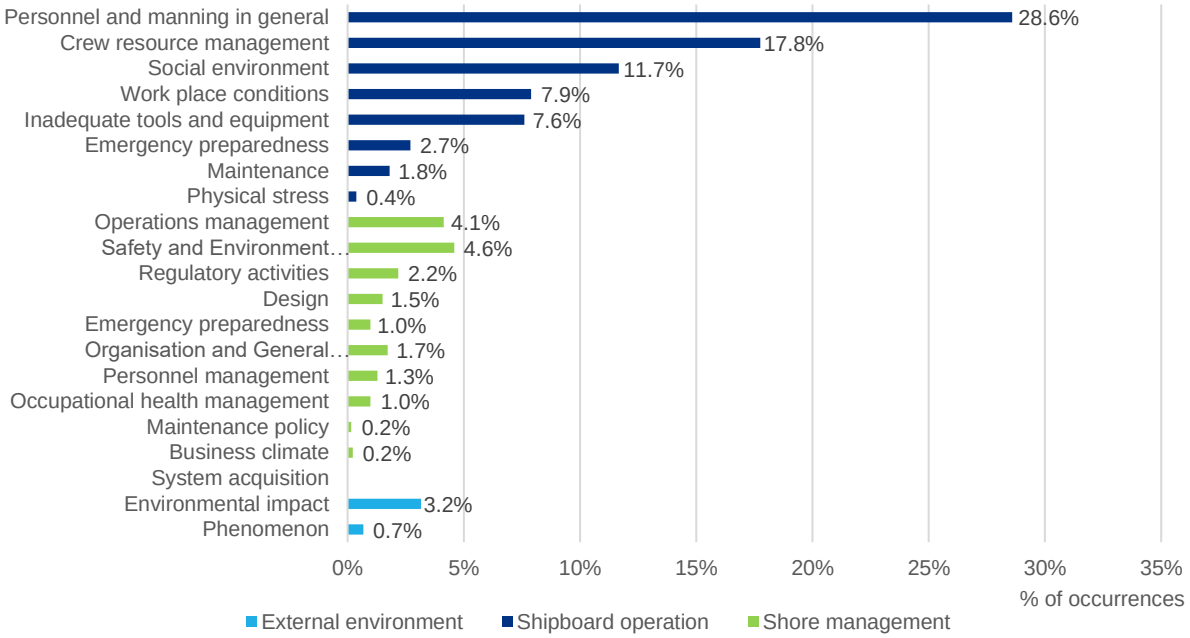
Cargo ships				
Accident events types	**Number of contributing factors**	**Contributing factors involved in the accident events**		
		External environment	**Shipboard operation**	**Shore management**
Hazardous material	107	1	68	38
Human action	1329	51	1042	236
Other agent or vessel	223	126	51	46
System/equipment failure	332	3	219	110
Unknown	1	0	0	1
Total	1992	181	1380	431

Figure 3.13: Contributing factors involved in "Hazardous Material" accident events, distributed by categories



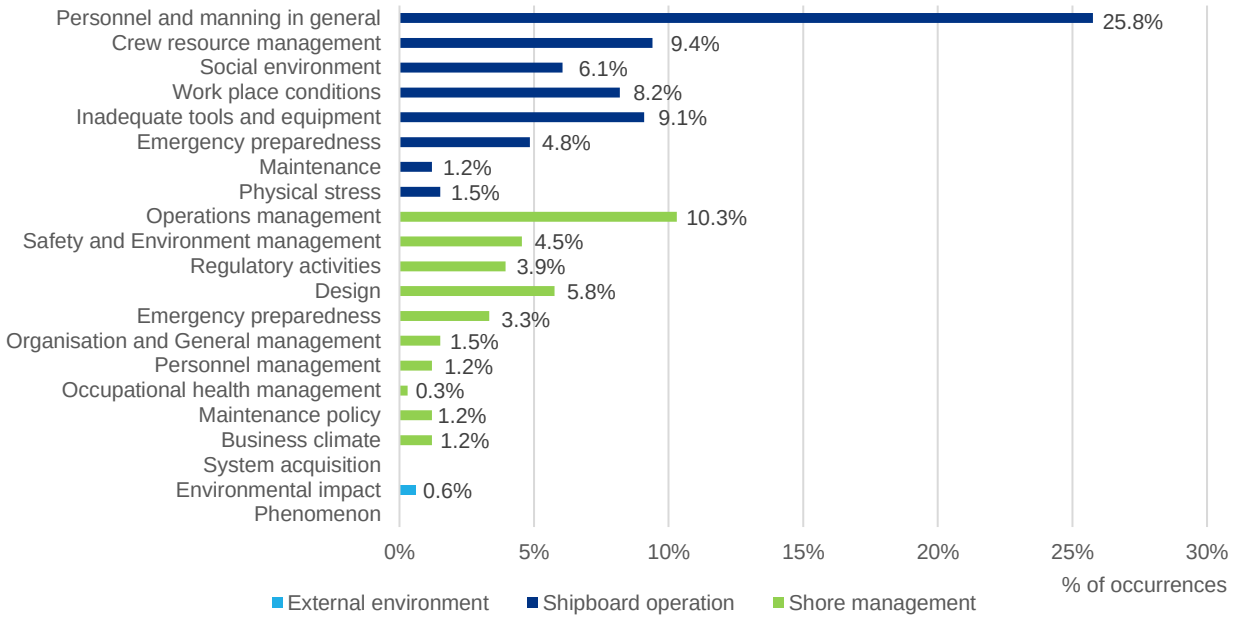
In the area of Hazardous Material, 'work place conditions' and 'personnel and manning in general' are the main contributing factors related to shipboard operation. When it is linked to shore management, 'operations management' and 'safety and environment management' are equally the most reported.

Figure 3.14: Contributing factors involved in "Human Action" accident events, distributed by categories



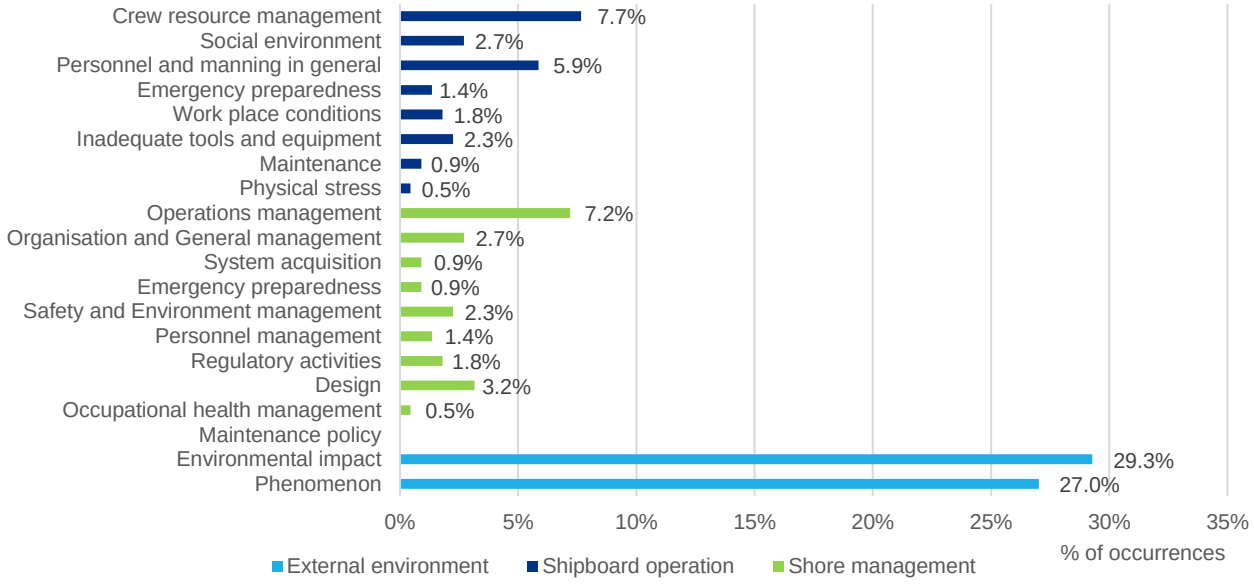
In the category 'Human Action', 'personnel and manning and general' is by far the main contributing factor associated to shipboard operation. It is followed by 'crew resource management'.

Figure 3.15: Contributing factors involved in "System / Equipment Failure" accident events, distributed by categories



With regards 'System / Equipment Failure', 'personnel and manning in general' is again the most reported factor' when it related to shipboard operation. 'Operations management' is the main factor when linked with shore management.

Figure 3.16: Contributing factors involved in "Other Agent or Vessel" accident events, distributed by categories

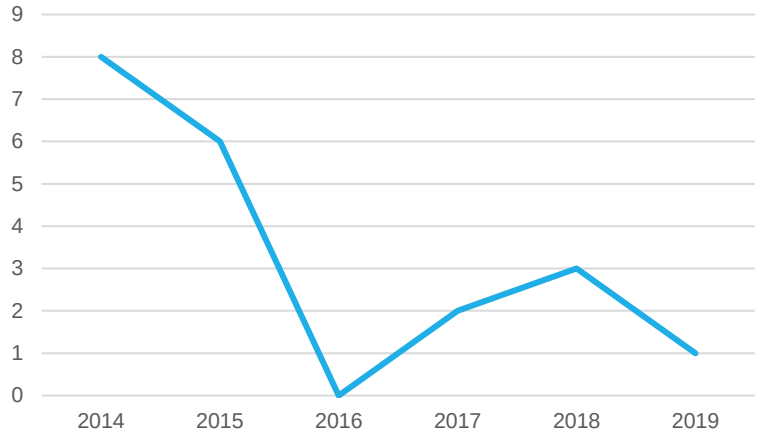


'External environment' is the most important contributing factor in the 'other agent or vessel' events analysed. 'Environmental impact' and 'Phenomenon' are almost equally reported.
The factors in categories 'shipboard operation' and 'shore management' were fairly distributed within each category.

3.5 Consequences

3.5.1 Consequences to ships

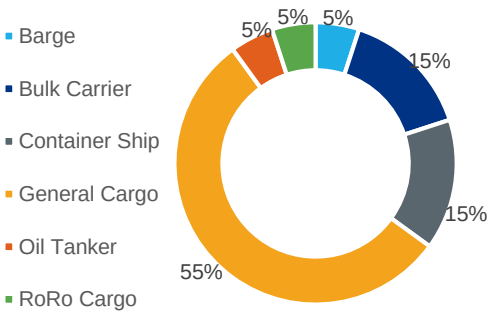
Figure 3.17: Cargo ships lost



	2014	2015	2016	2017	2018	2019
Cargo ships lost	8	6	0	2	3	1

It was noted that only 1 cargo ship was lost in 2019.

Over the period, more than half of the cargo ships lost were General Cargo ships.



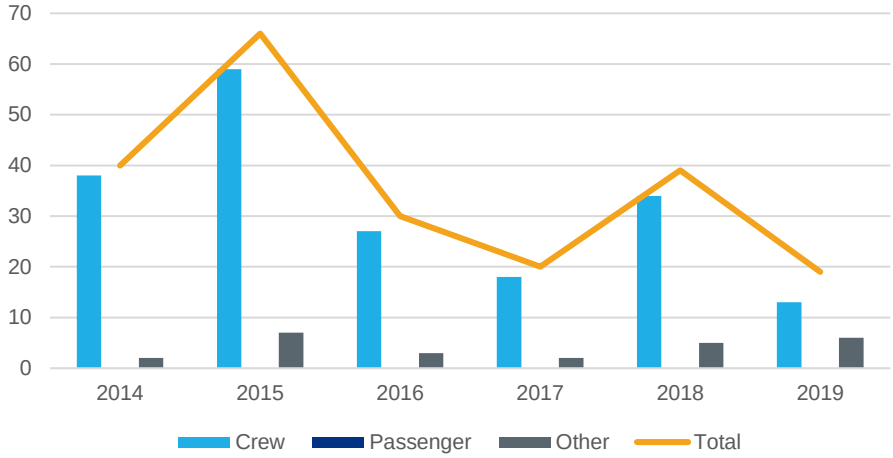
Barge	1
Bulk Carrier	3
Container Ship	3
General Cargo	11
Oil Tanker	1
RoRo Cargo	1
Cargo ships lost	20

10/03/2019, Fire on board Ro-Ro cargo ship "Grande America"

3.5.2 Consequences to persons

3.5.2.1 Fatalities

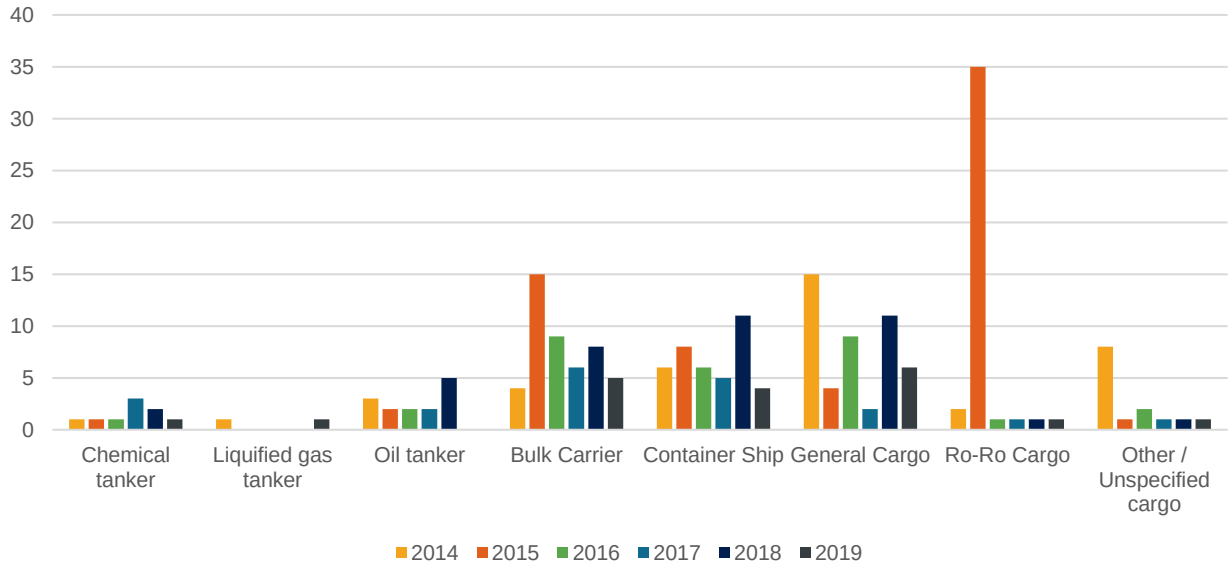
Figure 3.18: Number of fatalities



	2014	2015	2016	2017	2018	2019	Total
Crew	38	59	27	18	34	13	189
Passenger	0	0	0	0	0	0	0
Other	2	7	3	2	5	6	25
Fatalities	40	66	30	20	39	19	214

Except for the year 2018, the number of lives list on cargo ships has been divided by 3 since 2015. Fatalities of crew represented 88.3% of cases.

Figure 3.19: Distribution of fatalities per cargo ship type



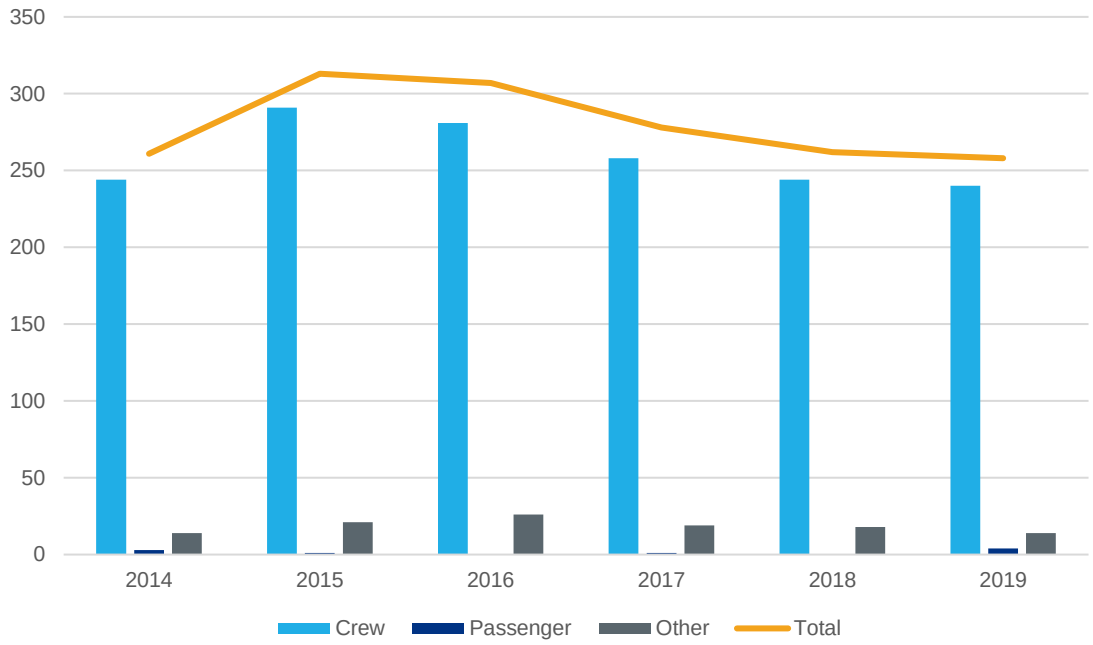
Highest numbers of fatalities relate almost equally to occurrences that happened on board bulk carriers, container ships, general cargo and Ro-Ro cargo ships. Those ships represent a total of 82% of all fatalities.

The number of fatalities was very high on board of Ro-Ro cargo ships in 2015, due to the sinking of El Faro on 02/10/2015 with 33 victims.

	2014	2015	2016	2017	2018	2019	Total
Chemical tanker	1	1	1	3	2	1	9
Liquified gas tanker	1	0	0	0	0	1	2
Oil tanker	3	2	2	2	5	0	14
Bulk Carrier	4	15	9	6	8	5	47
Container Ship	6	8	6	5	11	4	40
General Cargo	15	4	9	2	11	6	47
Ro-Ro Cargo	2	35	1	1	1	1	41
Other / Unspecified cargo	8	1	2	1	1	1	14
Total	40	66	30	20	39	19	214

3.5.2.2 Injuries

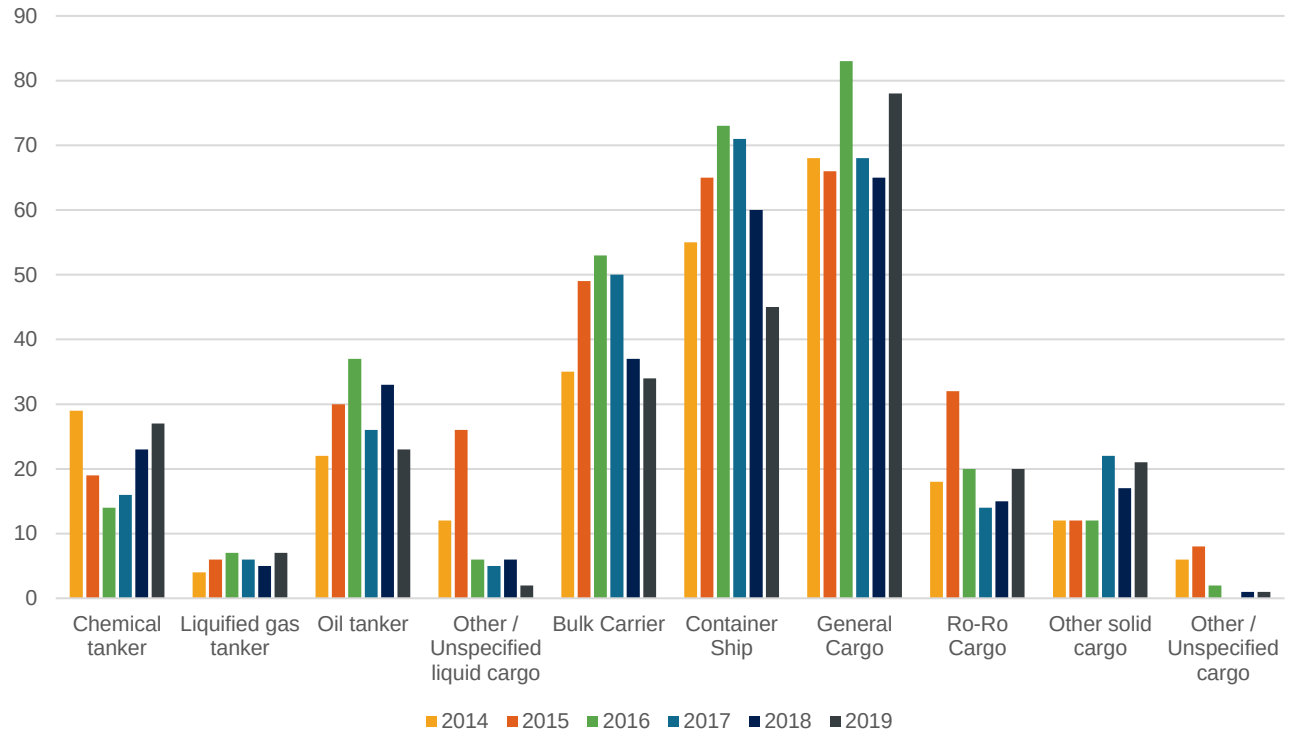
Figure 3.20: Number of injuries



	2014	2015	2016	2017	2018	2019	Total
Crew	244	291	281	258	244	240	1558
Passenger	3	1	0	1	0	4	9
Other	14	21	26	19	18	14	112
Total	261	313	307	278	262	258	1679

Since 2015, the total number of injuries has progressively reduced. Crew members represent 92.7% of the injured population.

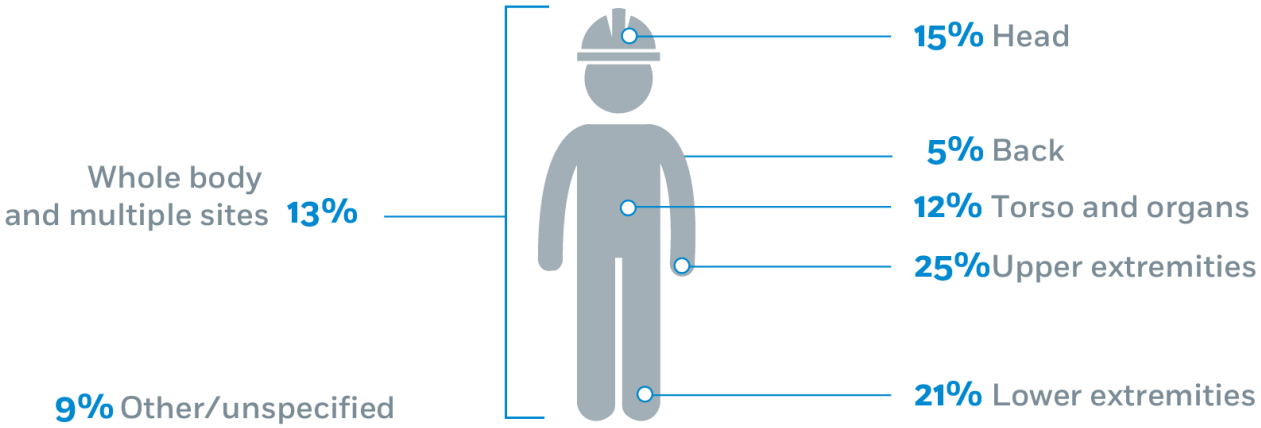
Figure 3.21: Distribution of injuries by cargo ship type



While 25.5% of injuries happened on board general cargo ships, container ships also accounted for 22%.

	2014	2015	2016	2017	2018	2019	Total
Chemical tanker	29	19	14	16	23	27	128
Liquified gas tanker	4	6	7	6	5	7	35
Oil tanker	22	30	37	26	33	23	171
Other / Unspecified liquid cargo	12	26	6	5	6	2	57
Bulk Carrier	35	49	53	50	37	34	258
Container Ship	55	65	73	71	60	45	369
General Cargo	68	66	83	68	65	78	428
Ro-Ro Cargo	18	32	20	14	15	20	119
Other solid cargo	12	12	12	22	17	21	96
Other / Unspecified cargo	6	8	2	0	1	1	18
Total	261	313	307	278	262	258	1679

Figure 3.22: Part of body injured



Back	16
Head	51
Lower Extremities	71
Torso and organs	41
Upper Extremities	81
Whole body and multiple sites	43
Other / Unspecified	29
Total of reported injuries	**332**

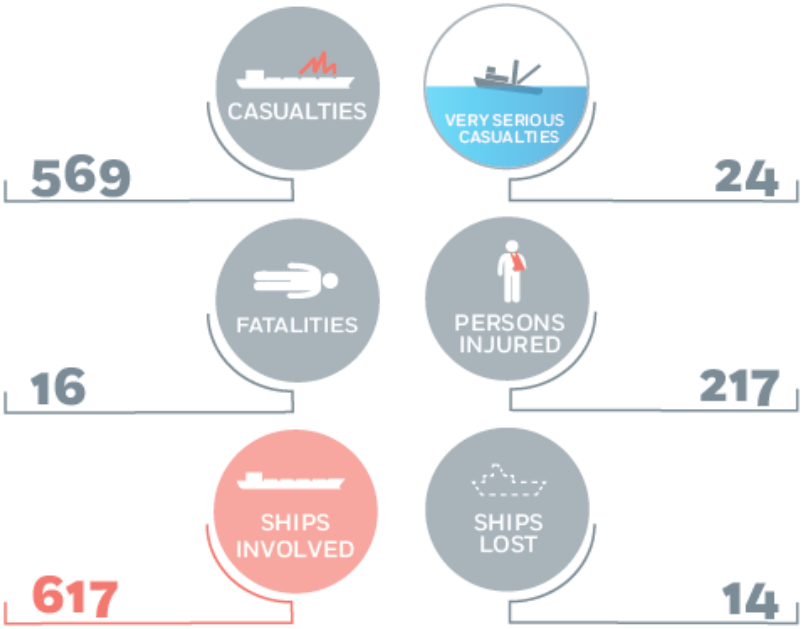
Almost half of injuries on board cargo ships affect body's upper or lower extremities.

10/05/2019, Damage / loss of equipment and fall of crew member from height on deck on Oil Tanker "Alyarmouk"

Chapter 4: FISHING VESSELS

04/08/2019, Grounding / stranding of fishing vessel "Coelleira"

KEY FIGURES 2019



4.0 Executive summary about Fishing Vessels

In 2019, some indicators related to fishing vessels have restarted to deteriorate.

A total of 3455 fishing vessels were involved in a marine casualty or incident over the period 2014-2019, which represented 16% of all occurrences.

With a number of 617 ships involved, the year 2019 remained above the period average (575). When compared to the evolution of the fishing vessels fleet since 2015, the overall increase of casualties involving a fishing vessel is clearly visible (from 0.069 to 0.081 in 2019). When comparing with the evolution of the EU flag fishing vessel fleet since 2014, an increase of the ratio 'ship involved' / 1000xEU flag fishing vessel' was noted between 2014 and 2019 (from 69 to 81).

Among the fishing vessels, trawlers represented the main type having incidents with 53.7% of all fishing vessels involved.

The rate of Very Serious casualties is 5.3%, and 44% when the severity is Serious. In both cases, the severity of occurrences affecting fishing vessels is much higher compared to the overall fleet, where Very Serious occurrences represent 3% and the serious ones 25%.

The number of events related to issues of a navigational nature, such as contacts, grounding/stranding and collision, represented one third of the total of events, while another third was due to loss of propulsion power. As concerns occurrences to person(s), slipping, stumbling and falling of persons on one hand and loss of control of machines on the other hand cumulated half of all deviations.

In 2019, 14 fishing vessels were lost. This type of ships is by far the category where the highest number of ships were lost, in comparison with an average of 11 losses per year for the other ship types all together. Among the fishing vessel losses, almost half of them were trawlers.

During the 2014-2019 period, 89 accidents involving fishing vessels resulted in a total of 173 lives lost. The decrease observed since 2016 started to reverse in 2019 (12 fatalities in 2018 versus 16 fatalities in 2019). Crew have been the most impacted category of victims over this period with 168 fatalities.

In 2019 there were 217 injured persons reported. This number has slowly decreased since 2017 (reduction of 10%).

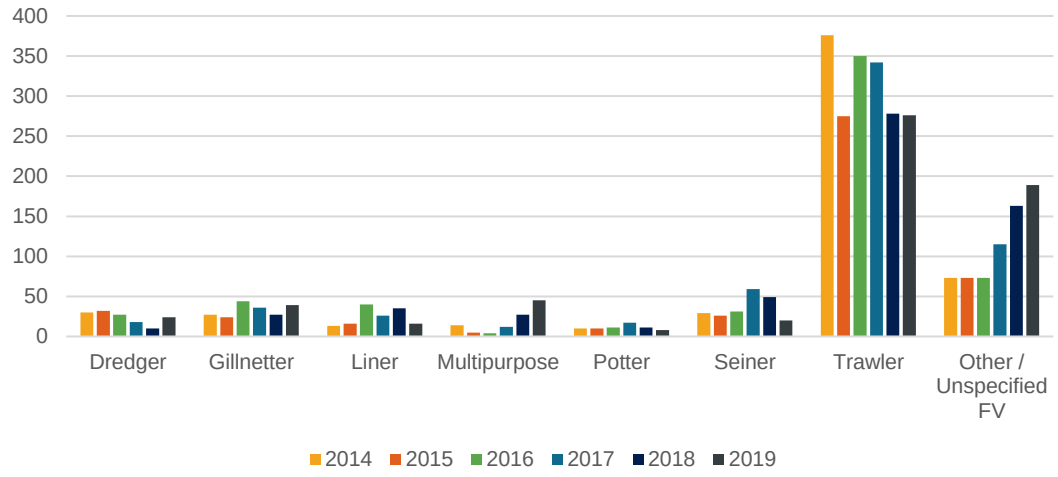
While the departure phase appeared to be the safest phase of a fishing vessel voyage, the en route segment, when fishing operations take place, is by far the most unsafe. It was noted that 77% of the casualties occurred in coastal waters and open sea.

The main underlying factor leading to casualties was the "Human Action", which represented 55.6% of all accident events. In this category of events 56.5% of the contributing factors were related to shipboard operations. Such figures are similar to the ones when all ship types are considered.

In conclusion, it seems that during the year 2019, some indicators such as the number of occurrences or the number of fatalities have increased in a limited way. Fishing vessels remain by far the activity with highest records in terms of severity of casualties in comparison with the other ship types: number of fatalities, number of ships lost are among such indicators.

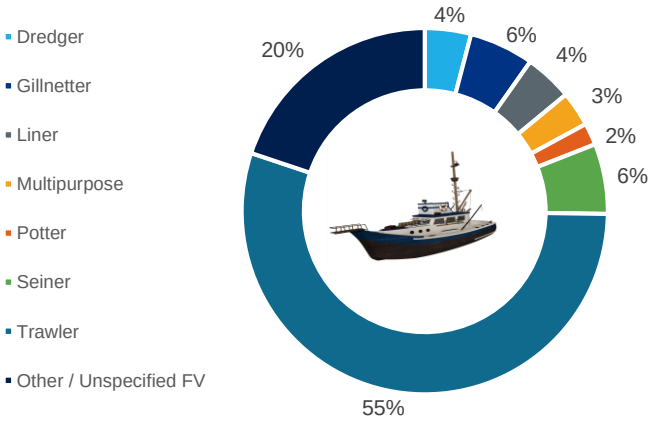
4.1 Detailed distribution

Figure 4.1: Distribution of fishing vessel types involved



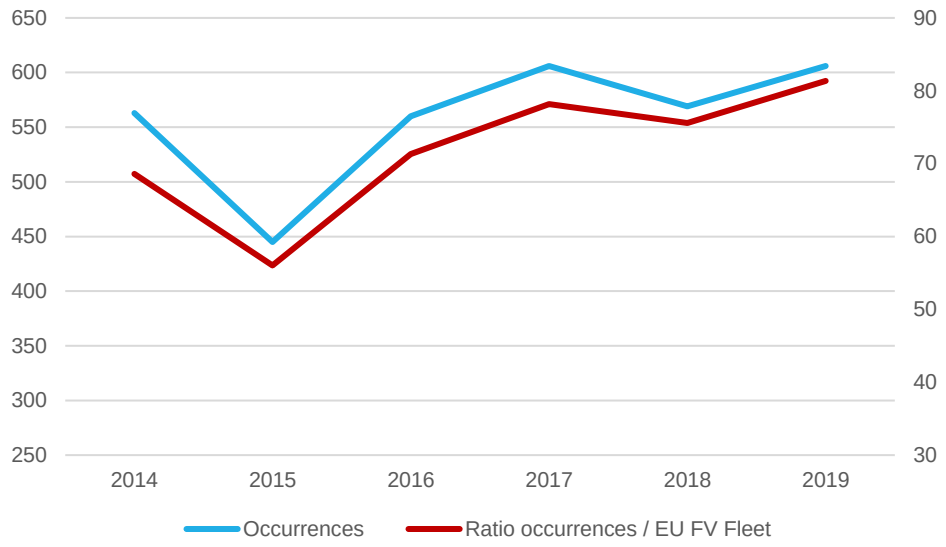
	2014	2015	2016	2017	2018	2019	Total
Dredger	30	32	27	18	10	24	141
Gillnetter	27	24	44	36	27	39	197
Liner	13	16	40	26	35	16	146
Multipurpose	14	5	4	12	27	45	107
Potter	10	10	11	17	11	8	67
Seiner	29	26	31	59	49	20	214
Trawler	376	275	350	342	278	276	1897
Other / Unspecified FV	73	73	73	115	163	189	686
Total	572	461	580	625	600	617	3455

Since 2017, the number of fishing vessels involved in a marine casualty has increased over 600 per year. If a decrease was noted in 2019 for liners or seiners, the trend is more generally oriented with an increase for most of the categories (dredgers, gillnetters, multipurpose or other/unspecified).



Among fishing vessels involved, the subcategory trawlers represented 55% of the marine casualties and incidents.

Figure 4.2: Safety indicators: occurrences versus fleet

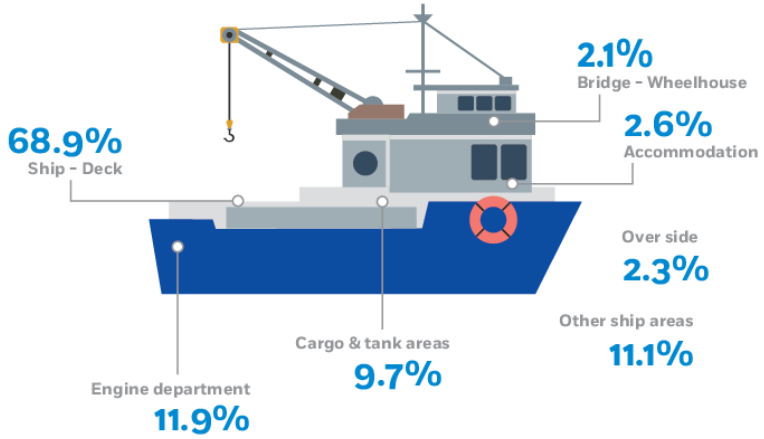


	2014	2015	2016	2017	2018	2019
Occurrences involving an EU Flag ship	563	445	560	606	569	606
EU Fishing Vessel Fleet	8206	7942	7854	7751	7529	7449
Ratio EU occ / EU fleet (x1,000)	69	56	71	78	76	81

In 2019, one fishing vessel flying an EU MS Flag out of a total of 6.8 was involved in a marine casualty.

Over the period 2014-2019, by comparing the evolution of the fleet of fishing vessels flying an EU MS Flag and the number of accidents that affected an EU MS Flag ship, the ratio has regularly increased since 2015, from 56 to 81, meaning an increase of 44.6%.

Figure 4.3: Main places of occurrence with person(s) on board fishing vessels for 2014-2019



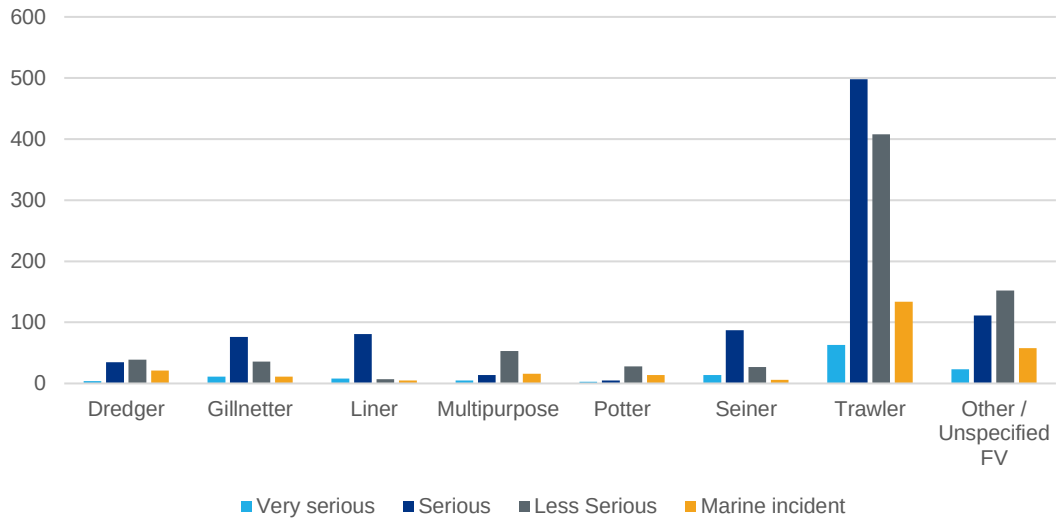
Accommodation	9
Bridge - Wheelhouse	7
Cargo & tank areas	33
Engine department	11
Ship - Deck	235
Over side	8
Other ship areas	38
Total	341

The most quoted location of marine casualties on board fishing vessels was ship decks (68.9%), in line with the nature of the operations on board of fishing vessels.

4.2 Nature of marine casualties and incidents

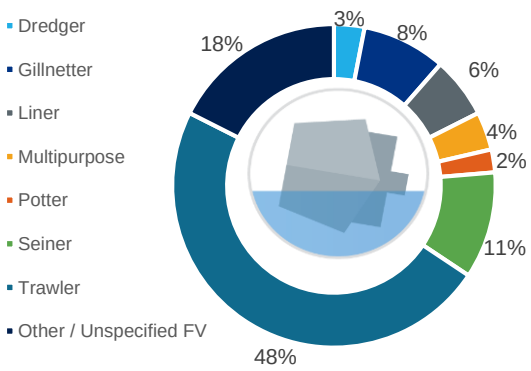
4.2.1 Occurrence with ship(s)

Figure 4.4: Distribution of severity per fishing vessel type for 2014-2019



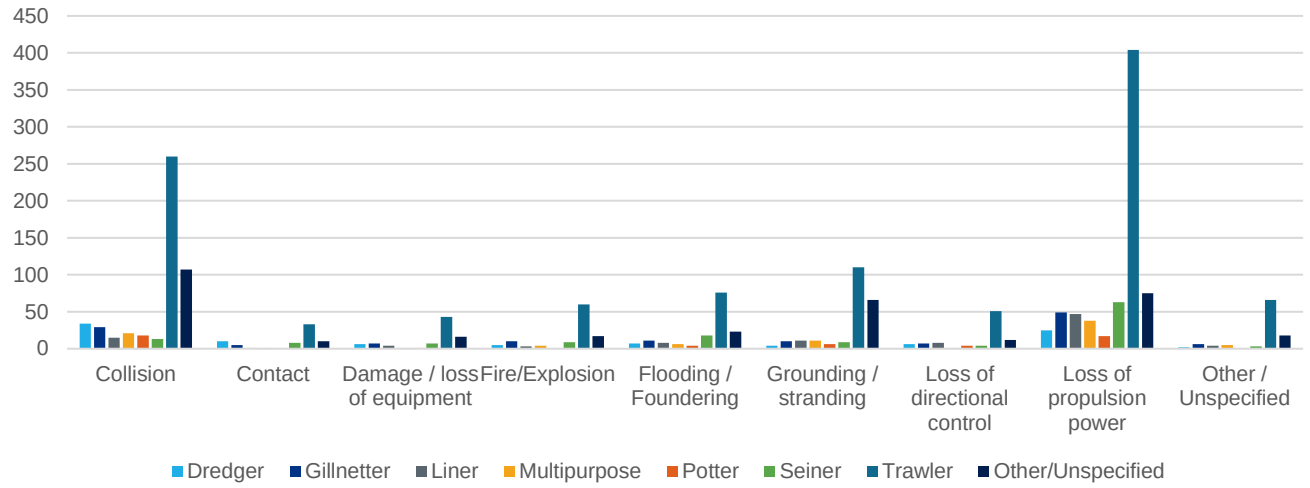
	Very serious	Serious	Less Serious	Marine incident	Total
Dredger	4	35	39	21	99
Gillnetter	11	76	36	11	134
Liner	8	81	7	5	101
Multipurpose	5	14	53	16	88
Potter	3	5	28	14	50
Seiner	14	87	27	6	134
Trawler	63	498	408	134	1103
Other / Unspecified FV	23	111	152	58	344
Total	131	907	750	265	2053

Trawlers represent 53.7% of all fishing vessels involved in a casualty. The sub-category "trawler stern" is by far the most unsafe type of fishing vessels, as it represents 59.3% of all trawlers and 32% of all fishing vessels involved.



Among all fishing vessels, 48% of the very serious casualties involved trawlers.

Figure 4.5: Distribution of casualty events per fishing vessel type for 2014-2019



	Collision	Contact	Damage / loss of equipment	Fire / Explosion	Flooding / Foundering	Grounding / stranding	Loss of directional control	Loss of propulsion power	Other / Unspecified	Total
Dredger	34	10	6	5	7	4	6	25	2	99
Gillnetter	29	5	7	10	11	10	7	49	6	134
Liner	15	1	4	3	8	11	8	47	4	101
Multipurpose	21	1	1	4	6	11	1	38	5	88
Potter	18	0	1	0	4	6	4	17	0	50
Seiner	13	8	7	9	18	9	4	63	3	134
Trawler	260	33	43	60	76	110	51	404	66	1103
Other/Unspecified	107	10	16	17	23	66	12	75	18	344
Total	497	68	85	108	153	227	93	718	104	2053

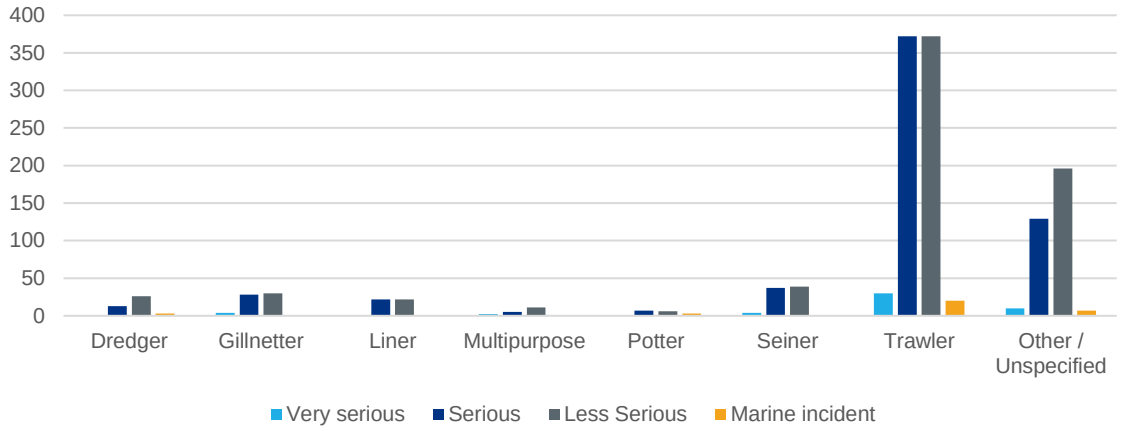
Loss of propulsion power, with 35% of all casualty events, was the most quoted category.

By grouping collision, contact and grounding / stranding, casualties of navigational nature represent another third of all casualty events (38%).

04/05/2019, foundering of fishing vessel "Zaira"

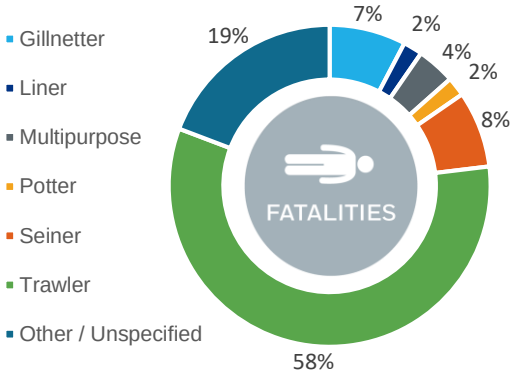
4.2.2 Occurrence with person(s)

Figure 4.6: Severity of occurrence with person(s)s per fishing vessel type for 2014-2019



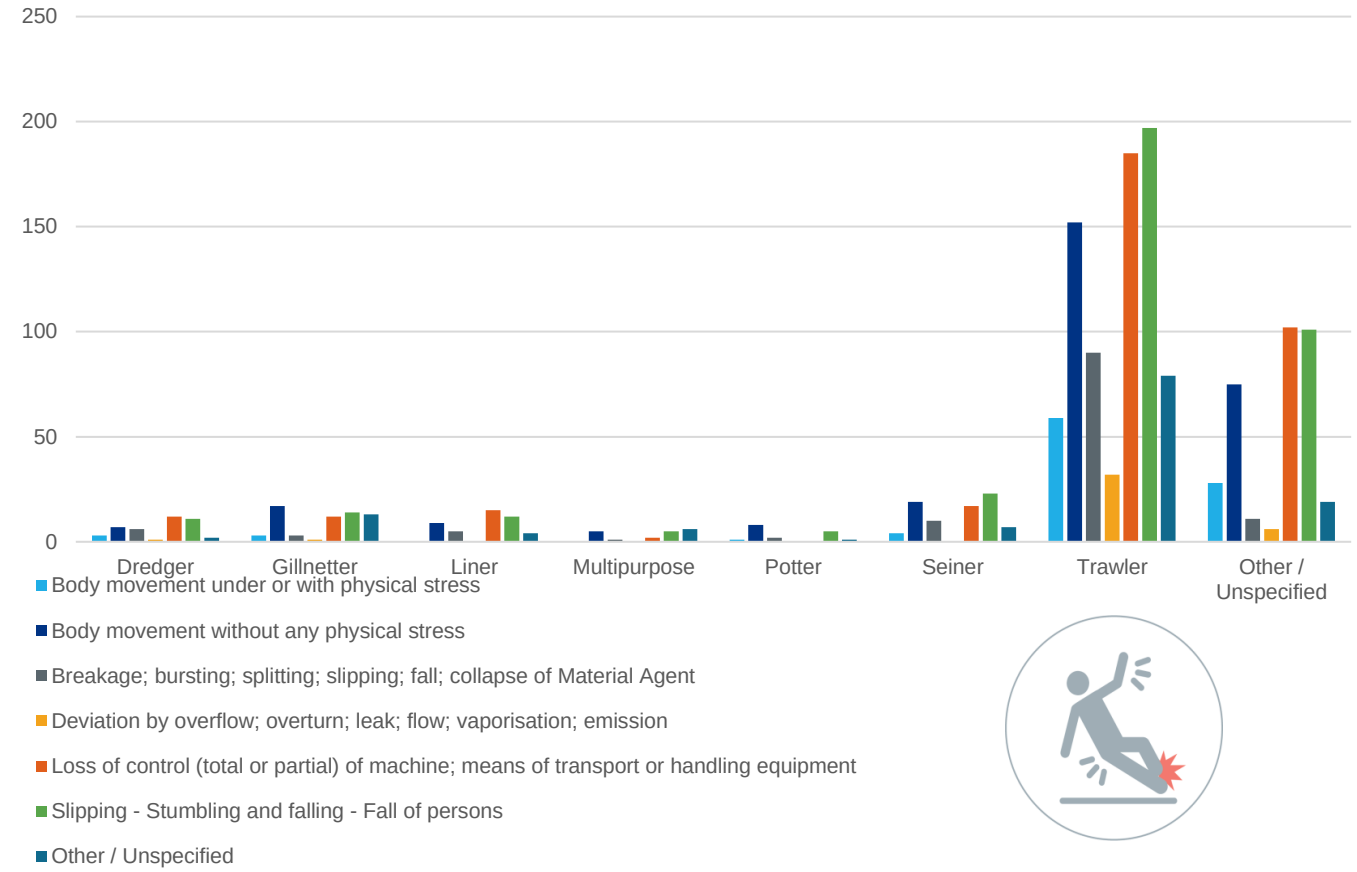
	Very serious	Serious	Less Serious	Marine incident	Total
Dredger	0	13	26	3	42
Gillnetter	4	28	30	1	63
Liner	1	22	22	0	45
Multipurpose	2	5	11	1	19
Potter	1	7	6	3	17
Seiner	4	37	39	0	80
Trawler	30	372	372	20	794
Other / Unspecified	10	129	196	7	342
Total	52	613	702	35	1402

Similar to casualty events, accidents to persons, with a total of 57% of all deviations, happened mainly on trawlers.



With 58%, the fatality rate is logically the highest on-board trawlers.

Figure 4.7: Distribution of deviations per fishing vessel type for 2014-2019



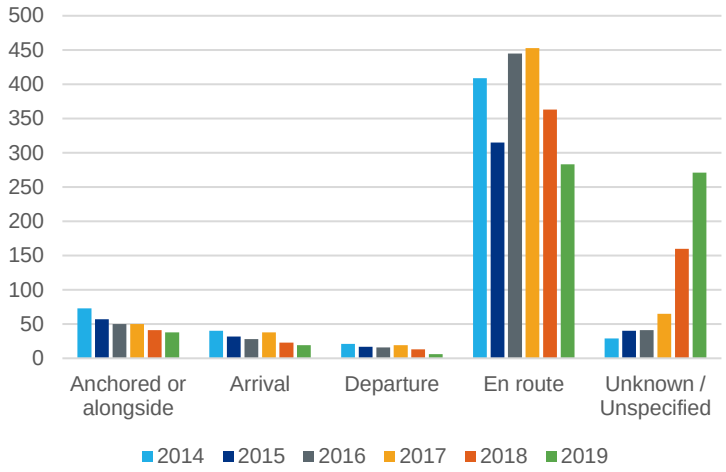
	Body movement under or with physical stress	Body movement without any physical stress	Breakage; bursting; splitting; slipping; fall; collapse of Material Agent	Deviation by overflow; overturn; leak; flow; vaporisation; emission	Loss of control (total or partial) of machine; means of transport or handling equipment	Slipping - Stumbling and falling - Fall of persons	Other / Unspecified	Total
Dredger	3	7	6	1	12	11	2	42
Gillnetter	3	17	3	1	12	14	13	63
Liner	0	9	5	0	15	12	4	45
Multipurpose	0	5	1	0	2	5	6	19
Potter	1	8	2	0	0	5	1	17
Seiner	4	19	10	0	17	23	7	80
Trawler	59	152	90	32	185	197	79	794
Other / Unspecified	28	75	11	6	102	101	19	342
Total	98	292	128	40	345	368	131	1402

Fall of persons and loss of control of machines or equipment's are the two main deviation categories with respectively 26.2% and 24.6%. Deviations on board trawlers represents 56.6% of the total.

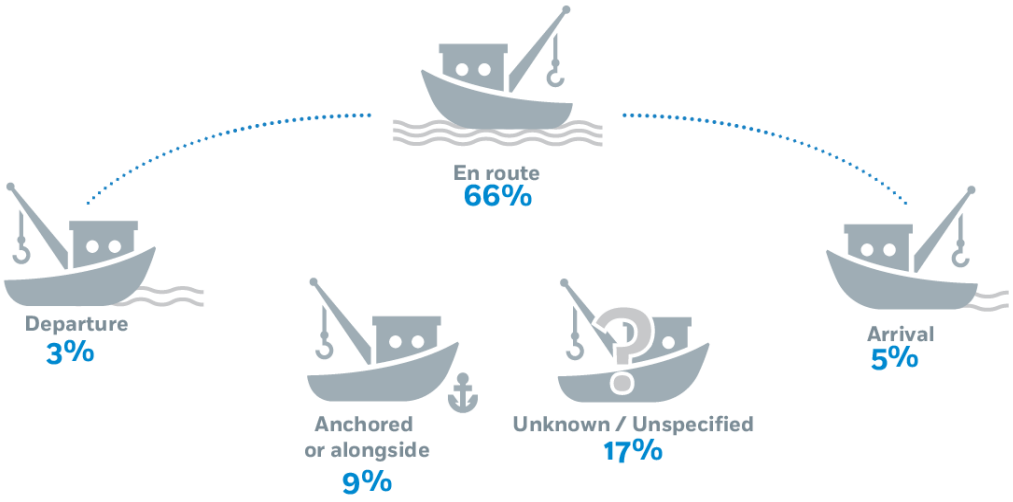
4.3 Location of the marine casualties and incidents

4.3.1 Voyage segments

Figure 4.8: Distribution by voyage segment



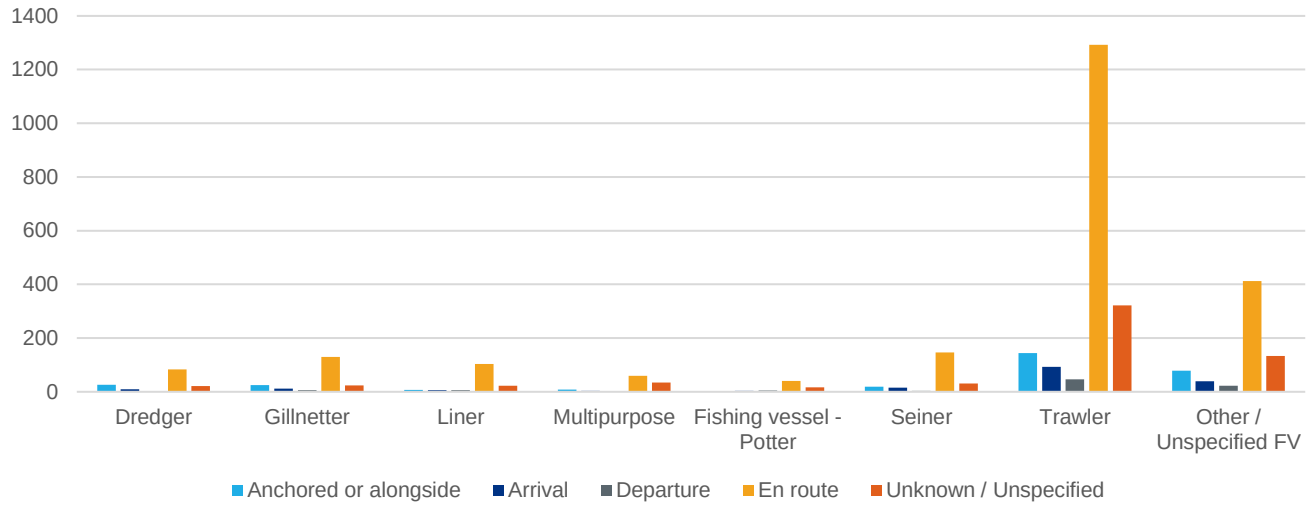
02/05/2019, fire on board fishing vessel "Suzanne II"



"En route", when fishing operations take place, is the segment where half of the occurrences took place.

	2014	2015	2016	2017	2018	2019	Total
Anchored or alongside	73	57	50	50	41	38	309
Arrival	40	32	28	38	23	19	180
Departure	21	17	16	19	13	6	92
En route	409	315	445	453	363	283	2268
Unknown / Unspecified	29	40	41	65	160	271	606
Total	572	461	580	625	600	617	3455

Figure 4.9: Distribution by voyage segment per fishing vessel type for 2014-2019



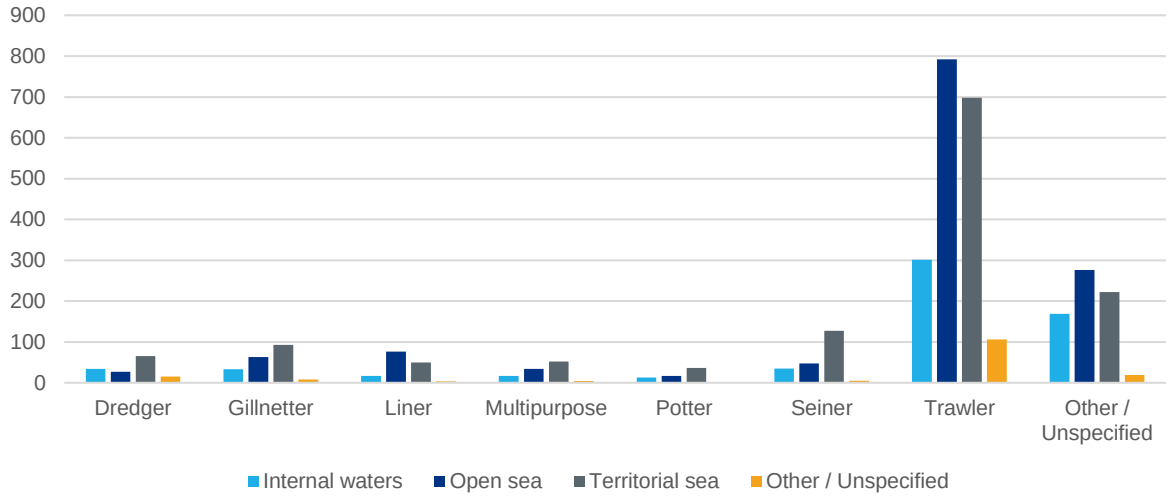
	Anchored or alongside	Arrival	Departure	En route	Unknown / Unspecified	Total
Dredger	26	9	2	83	21	141
Gillnetter	25	12	6	130	24	197
Liner	7	6	6	104	23	146
Multipurpose	8	3	1	60	35	107
Fishing vessel - Potter	2	3	5	41	16	67
Seiner	19	15	3	146	31	214
Trawler	144	93	46	1292	322	1897
Other / Unspecified FV	78	39	23	412	134	686
Total	309	180	92	2268	606	3455

For all fishing vessels, the “en route” segment is by far the most unsafe part of the ship voyage.

20/03/2018, collision between fishing vessel “Deborah” and General Cargo “Britannica Hav”

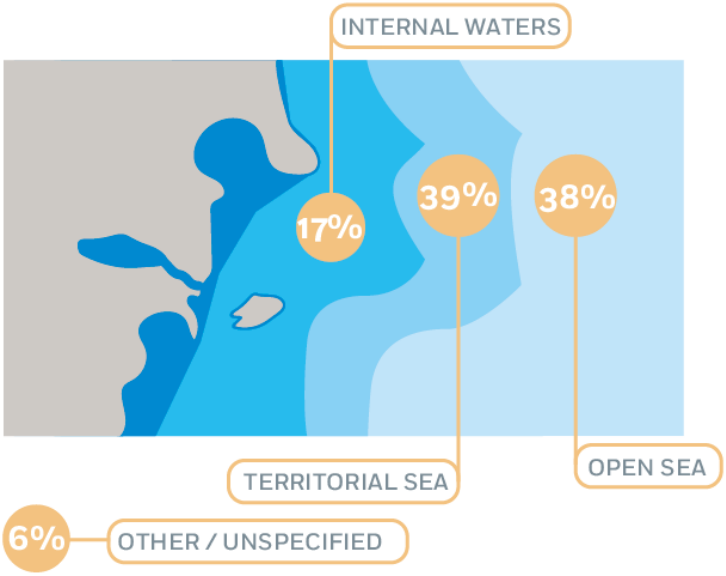
4.3.2 Location

Figure 4.10: Distribution by location of marine casualties and incidents per fishing vessel type for 2014-2019



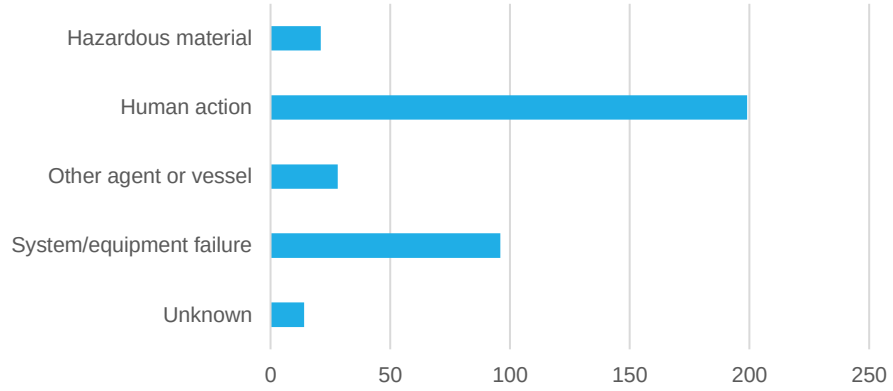
	Internal waters	Open sea	Territorial sea	Other / Unspecified	Total
Dredger	34	27	65	15	141
Gillnetter	33	63	93	8	197
Liner	17	76	50	3	146
Multipurpose	17	34	52	4	107
Potter	13	17	36	1	67
Seiner	35	47	127	5	214
Trawler	301	792	698	106	1897
Other / Unspecified	169	276	222	19	686
Total	619	1332	1343	161	3455

Accidents with fishing vessels take equally place in open sea (above 12nm from shore) or in territorial seas (coastal waters <= 12 nm). This repartition is explained by the type of fishing operation and/or the length of the vessel.



4.4 Accidental Events and Contributing Factors

Figure 4.11: Distribution of accident events in fishing vessels related events for the period 2014-2019

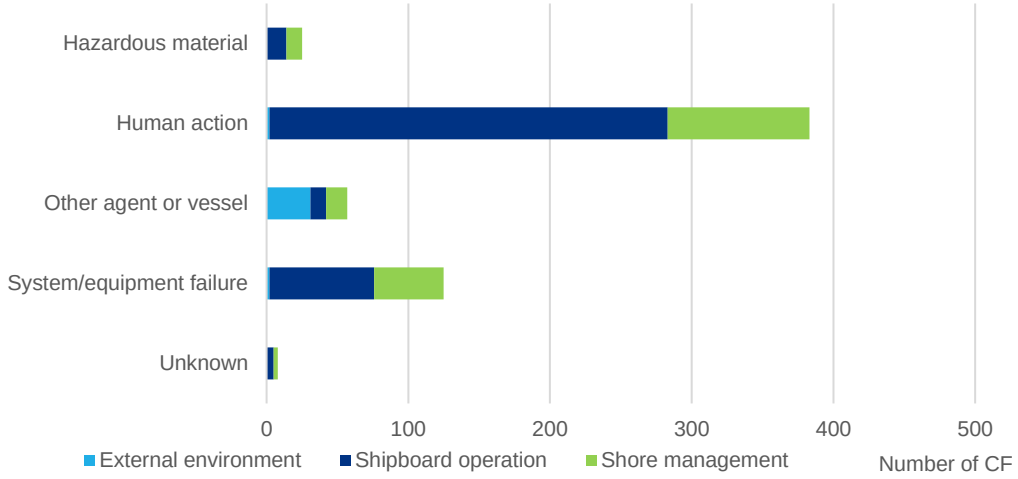


From a total of 358 accident events in fishing vessels analysed during the investigations, 55.6% were attributed to 'human action' category and 26.8% to 'system/equipment failure'.

Fishing vessels have the same trend for accident event distribution as marine casualties in general.

Accident events types	Number of accident events
Hazardous material	21
Human action	199
Other agent or vessel	28
System/equipment failure	96
Unknown	14
Total	358

Figure 4.12: Relationship between accident events and the contributing factors in fishing vessels for 2014-2019

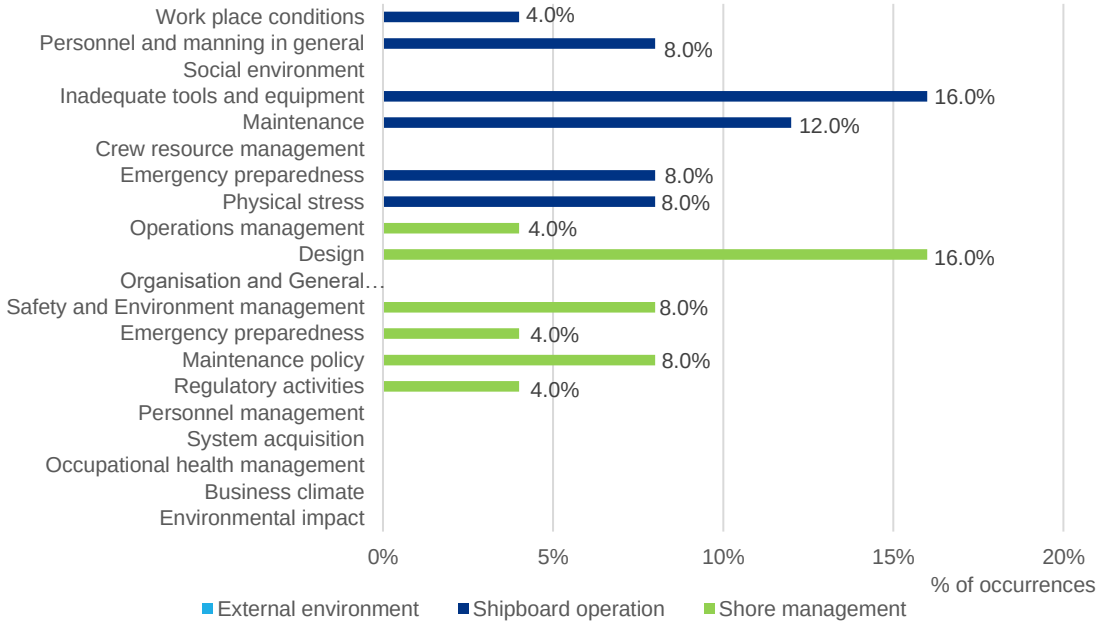


598 contributing factors were associated to 358 accident events. In every accident with a fishing vessel involved, 1.67 contributing factors was recorded.

The main accident events type was human action failure associated with the factor shipboard operation.

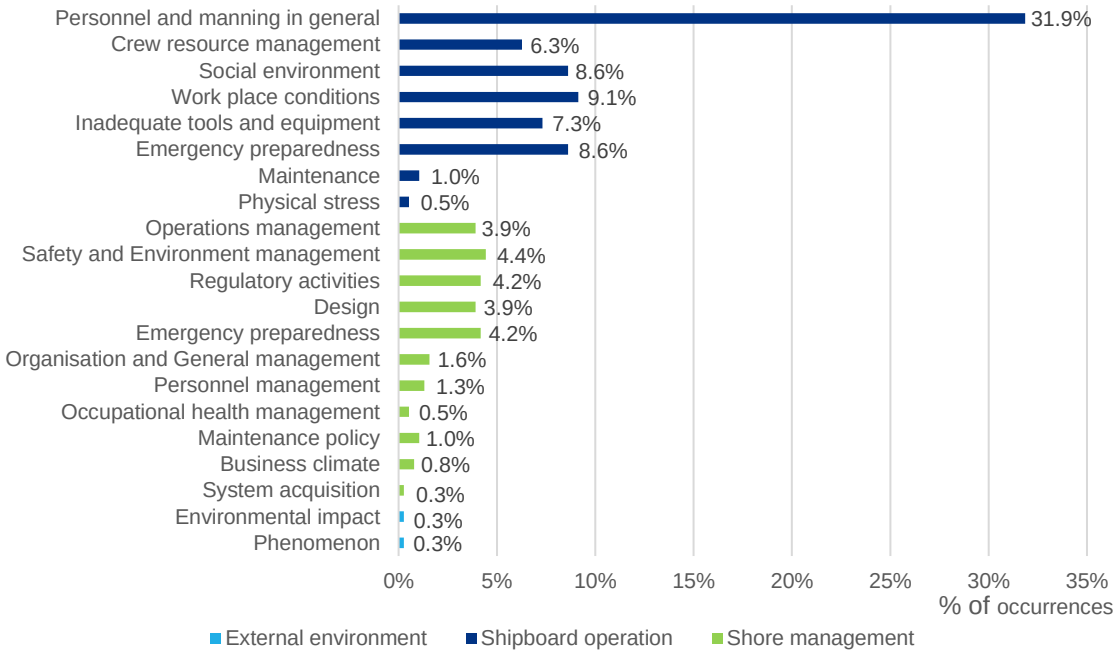
Fishing vessels				
Accident events types	**Number of contributing factors**	**Contributing factors categories involved in each accident events type**		
		External environment	**Shipboard operation**	**Shore management**
Hazardous material	25	0	14	11
Human action	383	2	281	100
System/equipment failure	125	2	74	49
Other agent or vessel	57	31	11	15
Unknown	8	0	5	3
Total	598	35	385	178

Figure 4.13: Contributing factors involved in "Hazardous Material" accident events, distributed by categories



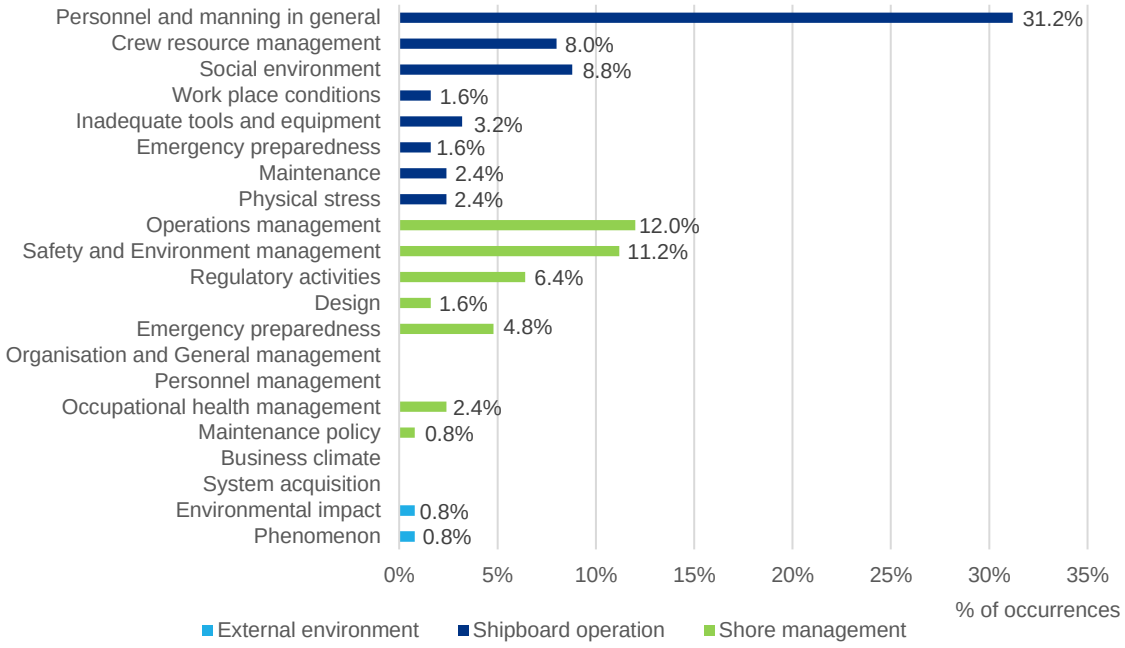
In the area of Hazardous Material, 'Inadequate tools and equipment' and 'maintenance' are the main contributing factors related to shipboard operation. When it is linked to shore management, 'design' is by far the most reported.

Figure 4.14: Contributing factors involved in "Human Action" accident events, distributed by categories



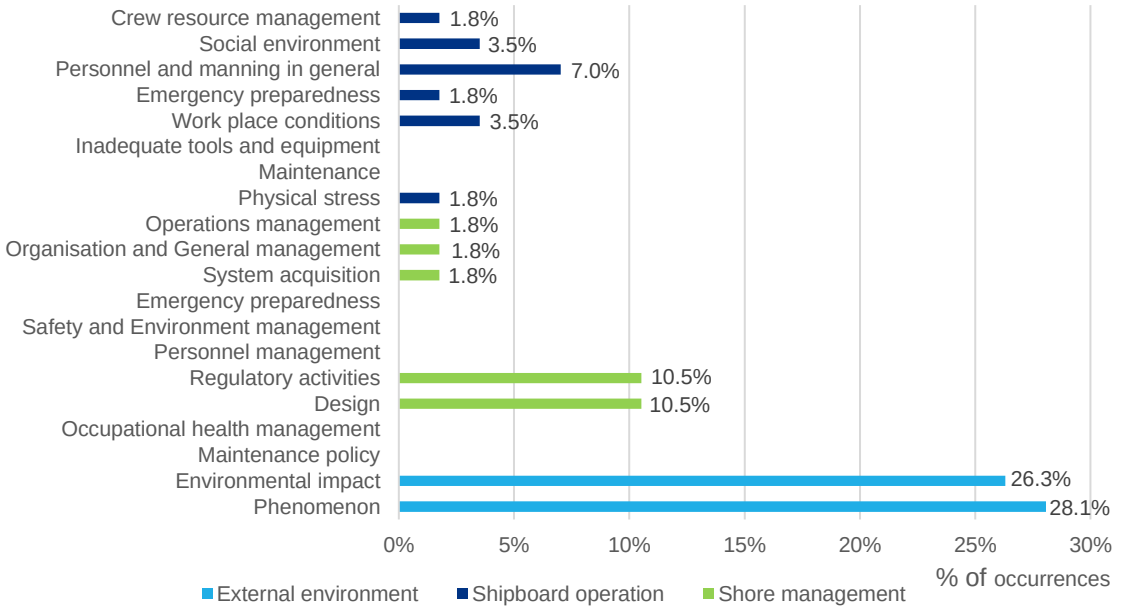
In the category 'Human Action', 'personnel and manning and general' is the most reported contributing factor associated to shipboard operation.

Figure 4.15: Contributing factors involved in "System / Equipment Failure" accident events, distributed by categories



With regards to 'System / Equipment Failure', 'personnel and manning in general' is again and by far the most reported factor' when it related to shipboard operation. 'Operations management' and 'safety and environment management' are were equally reported in the category with shore management.

Figure 4.16: Contributing factors involved in "Other Agent or Vessel" accident events, distributed by categories

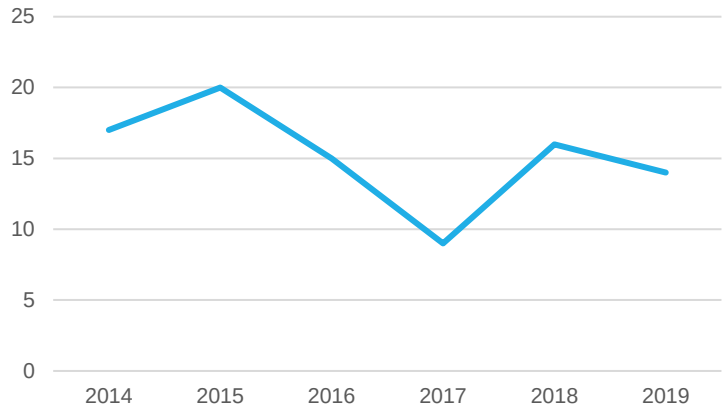


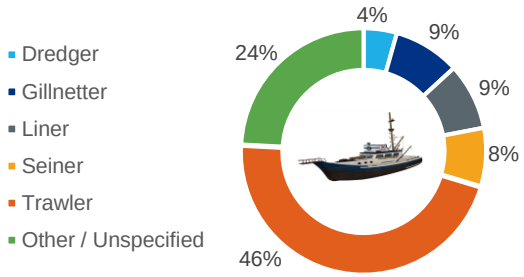
'External environment' is the most important contributing factor in the 'other agent or vessel' events analysed. 'Environmental impact' and 'Phenomenon' are almost equally reported.
The factors in categories 'shipboard operation' and 'shore management' were fairly distributed within each category.

4.5 Consequences

4.5.1 Consequences to ships

Figure 4.17: Fishing vessels lost



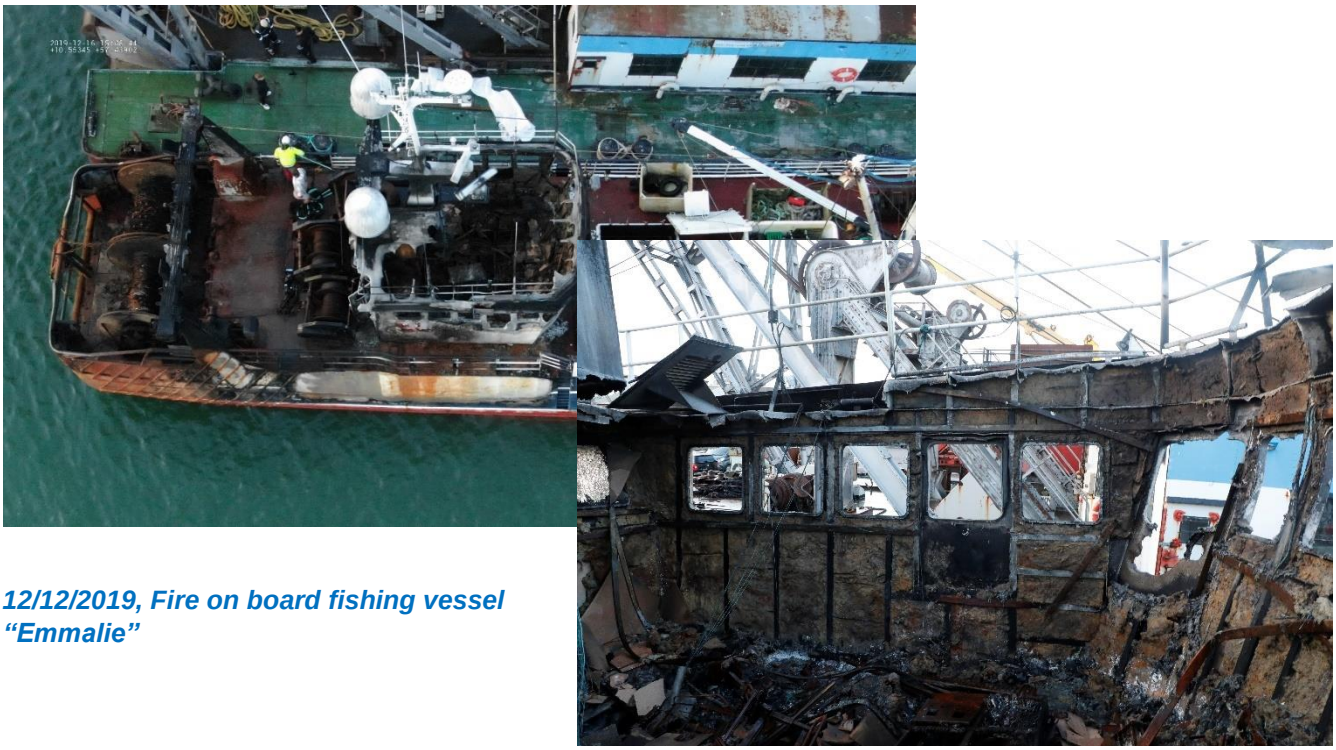


	2014	2015	2016	2017	2018	2019	Total
Fishing vessels lost	17	20	15	9	16	14	91

Dredger	4
Gillnetter	8
Liner	8
Seiner	7
Trawler	42
Other / Unspecified	22
Fishing vessels lost	91

In 2019, a limited reduction of the lost fishing vessels was noted.

Almost half of lost fishing vessels were trawlers.

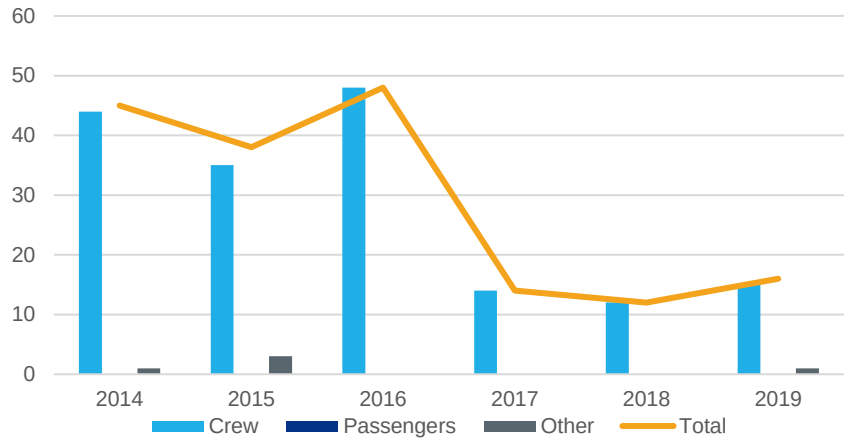


12/12/2019, Fire on board fishing vessel "Emmalie"

4.5.2 Consequences to persons

4.5.2.1 Fatalities

Figure 4.18: Number of fatalities

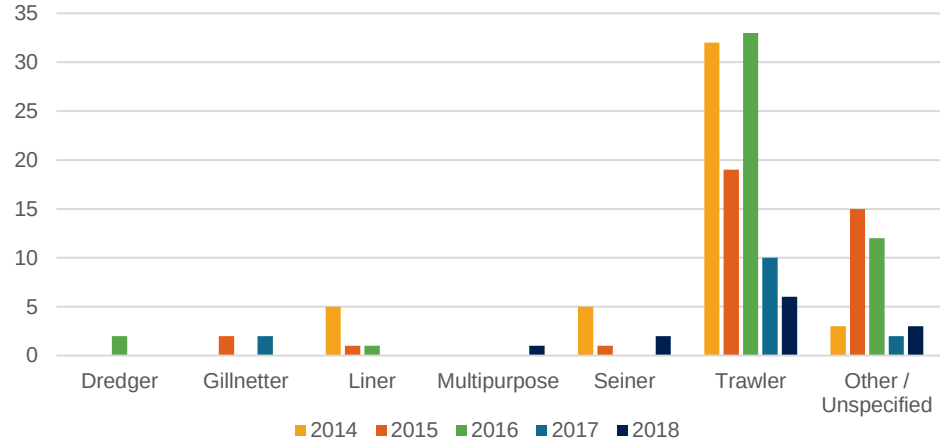


In 2019, the number of fatalities has increased by 33% in comparison with 2018.

The nature of persons on board fishing vessels explains the high rate of crew members that lost their lives.

	2014	2015	2016	2017	2018	2019	Total
Crew	44	35	48	14	12	15	168
Passengers	0	0	0	0	0	0	0
Other	1	3	0	0	0	1	5
Fatalities	45	38	48	14	12	16	173

Figure 4.19: Distribution of fatalities per fishing vessel type

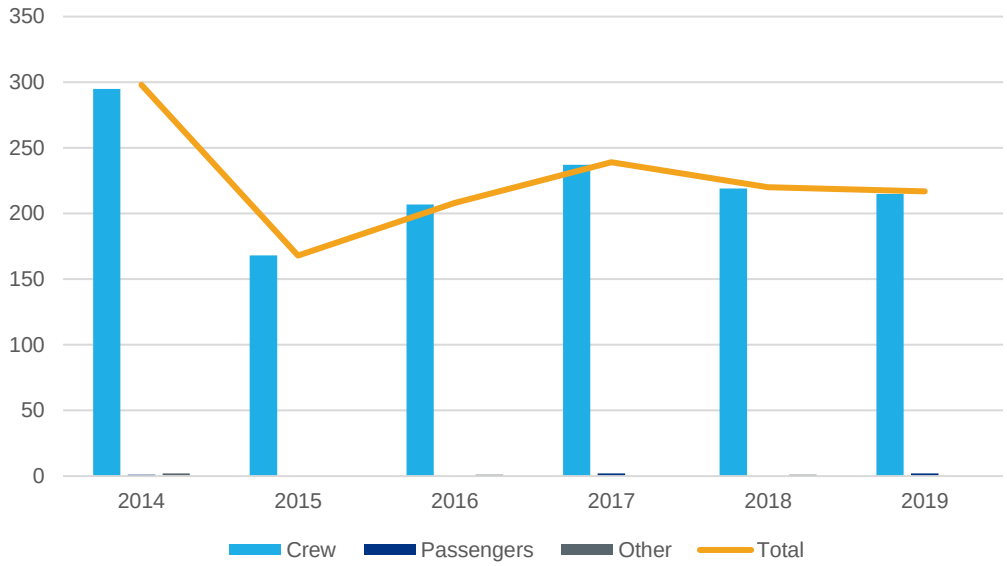


Almost 2 fatalities out of 3 took place on board trawlers.
At the subcategory level, 1 life out of 3 was lost on board stern trawlers.

	2014	2015	2016	2017	2018	2019	Total
Dredger	0	0	2	0	0	0	2
Gillnetter	0	2	0	2	0	6	10
Liner	5	1	1	0	0	0	7
Multipurpose	0	0	0	0	1	1	2
Seiner	5	1	0	0	2	1	9
Trawler	32	19	33	10	6	4	104
Other / Unspecified	3	15	12	2	3	4	39
Total	45	38	48	14	12	16	173

4.5.2.2 Injuries

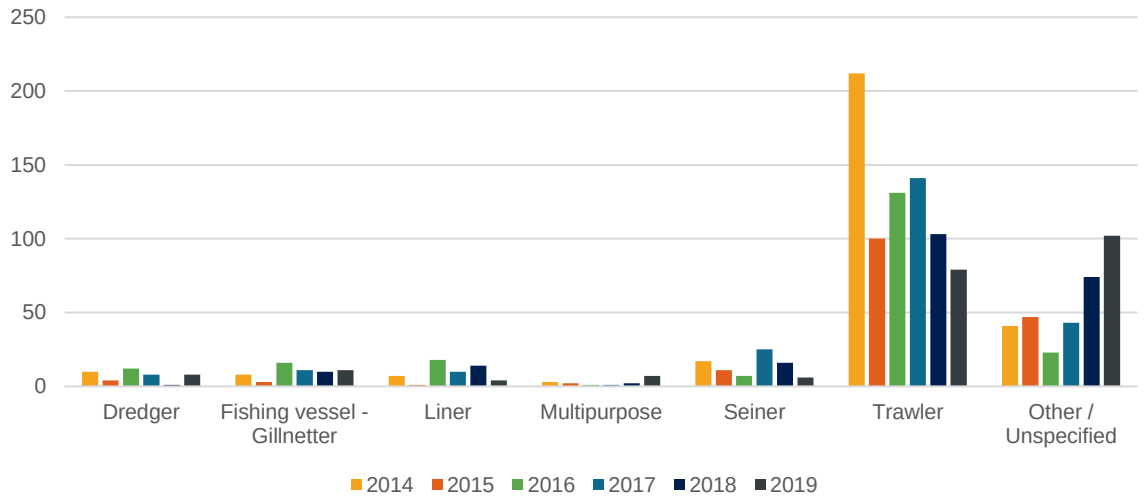
Figure 4.20: Number of injuries



	2014	2015	2016	2017	2018	2019	Total
Crew	295	168	207	237	219	215	1341
Passengers	1	0	0	2	0	2	5
Other	2	0	1	0	1	0	4
Total	298	168	208	239	220	217	1350

The average of injured fishermen over the last 6 years is around 225. In 2019, injuries continued to very slightly decreased in comparison with 2018.

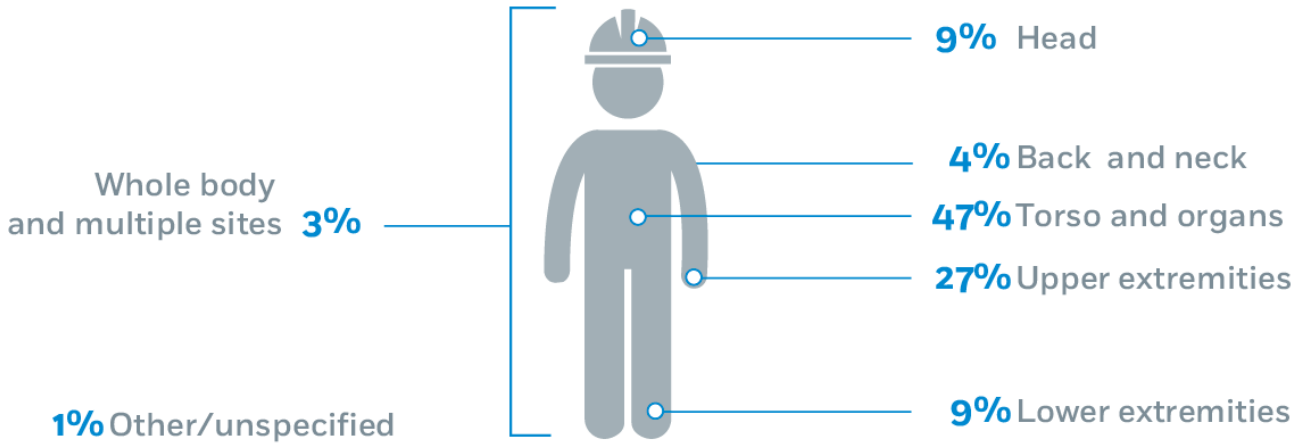
Figure 4.21: Distribution of injuries by fishing vessel type



	2014	2015	2016	2017	2018	2019	Total
Dredger	10	4	12	8	1	8	43
Fishing vessel - Gillnetter	8	3	16	11	10	11	59
Liner	7	1	18	10	14	4	54
Multipurpose	3	2	1	1	2	7	16
Seiner	17	11	7	25	16	6	82
Trawler	212	100	131	141	103	79	766
Other / Unspecified	41	47	23	43	74	102	330
Total	298	168	208	239	220	217	1350

More than one injury out of 2 took place on-board trawlers.

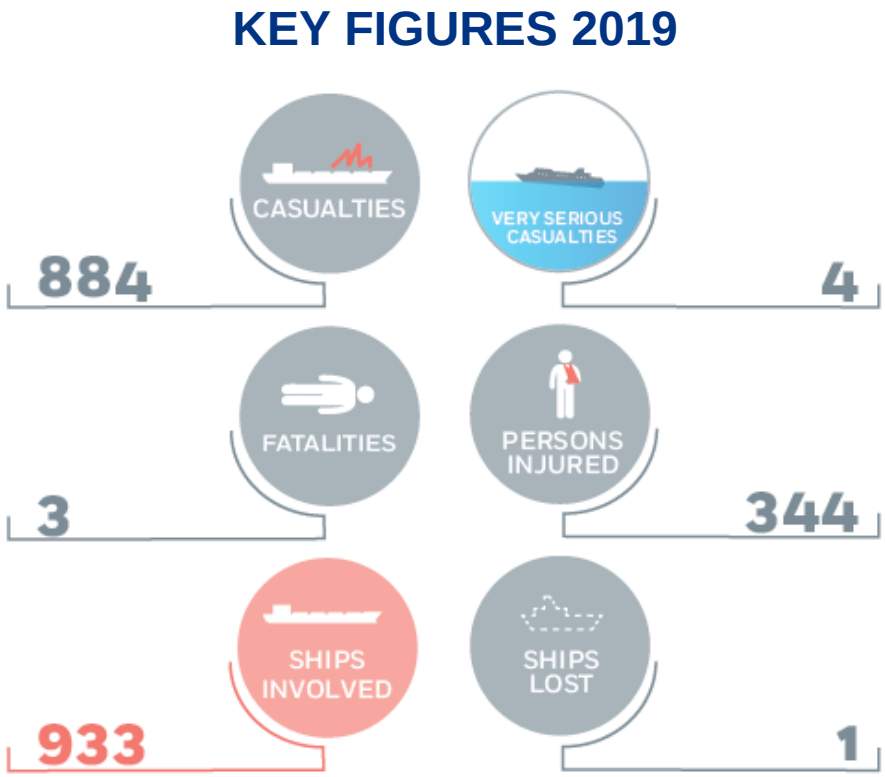
Figure 4.22: Part of body injured



Almost half of the injuries affected the torso and organs.

Back & Neck	20
Head	47
Lower Extremities	50
Torso and organs	256
Upper Extremities	149
Whole body and multiple sites	18
Other / Unspecified	8
Total of reported injuries	548

Chapter 5: PASSENGER SHIPS



23/03/2019, Loss of propulsion power in bad weather, passenger vessel "Viking Sky"

5.0 Executive summary about Passenger Ships

Casualty records in 2019 indicated a stabilisation of the safety level related to accidents involving passenger ships.

A total number of 5315 passenger ships were involved in a marine casualty or incident over the period 2014-2019, which represented one fourth of all occurrences. Since 2014, the number of passenger ships involved has remained close to the average of 885 ships per year. When comparing with the evolution of the EU flag passenger ship fleet since 2014, a small reduction of the ratio 'ship involved' / 1000xEU flag passenger ship' was noted between 2014 and 2018 (from 384 to 356). This ratio increased by 4% in 2019.

Among the overall passenger ships, passenger ships carrying only passengers (OP) and ships carrying passengers and Ro-Ro cargo (PRC) equally contributed to the total number of casualties.

The rate of Very Serious casualties is 0.85%, and 16% when the severity is Serious. In both cases, the severity of occurrences affecting passenger ships is very low in comparison with the overall fleet, where Very Serious occurrences represent 3% and Serious represents 25%.

Almost half of the casualties with a ship (44%) were related to issues of a navigational nature, such as contacts, grounding/stranding and collision.

As concerns occurrences to person(s), 38.5% were attributed to slipping, stumbling and falling of persons.

In 2019 1 passenger ship was lost.

Over the overall period, out of a total of 12 passenger ships lost, 7 were carrying only passengers while 4 were ferries, carrying passengers and Ro-Ro cargo.

During the 2014-2019 period, 27 accidents involving passenger ships resulted in a total of 42 lives lost. The decrease observed since 2014 continued in 2019 and 3 lives lost were recorded in 2019. Crew and passengers were equally affected.

In 2019 there were 344 injured persons reported. This number has progressively decreased since 2015 and appears to be stabilised around 350 injured per year. Again, with a total of 55%, crew represented the main category of persons injured at sea over the period 2014-2019.

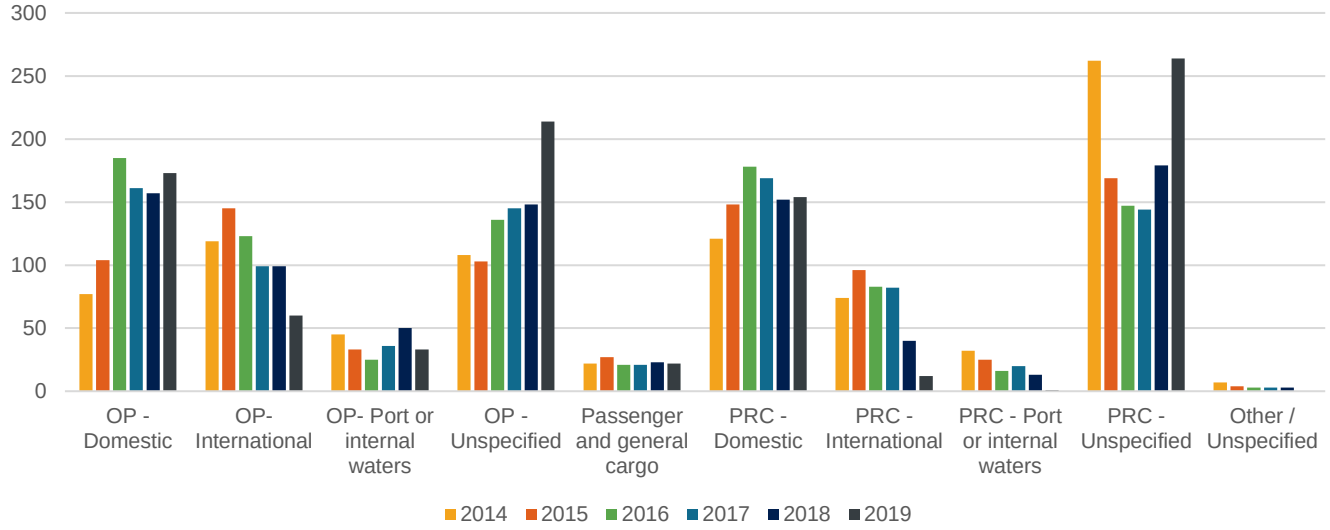
The departure phase appeared to be the safest phase of a voyage, while "en route" represented the most unsafe segment. It was noted that 59.7% of the casualties occurred in internal waters.

The main underlying factor leading to casualties was the "Human Action", which represented 52.9% of all accident events. In this category of events, 53% of the contributing factors were related to shipboard operations. Such figures are similar to the ones when all ship types are considered.

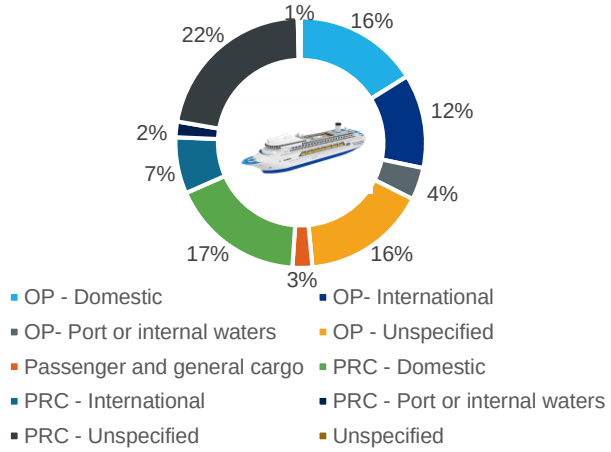
In conclusion, the year 2019 saw some improvements of several indicators, such as the number of passenger ships lost or the number of fatalities. The stabilisation of other indicators such as the number of injured persons was also noted. However, the number of passenger ships involved in an accident has slowly increased. The overall picture can be considered as a stabilisation of the safety level of passenger ships.

5.1 Detailed distribution

Figure 5.1: Distribution of passenger ship types involved



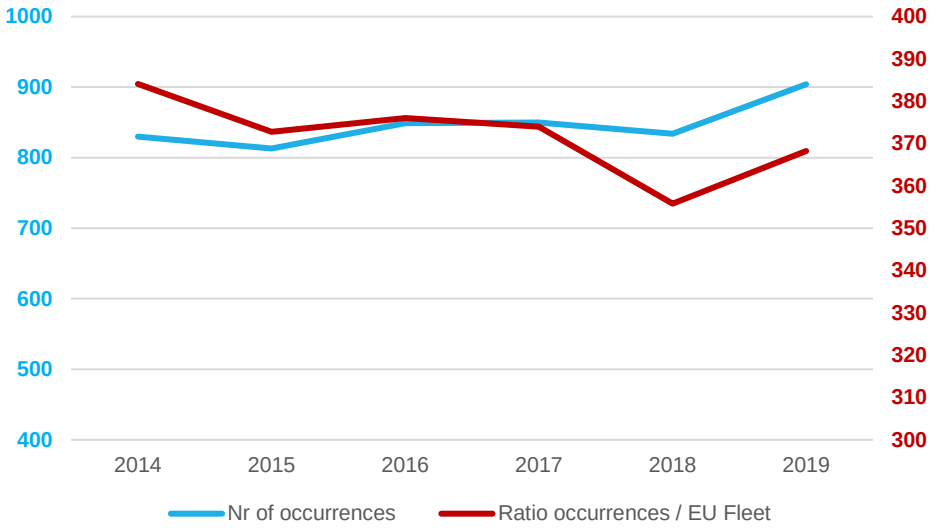
	2014	2015	2016	2017	2018	2019	Total
OP - Domestic	77	104	185	161	157	173	857
OP- International	119	145	123	99	99	60	645
OP- Port or internal waters	45	33	25	36	50	33	222
OP - Unspecified	108	103	136	145	148	214	854
Passenger and general cargo	22	27	21	21	23	22	136
PRC - Domestic	121	148	178	169	152	154	922
PRC - International	74	96	83	82	40	12	387
PRC - Port or internal waters	32	25	16	20	13	1	107
PRC - Unspecified	262	169	147	144	179	264	1165
Other / Unspecified	7	4	3	3	3	0	20
Total	867	854	917	880	864	933	5315



Among the passenger ships involved, passenger ships carrying only passengers (OP) and ships carrying passengers and Ro-Ro cargo (PRC) equally shared the total number of casualties. Among the subcategories, OP and PRC trading in port areas, as well as the ships carrying passenger and general cargo were less involved in accidents.

OP: Passenger ship carrying only passengers PRC: Passenger ship carrying passengers and Ro-Ro cargo (acronyms used throughout chapter).

Figure 5.2: Safety indicators: occurrences versus fleet

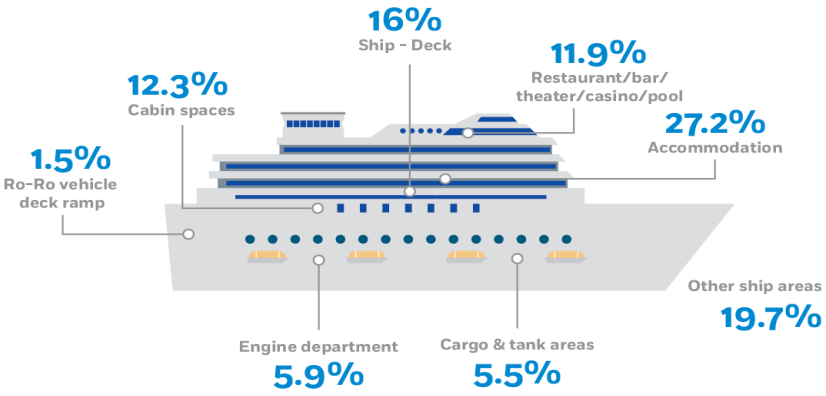


	2014	2015	2016	2017	2018	2019
Occurrences involving an EU Flag ship	830	813	849	850	834	904
EU Passenger ship Fleet	2161	2181	2258	2273	2344	2455
Ratio EU occ / EU fleet (x1,000)	384	373	376	374	356	368

In 2019, one passenger ship flying an EU MS Flag out of a total of 2.7 was involved in a marine casualty.

Over the period 2014-2019, by comparing the evolution of the fleet of passenger ships flying an EU MS Flag and the number of accidents that affected an EU MS Flag ship, the ratio has regularly decreased since 2015, from 384 to 351 in 2018. It has however increased 3.4% in 2019.

Figure 5.3: Main places of occurrence with person(s) on board passenger ships for 2014-2019



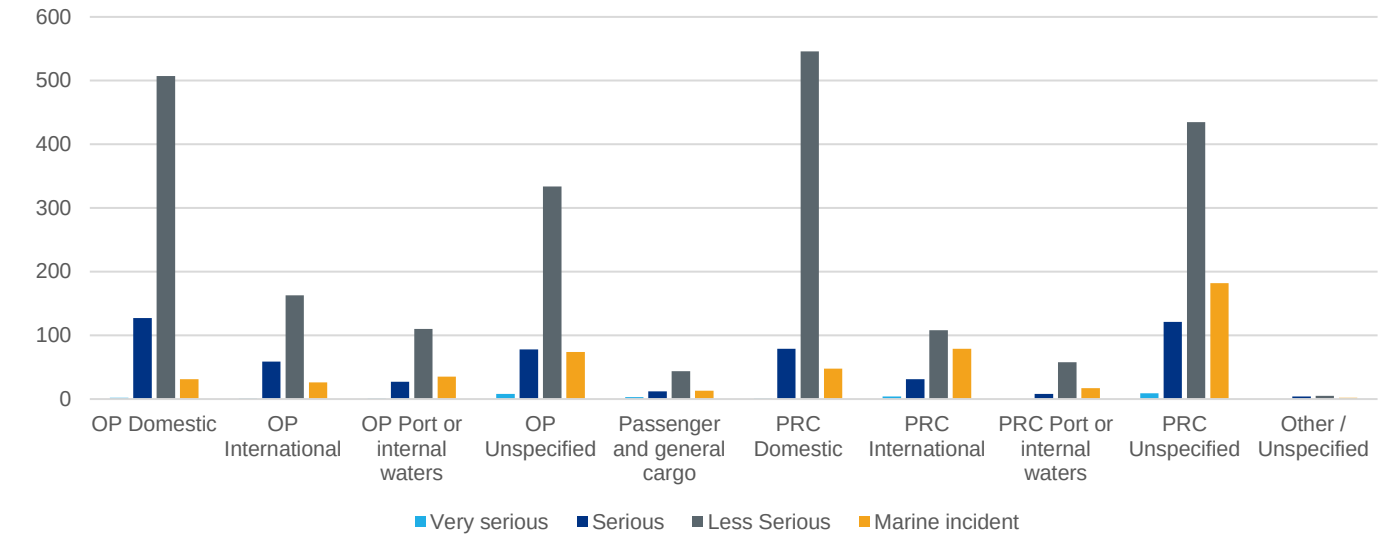
Accommodation	265
Cabin spaces	120
Restaurant/bar/theatre/casino/pool	116
Cargo & tank areas	54
Ro-Ro vehicle deck ramp	15
Engine department	58
Ship - Deck	156
Other ship areas	192
Total places reported	976

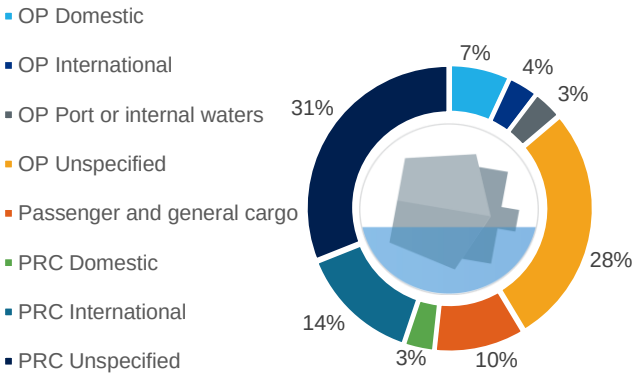
More than half of the accidents happened in the areas dedicated to passengers: Accommodation, Cabin spaces and the Restaurant/Bar/Theatre.

5.2 Nature of marine casualties and incidents

5.2.1 Occurrence with ship(s)

Figure 5.4: Distribution of severity per passenger ship type for 2014-2019

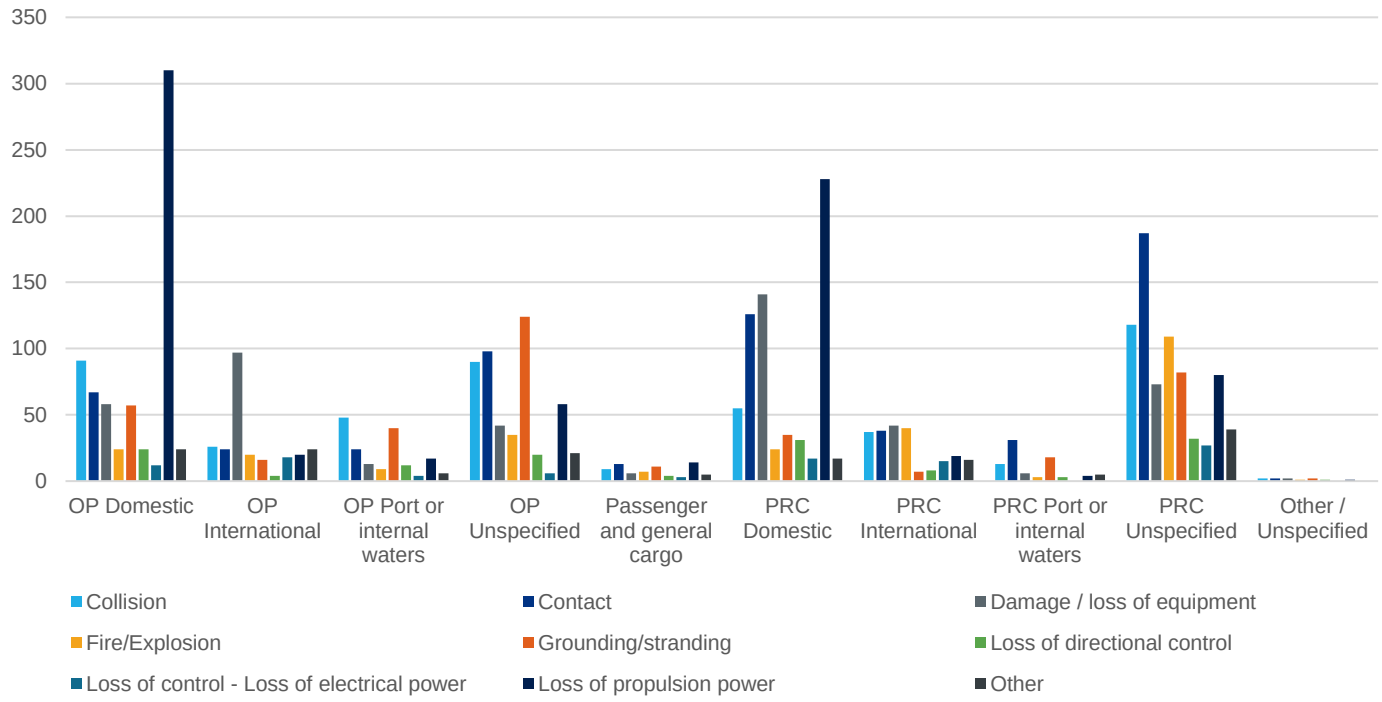




The rate of passenger ships involved in a very serious occurrence with ship(s) is very low (0.85%), when compared with the overall fleet for which the very serious represent 3%. Similarly, the rate of serious casualties (16%) is also low.

	Very serious	Serious	Less Serious	Marine incident	Total
OP Domestic	2	127	507	31	667
OP International	1	59	163	26	249
OP Port or internal waters	1	27	110	35	173
OP Unspecified	8	78	334	74	494
Passenger and general cargo	3	12	44	13	72
PRC Domestic	1	79	546	48	674
PRC International	4	31	108	79	222
PRC Port or internal waters	0	8	58	17	83
PRC Unspecified	9	121	435	182	747
Other / Unspecified	0	4	5	2	11
Total	29	546	2310	507	3392

Figure 5.5: Distribution of casualty events per passenger ship type for 2014-2019

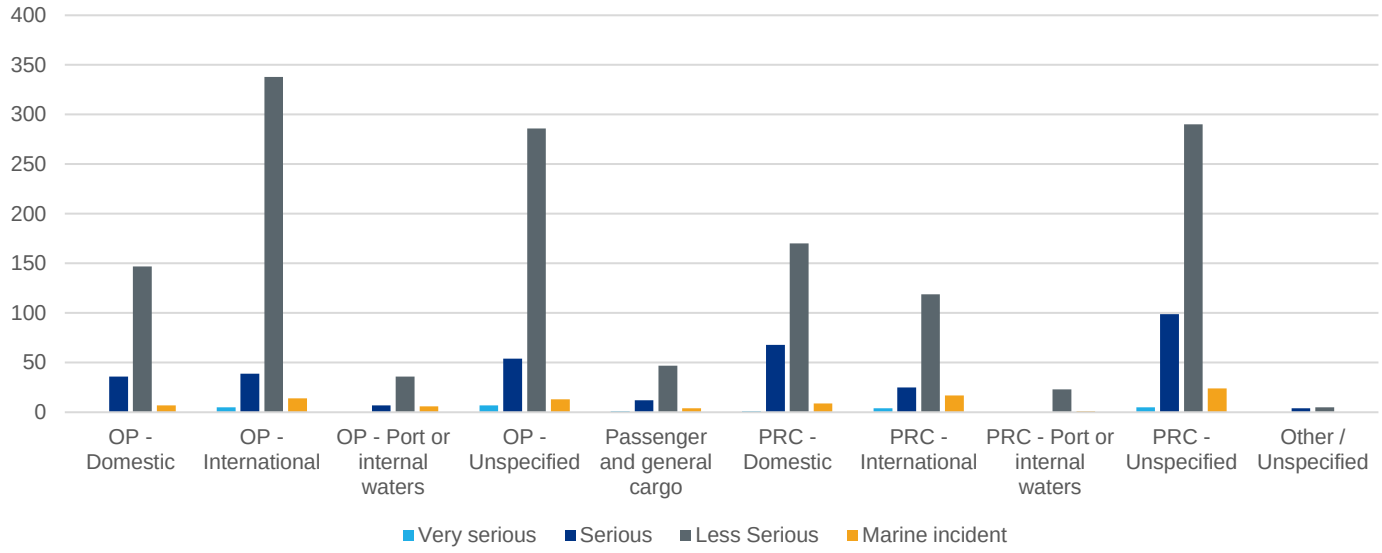


	Collision	Contact	Damage / loss of equipment	Fire / Explosion	Grounding / stranding	Loss of directional control	Loss of control - Loss of electrical power	Loss of propulsion power	Other	Total
OP Domestic	91	67	58	24	57	24	12	310	24	667
OP International	26	24	97	20	16	4	18	20	24	249
OP Port or internal waters	48	24	13	9	40	12	4	17	6	173
OP Unspecified	90	98	42	35	124	20	6	58	21	494
Passenger and general cargo	9	13	6	7	11	4	3	14	5	72
PRC Domestic	55	126	141	24	35	31	17	228	17	674
PRC International	37	38	42	40	7	8	15	19	16	222
PRC Port or internal waters	13	31	6	3	18	3	0	4	5	83
PRC Unspecified	118	187	73	109	82	32	27	80	39	747
Other / Unspecified	2	2	2	1	2	1	0	1	0	11
Total	489	610	480	272	392	139	102	751	157	3392

Navigational accidents (collision, contact and grounding) represented 44% of events that affected passenger ships. Loss of propulsion power still represents a significant casualty event with 22.1% of all events.

5.2.2 Occurrence with person(s)

Figure 5.6: Severity of occurrence with person(s)s per passenger ship type for 2014-2019



	Very serious	Serious	Less Serious	Marine incident	Total
OP - Domestic	0	36	147	7	190
OP - International	5	39	338	14	396
OP - Port or internal waters	0	7	36	6	49
OP - Unspecified	7	54	286	13	360
Passenger and general cargo	1	12	47	4	64
PRC - Domestic	1	68	170	9	248
PRC - International	4	25	119	17	165
PRC - Port or internal waters	0	0	23	1	24
PRC - Unspecified	5	99	290	24	418
Other / Unspecified	0	4	5	0	9
Total	23	344	1461	95	1923

Very serious occurrence with person(s) are regularly distributed throughout all passenger ship sub-types.

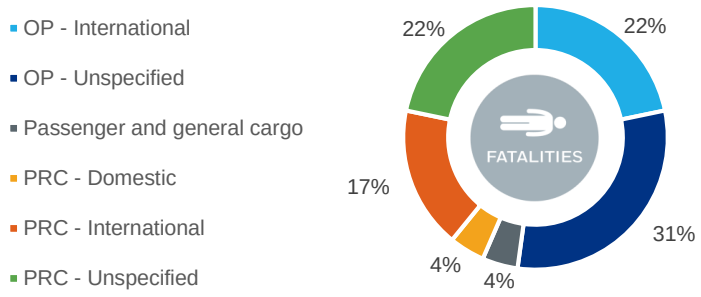
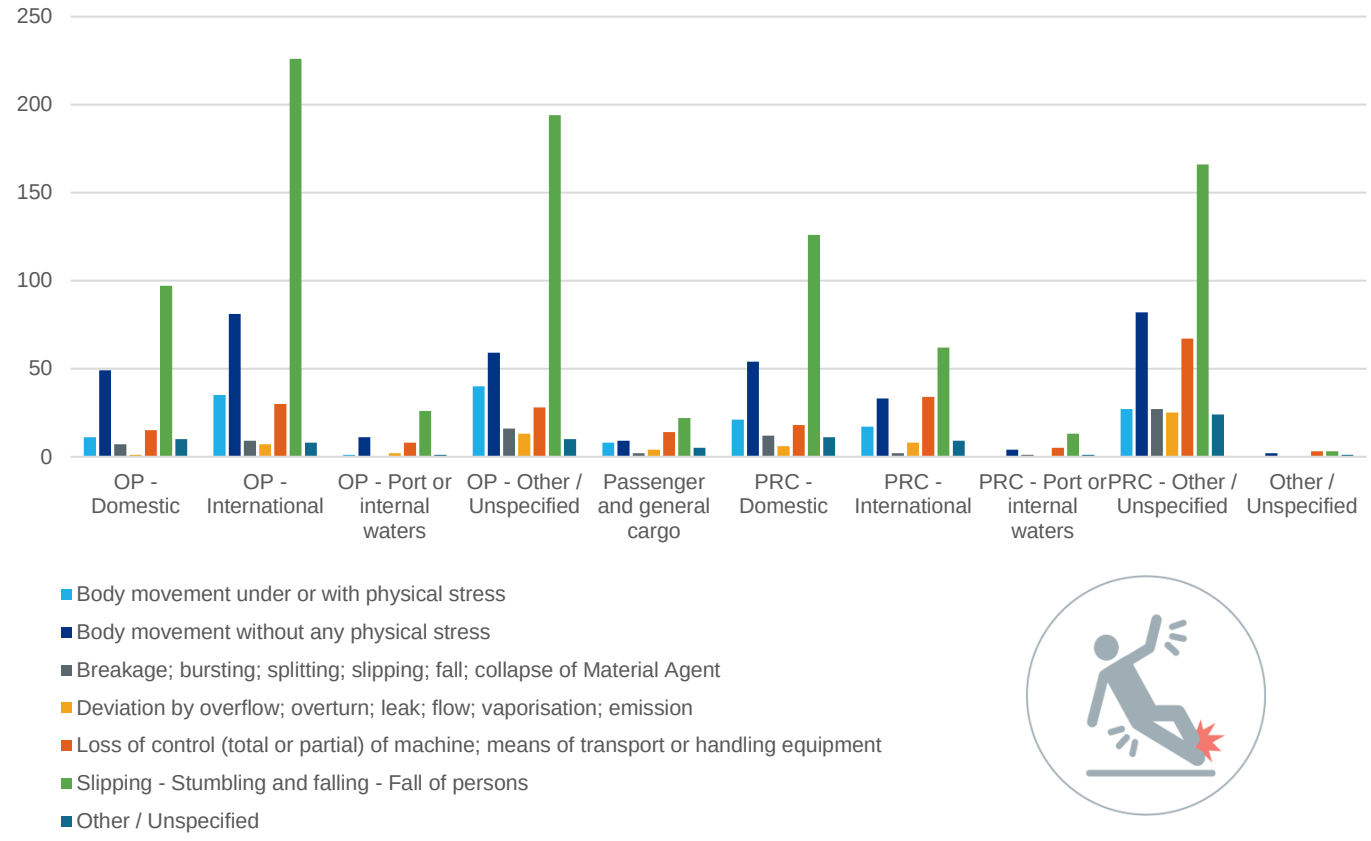


Figure 5.7: Distribution of deviations per passenger ship type for 2014-2019



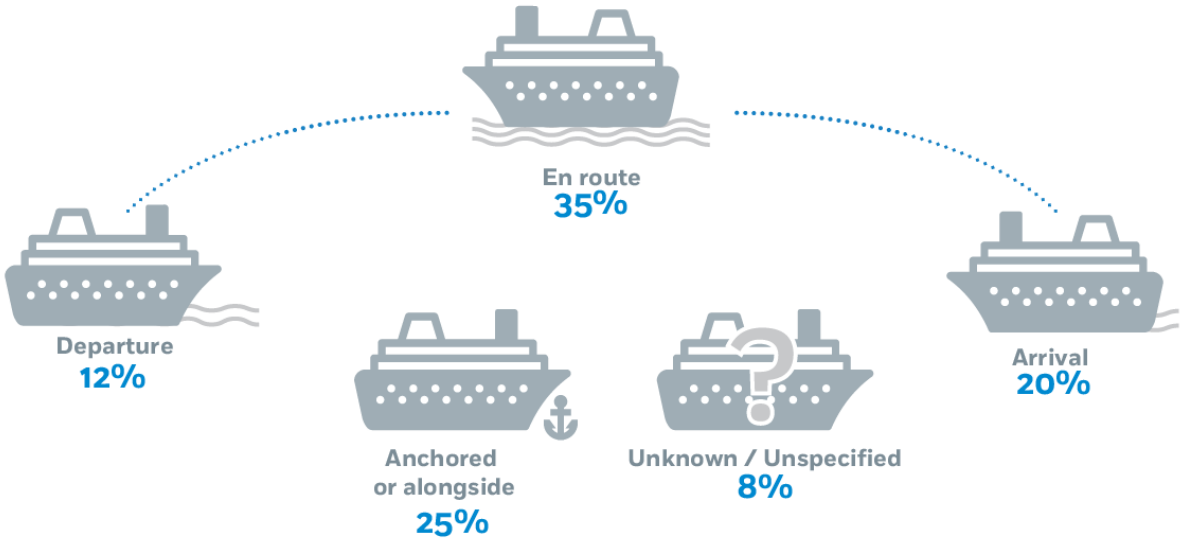
	Body movement under or with physical stress	Body movement without any physical stress	Breakage; bursting; splitting; slipping; fall; collapse of Material Agent	Deviation by overflow; overturn; leak; flow; vaporisation; emission	Loss of control (total or partial) of machine; means of transport or handling equipment	Slipping - Stumbling and falling - Fall of persons	Other / Unspecified	Total
OP - Domestic	11	49	7	1	15	97	10	190
OP - International	35	81	9	7	30	226	8	396
OP - Port or internal waters	1	11	0	2	8	26	1	49
OP - Other / Unspecified	40	59	16	13	28	194	10	360
Passenger and general cargo	8	9	2	4	14	22	5	64
PRC - Domestic	21	54	12	6	18	126	11	248
PRC - International	17	33	2	8	34	62	9	165
PRC - Port or internal waters	0	4	1	0	5	13	1	24
PRC - Other / Unspecified	27	82	27	25	67	166	24	418
Other / Unspecified	0	2	0	0	3	3	1	9
Total	200	496	76	66	222	935	80	2425

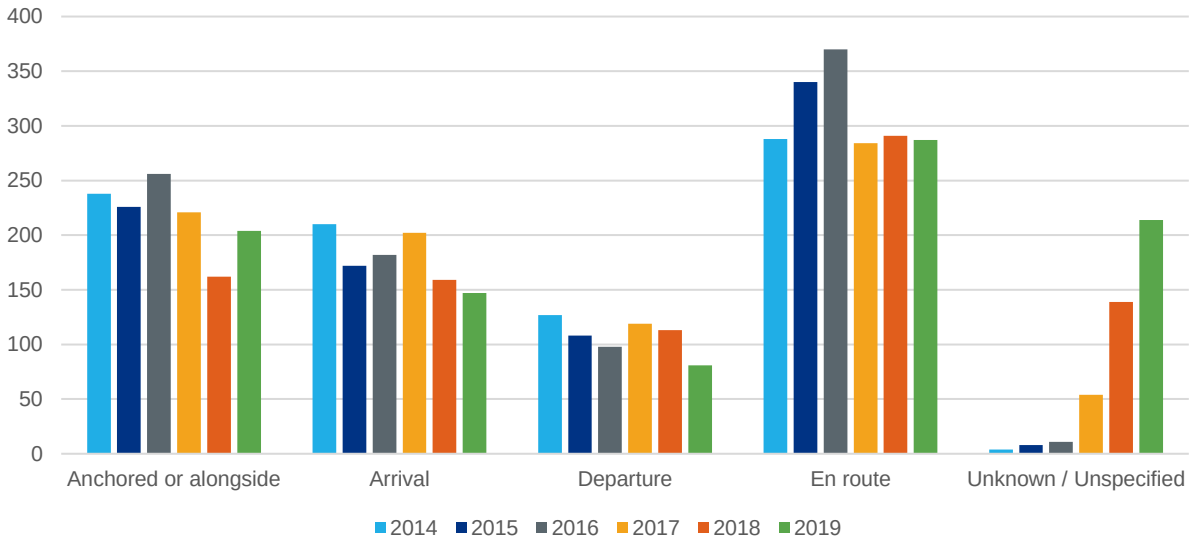
Slipping and falling of person is the most significant deviation (38.5%) on board passenger ships.

5.3 Location of the marine casualties and incidents

5.3.1 Voyage segments

Figure 5.8: Distribution by voyage segment

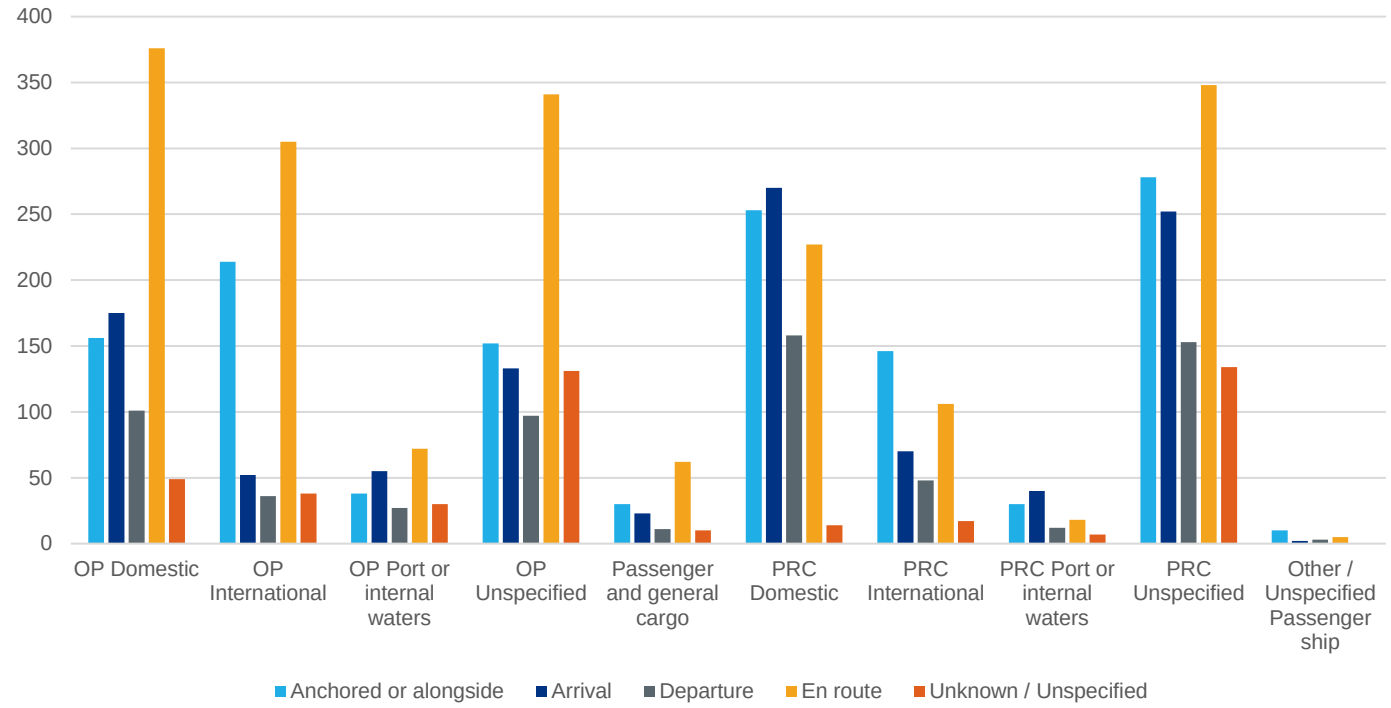




	2014	2015	2016	2017	2018	2019	Total
Anchored or alongside	238	226	256	221	162	204	1307
Arrival	210	172	182	202	159	147	1072
Departure	127	108	98	119	113	81	646
En route	288	340	370	284	291	287	1860
Unknown / Unspecified	4	8	11	54	139	214	430
Total	867	854	917	880	864	933	5315

"En route", arrival and anchored are the phases least safe representing over the period 2014-2019 more than two thirds of the total.

Figure 5.9: Distribution by voyage segment per passenger ship type for 2014-2019

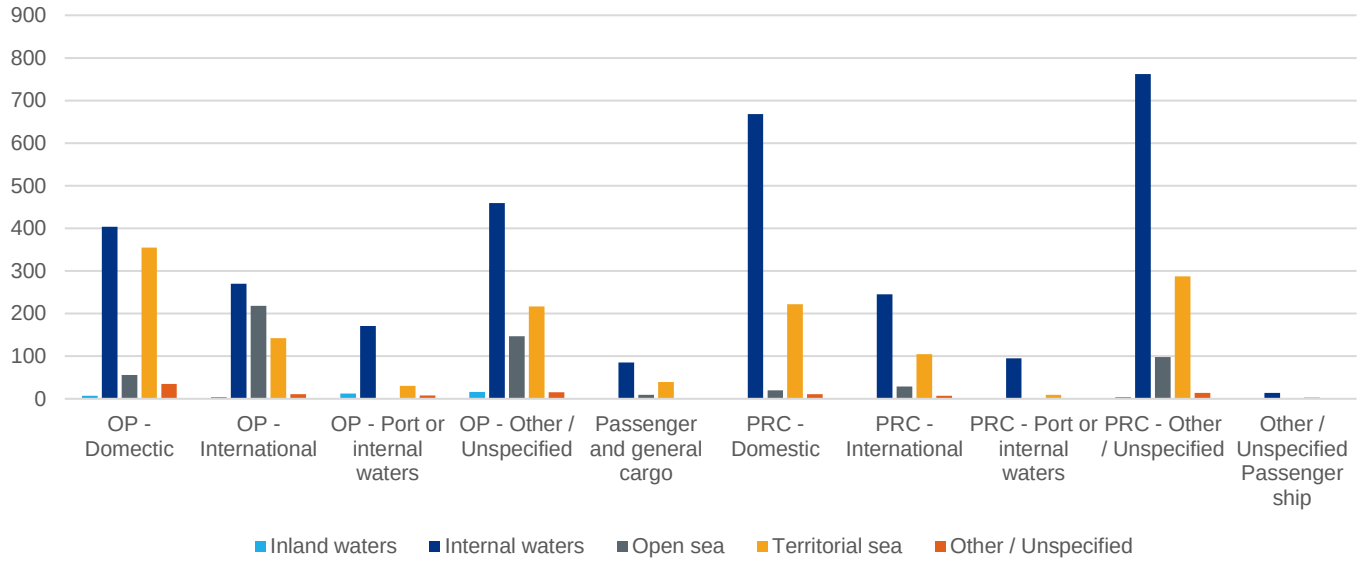


	Anchored or alongside	Arrival	Departure	En route	Unknown / Unspecified	Total
OP Domestic	156	175	101	376	49	857
OP International	214	52	36	305	38	645
OP Port or internal waters	38	55	27	72	30	222
OP Unspecified	152	133	97	341	131	854
Passenger and general cargo	30	23	11	62	10	136
PRC Domestic	253	270	158	227	14	922
PRC International	146	70	48	106	17	387
PRC Port or internal waters	30	40	12	18	7	107
PRC Unspecified	278	252	153	348	134	1165
Other / Unspecified Passenger Ship	10	2	3	5	0	20
Total	1307	1072	646	1860	430	5315

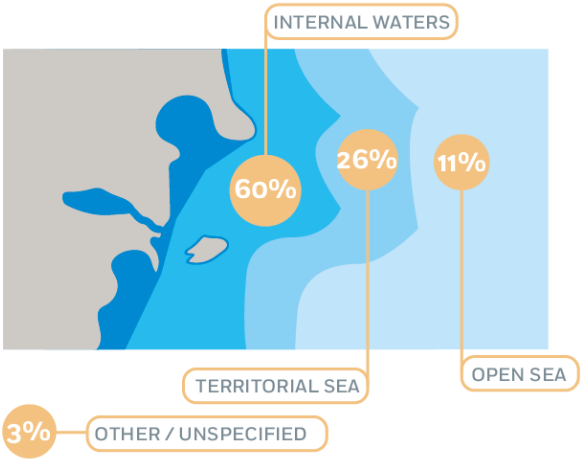
Passenger and Ro-Ro cargo ships are accountable for 25% of all casualties during the arrival phase or when anchored or alongside, which represents the most unsafe combination.

5.3.2 Location

Figure 5.10: Distribution by location of marine casualties and incidents per passenger ship type for 2014-2019



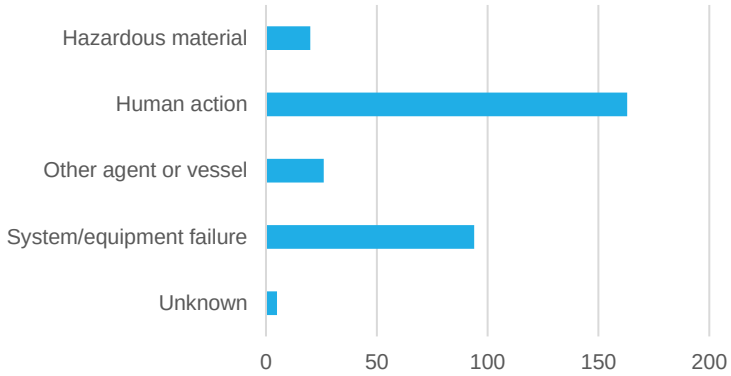
	Inland waters	Internal waters	Open sea	Territorial sea	Other / Unspecified	Total
OP - Domestic	7	404	56	355	35	857
OP - International	4	270	218	142	11	645
OP - Port or internal waters	12	171	1	30	8	222
OP - Other / Unspecified	16	459	147	217	15	854
Passenger and general cargo	1	85	9	39	2	136
PRC - Domestic	1	668	20	222	11	922
PRC - International	1	245	29	105	7	387
PRC - Port or internal waters	1	95	1	9	1	107
PRC - Other / Unspecified	4	762	98	287	14	1165
Other / Unspecified Passenger ship	0	14	2	3	1	20
Total	47	3173	581	1409	105	5315



Whatever the type of passenger ship, the great majority of accidents (60%) take place in internal waters, in line with the high percentage of events during the anchorage or departure phase.

5.4 Accidental Events and Contributing Factors

Figure 5.11: Distribution of accident events in passenger ships related events for the period 2014-2019

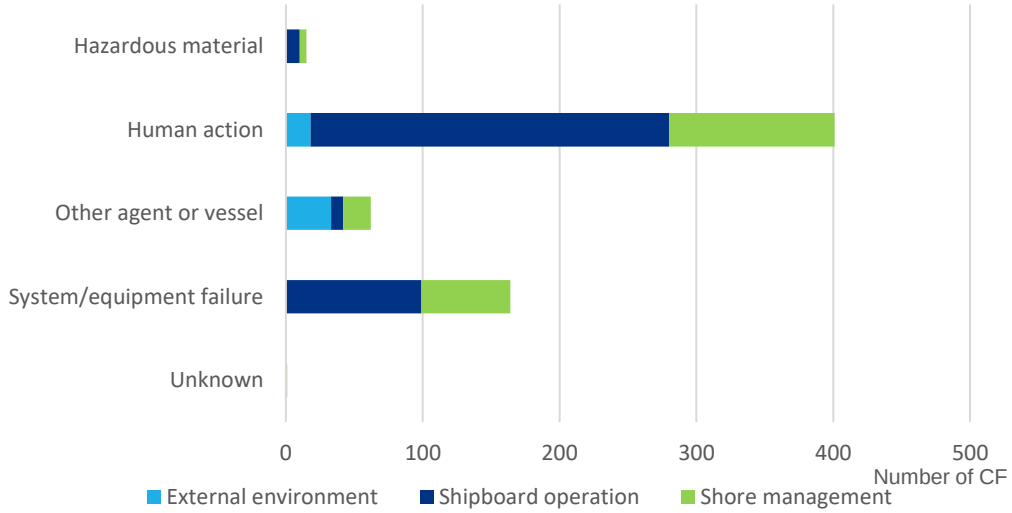


Accident events types	Number of accident events
Hazardous material	20
Human action	163
Other agent or vessel	26
System/equipment failure	94
Unknown	5
Total	308

From a total of 308 accident events in passenger ships analysed during the investigations, 52.92% were attributed to 'human action' category and 30.52% to 'system/equipment failures'.

Passenger ships have the same trend for accident event distribution than marine casualties in general.

Figure 5.12: Relationship between accident events and the contributing factors in passenger ships for 2014-2019

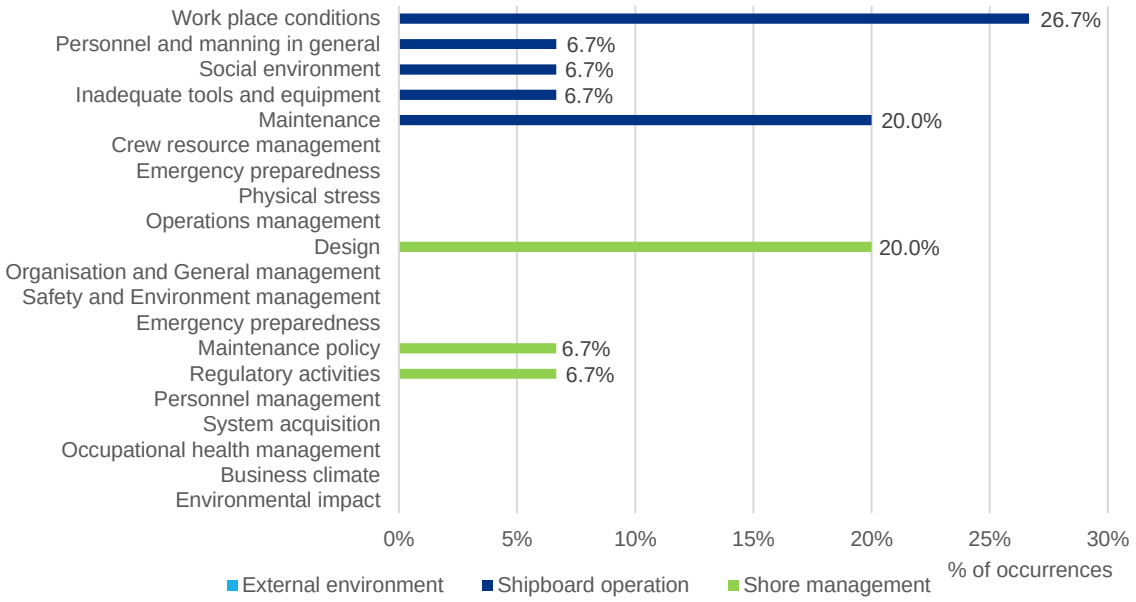


Passenger ships				
Accident events types	**Number of contributing factors**	**Contributing factors categories involved in each accident events type**		
		External environment	**Shipboard operation**	**Shore management**
Hazardous material	15	0	10	5
Human action	401	18	262	121
Other agent or vessel	62	33	9	20
System/equipment failure	164	0	99	65
Unknown	1	0	0	1
Total	643	51	380	212

643 contributing factors associated to 308 accident events; this is a medium value of 2.08 contributing factors per accident event in passenger ships.

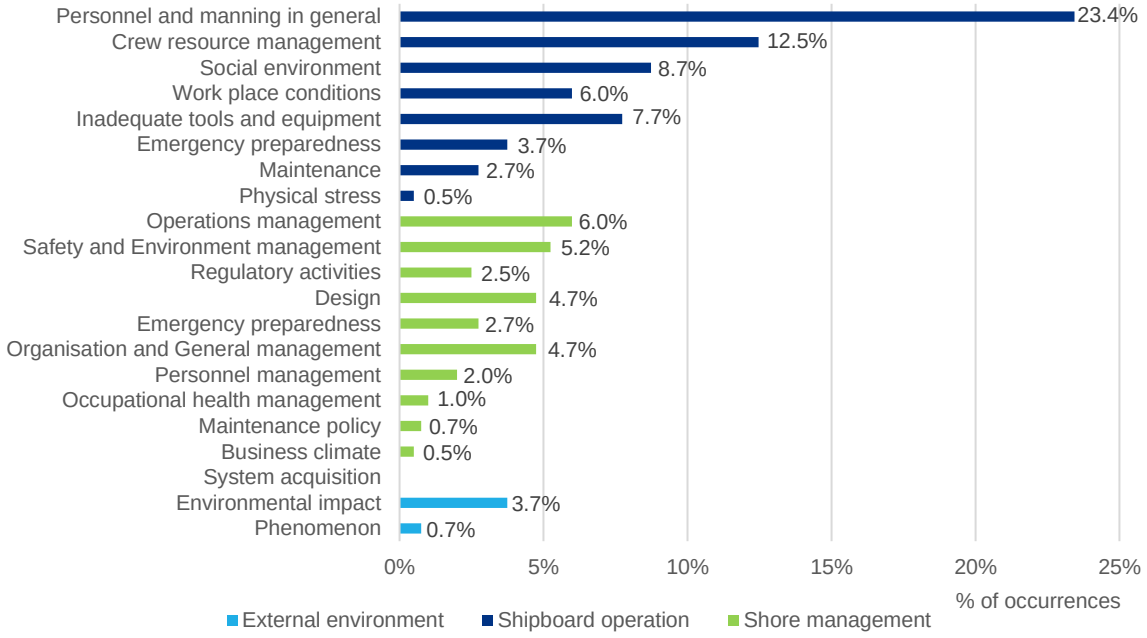
The main accident events type was human action failure associated with the factor shipboard operation.

Figure 5.13: Contributing factors involved in "Hazardous Material" accident events, distributed by categories



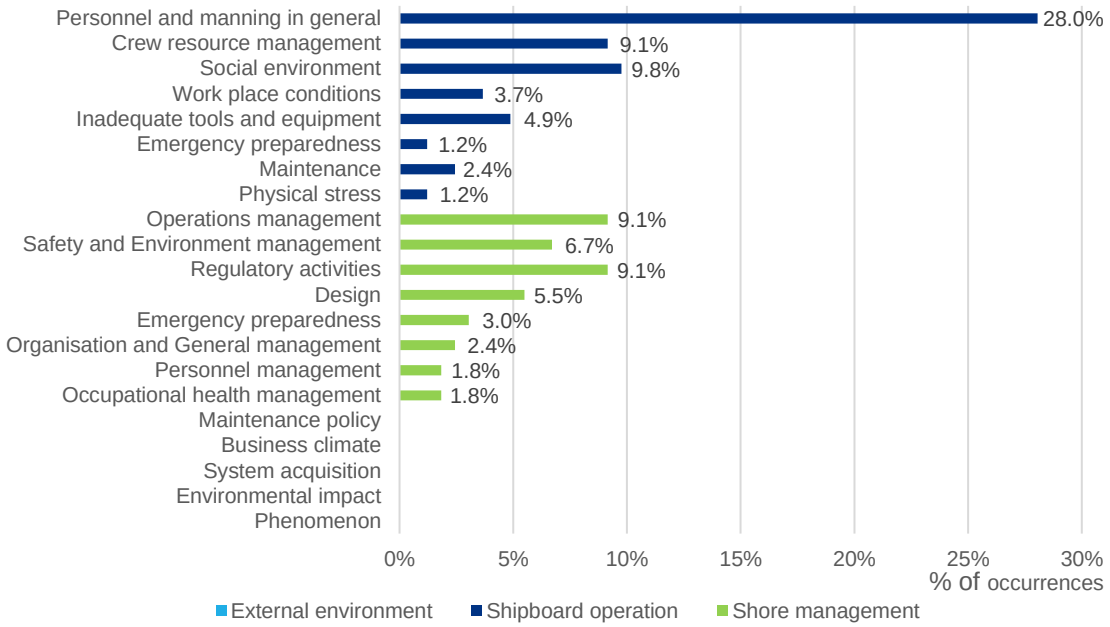
In the area of Hazardous Material, 'work place conditions' and 'maintenance' are the main contributing factors related to shipboard operation. When it is linked to shore management, 'design' is by far the most reported.

Figure 5.14: Contributing factors involved in "Human Action" accident events, distributed by categories



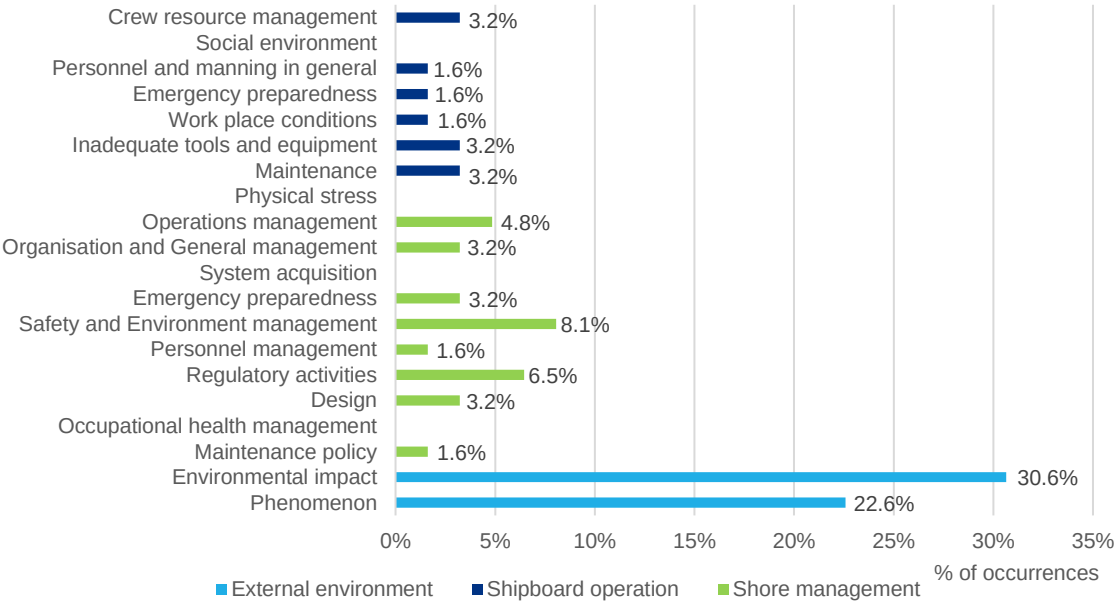
In the category 'Human Action', 'personnel and manning and general' is by far the main contributing factor associated to shipboard operation. 'Crew resource management' was also often reported.

Figure 5.15: Contributing factors involved in "System / Equipment Failure" accident events, distributed by categories



With regards 'System / Equipment Failure', 'personnel and manning in general' is the most reported factor' when it related to shipboard operation. Other reported contributing factors are spread among the other categories.

Figure 5.16: Contributing factors involved in "Other Agent or Vessel" accident events, distributed by categories

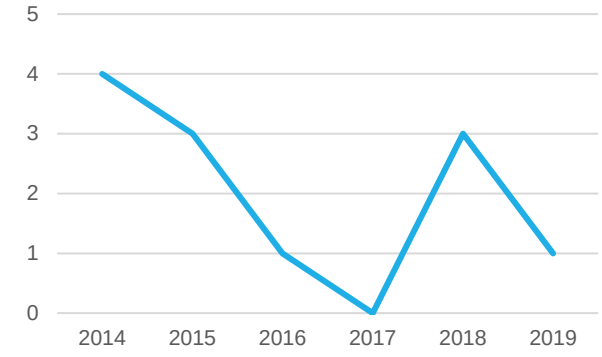


'External environment' is the most important contributing factor in the 'other agent or vessel' events analysed. 'Environmental impact' was more reported than 'Phenomenon', which remained a significant factor.
The factors in categories 'shipboard operation' and 'shore management' were fairly distributed within each category.

5.5 Consequences

5.5.1 Consequences to ships

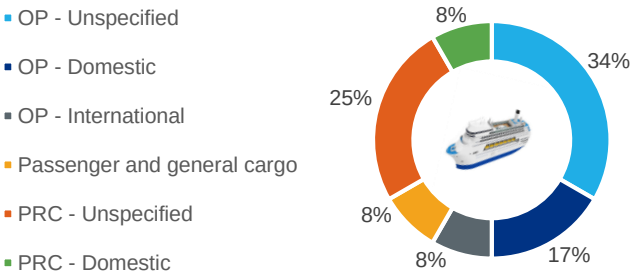
Figure 5.17: Passenger ships lost



After the tree losses recorded in 2018, only one ship loss was recorded last year.

	2014	2015	2016	2017	2018	2019
Passenger ships lost	4	3	1	0	3	1

Among the 12 passenger ships that were lost over the period, 54% were passenger ships 'carrying only passengers'.

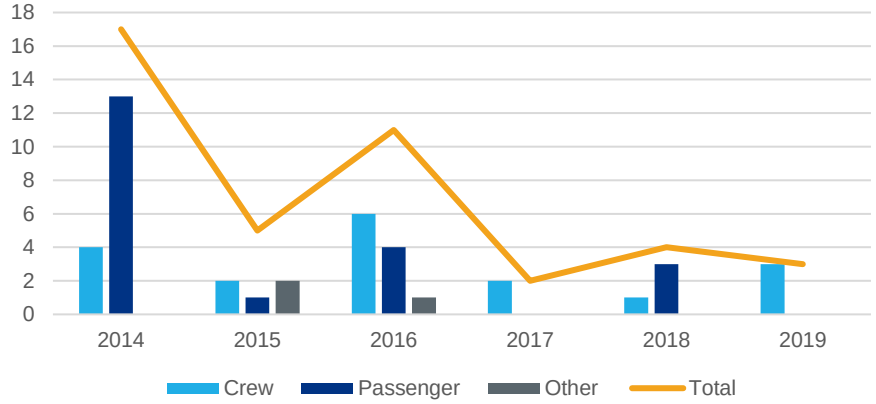


OP	4
OP - Domestic	2
OP - International	1
Passenger and general cargo - Domestic	1
PRC	3
PRC - Domestic	1
Total passenger ships lost	12

5.5.2 Consequences to persons

5.5.2.1 Fatalities

Figure 5.18: Number of fatalities

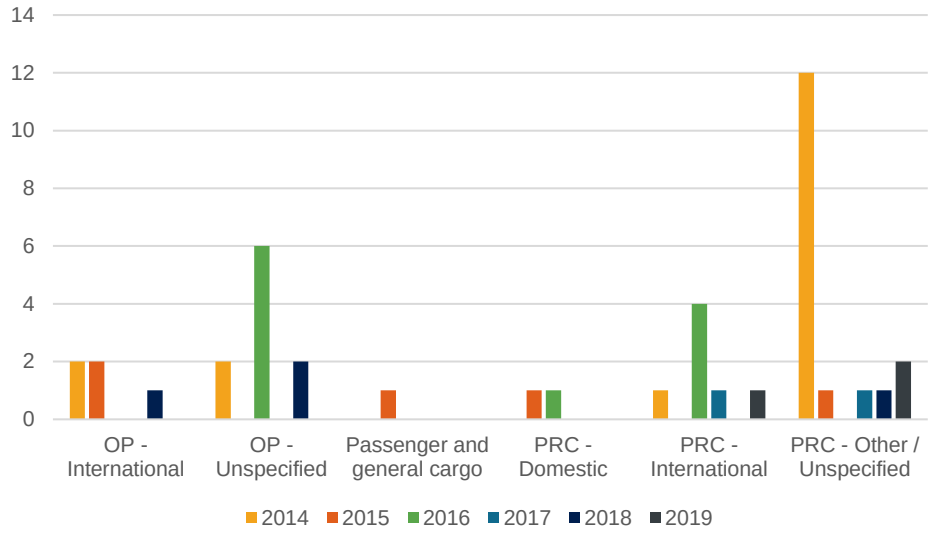


Since the year 2016, the number of fatalities on board of passenger ships regularly decreased.
The number of victims was almost equally shared between passengers and crew members.

	2014	2015	2016	2017	2018	2019	Total
Crew	4	2	6	2	1	3	18
Passenger	13	1	4	0	3	0	21
Other	0	2	1	0	0	0	3
Total	17	5	11	2	4	3	42

06/10/2019, loss of containment on board RoRo Cargo "Euroferry Malta"

Figure 5.19: Distribution of fatalities per passenger ship type

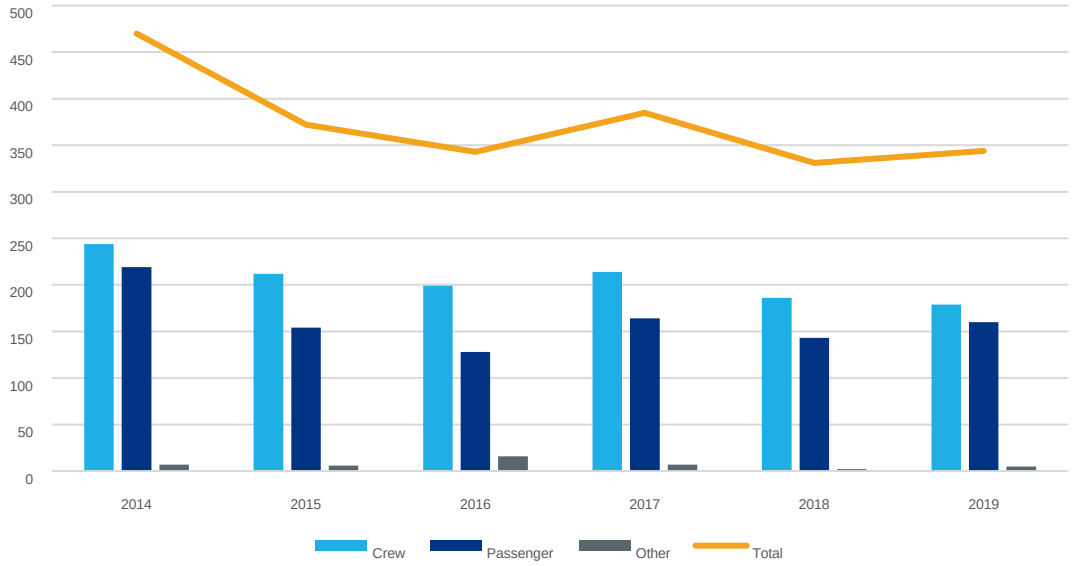


The abnormally high number of fatalities recorded in 2014 is explained by the death of 11 persons during fire of Norman Atlantic on 28/12/2014. 62% of the fatalities took place on Passenger and Ro-Ro cargo ships, also known as "ferries".

	2014	2015	2016	2017	2018	2019	Total
OP - International	2	2	0	0	1	0	5
OP - Unspecified	2	0	6	0	2	0	10
Passenger and general cargo	0	1	0	0	0	0	1
PRC - Domestic	0	1	1	0	0	0	2
PRC - International	1	0	4	1	0	1	7
PRC - Other / Unspecified	12	1	0	1	1	2	17
Total	17	5	11	2	4	3	42

5.5.2.2 Injuries

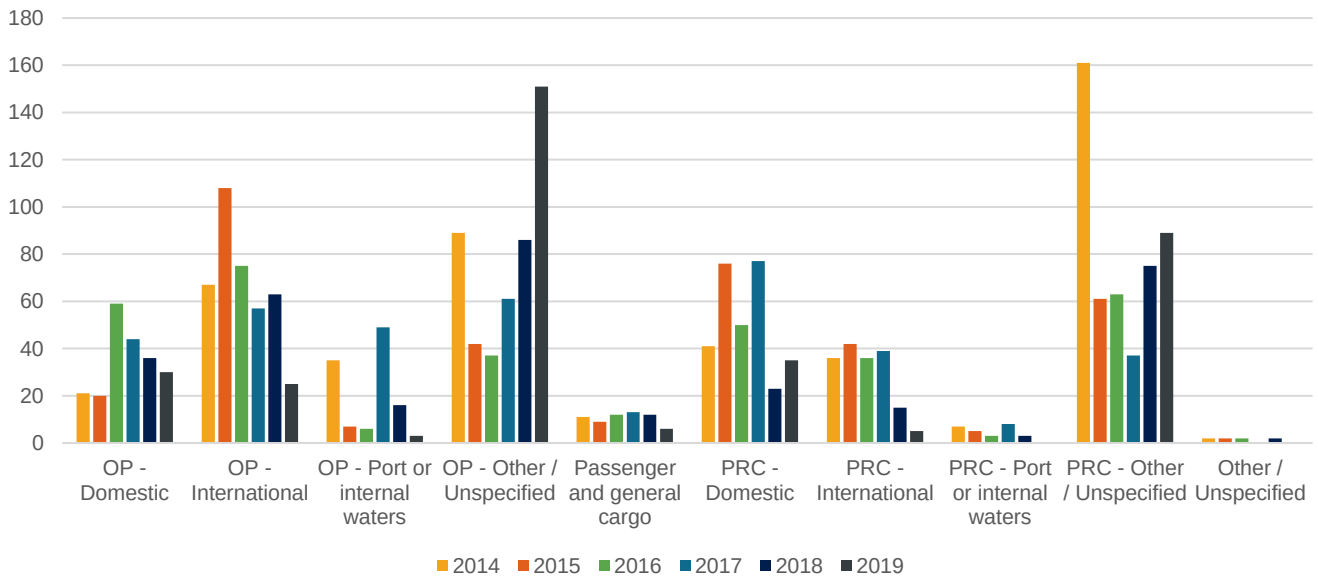
Figure 5.20: Number of injuries



	2014	2015	2016	2017	2018	2019	Total
Crew	244	212	199	214	186	179	1234
Passenger	219	154	128	164	143	160	968
Other	7	6	16	7	2	5	43
Total	470	372	343	385	331	344	2245

Since 2015, the annual total of injured persons has stabilised around an average of 350. Over the period, crew members remained more affected than the passengers.

Figure 5.21: Distribution of injuries by passenger ship types

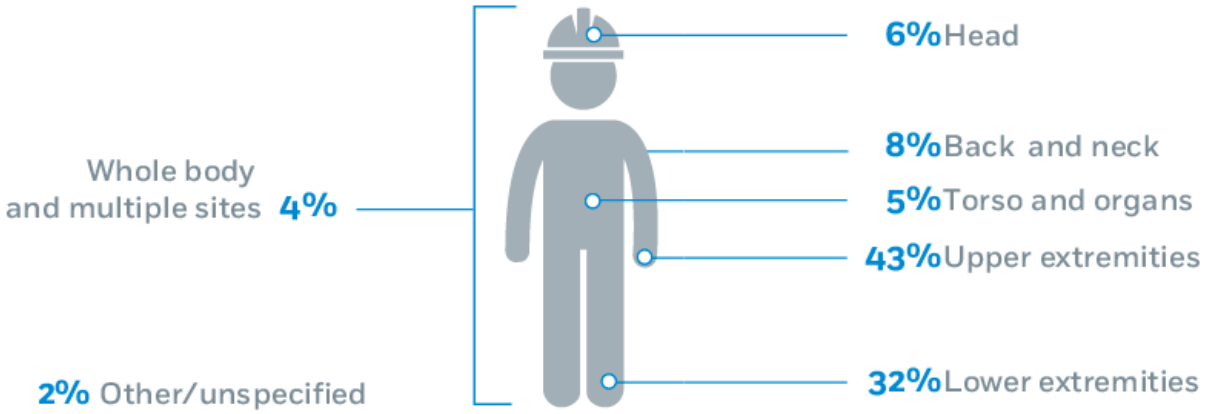


	2014	2015	2016	2017	2018	2019	Total
OP - Domestic	21	20	59	44	36	30	210
OP - International	67	108	75	57	63	25	395
OP - Port or internal waters	35	7	6	49	16	3	116
OP - Other / Unspecified	89	42	37	61	86	151	466
Passenger and general cargo	11	9	12	13	12	6	63
PRC - Domestic	41	76	50	77	23	35	302
PRC - International	36	42	36	39	15	5	173
PRC - Port or internal waters	7	5	3	8	3	0	26
PRC - Other / Unspecified	161	61	63	37	75	89	486
Other / Unspecified	2	2	2	0	2	0	8
Total	470	372	343	385	331	344	2245

The high number of injured persons in 2014 can be partially explained by the victims of two fires: 31 victims of the Norman Atlantic accident on 28/12/2014, and 11 ones on-board the Volcan de Taburiente event on 25/04/2014.

Passenger ships carrying only passengers affected in an accident resulted for 52.8% of the total injured persons, while ferries accounted for 44%.

Figure 5.22: Part of body injured



Persons suffering injuries on board passenger ships were mainly injured the upper extremities, followed by lower injuries.

Back & Neck	80
Head	56
Lower Extremities	307
Torso and organs	50
Upper Extremities	424
Whole body and multiple sites	41
Other / Unspecified	20
Total of reported injuries	978

Chapter 6: SERVICE SHIPS

KEY FIGURES 2019

19/02/2019, Collision between Special Purpose Ship "World Bora" and General Cargo ship "Raba"

6.0 Executive summary about Service Ships

Relatively positive results were recorded in 2019 in the category of Service Ships.

A total number of 2439 of service ships were involved in a marine casualty or incident over the period 2014-2019. Since 2014, the number of service ships involved decreased from 487 to 320 in 2019, the average number over the period being 406.

Among the service ships, tugs represented the main type with one fourth of all service ships involved.

The rate of Very Serious casualties is 2.5%, and 19.6% when the severity is Serious. In both cases, the severity of occurrences affecting service ships is lower than the one related to the overall fleet, where Very Serious occurrences represent respectively 3% of Very Serious and 25% of Serious.

More than half of the casualties with a ship (58.5%) were related to issues of a navigational nature, such as contacts, grounding/stranding and collision. As concerns occurrences to person(s), 35.3% were attributed to slipping, stumbling and falling of persons.

The lost service ships remained constant during the past years, the average being 3 ships lost per year. In 2019, two service ships were lost.

From 2015 to 2018, a regular decrease of fatalities was noted. However, following the sinking of the Bourbon Rhode, resulting in 4 deaths and 7 persons being reported missing, the number of fatalities reached in 2019 a total of 15. Crew have been the most impacted category of victims over this period with 43 fatalities.

In 2019 there were 88 injured persons reported. This number has continuously decreased in the last 6 years. Again, crew represent the main category of persons injured at sea (691, out of a total of 739 during the 2014-2019 period).

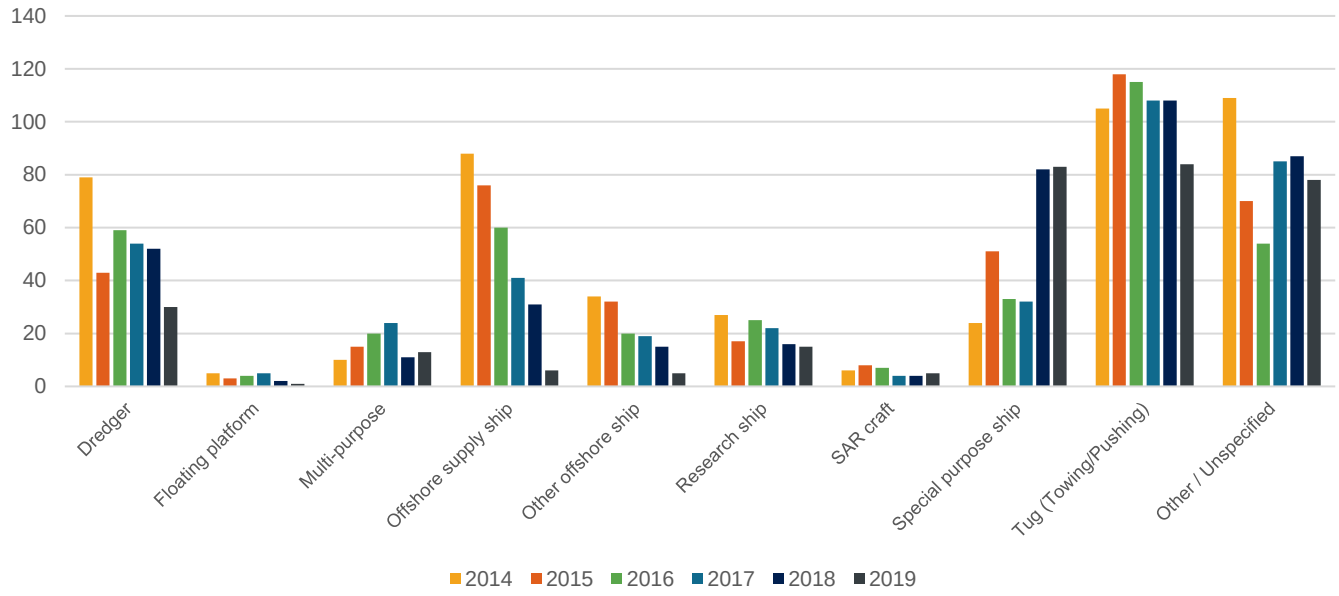
The departure phase was the safest segment (6%) of a voyage and en route was the most unsafe (42%). It was noted more than half of the casualties occurred in internal waters.

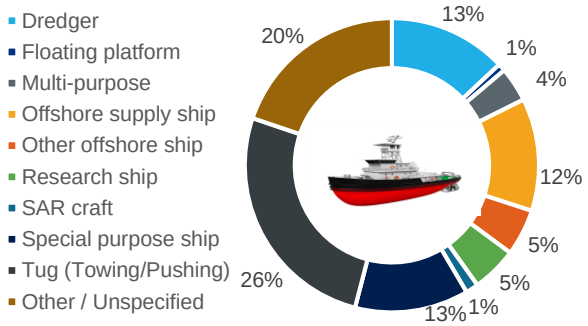
The main underlying factor leading to casualties was the "Human Action", which represented 52.1% of all accident events. In this category of events, 48.2% of the contributing factors were related to shipboard operations. Such figures are similar to the ones when all ship types are considered.

In conclusion, but keeping in mind the Bourbon Rhode accident, most of the indicators, such as the number of ships involved, severity rates of occurrences, injuries, etc indicated an improvement of this category of ships in 2019.

6.1 Detailed distribution

Figure 6.1: Distribution of service ship types involved



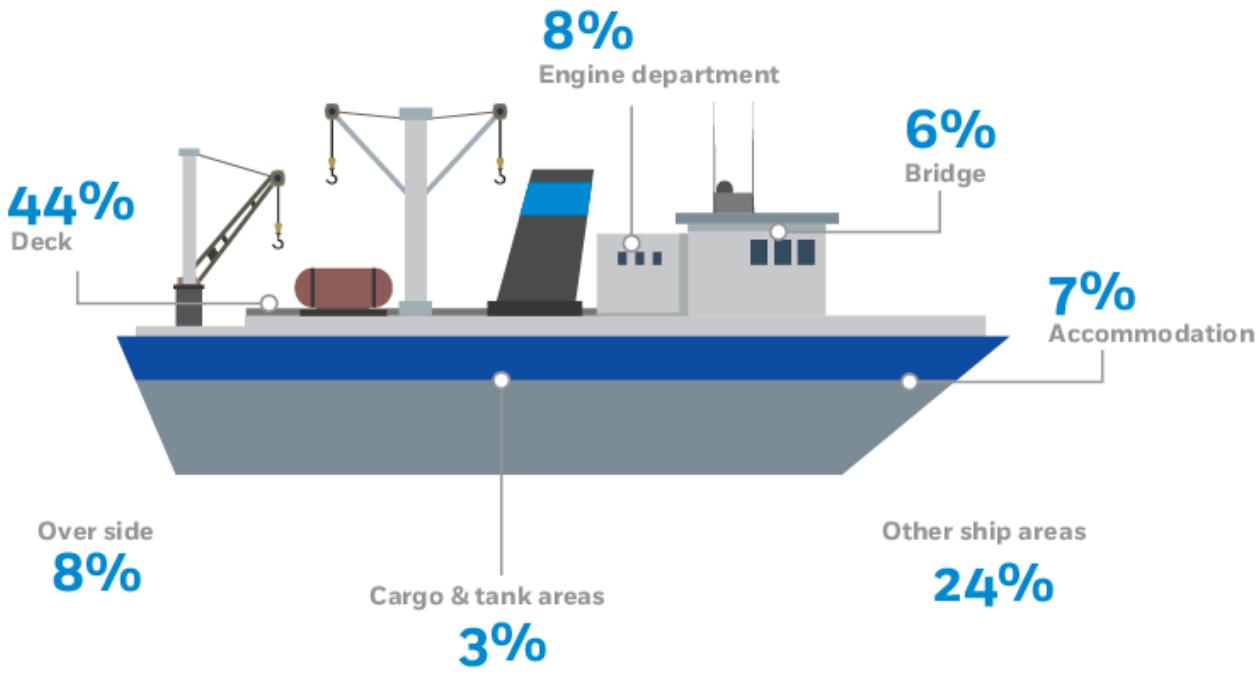


Among the service ships involved in a marine casually or incident, the most quoted subcategory was tugs (towing/pushing) (26.1%), followed by dredgers (13%).

	2014	2015	2016	2017	2018	2019	Total
Dredger	79	43	59	54	52	30	317
Floating platform	5	3	4	5	2	1	20
Multi-purpose	10	15	20	24	11	13	93
Offshore supply ship	88	76	60	41	31	6	302
Other offshore ship	34	32	20	19	15	5	125
Research ship	27	17	25	22	16	15	122
SAR craft	6	8	7	4	4	5	34
Special purpose ship	24	51	33	32	82	83	305
Tug (Towing/Pushing)	105	118	115	108	108	84	638
Other / Unspecified	109	70	54	85	87	78	483
Total	487	433	397	394	408	320	2439

Since 2015, the number of service ships has continuously decreased. In 2019, a reduction of 27% of the ships involved was noted. All types of service ships showed this reduction.

Figure 6.2: Main places of occurrence with person(s) on board service ships for 2014-2019



Accommodation	22
Bridge	19
Cargo & tank areas	8
Engine department	25
Deck	131
Over side	23
Ship	70
Total places reported	298

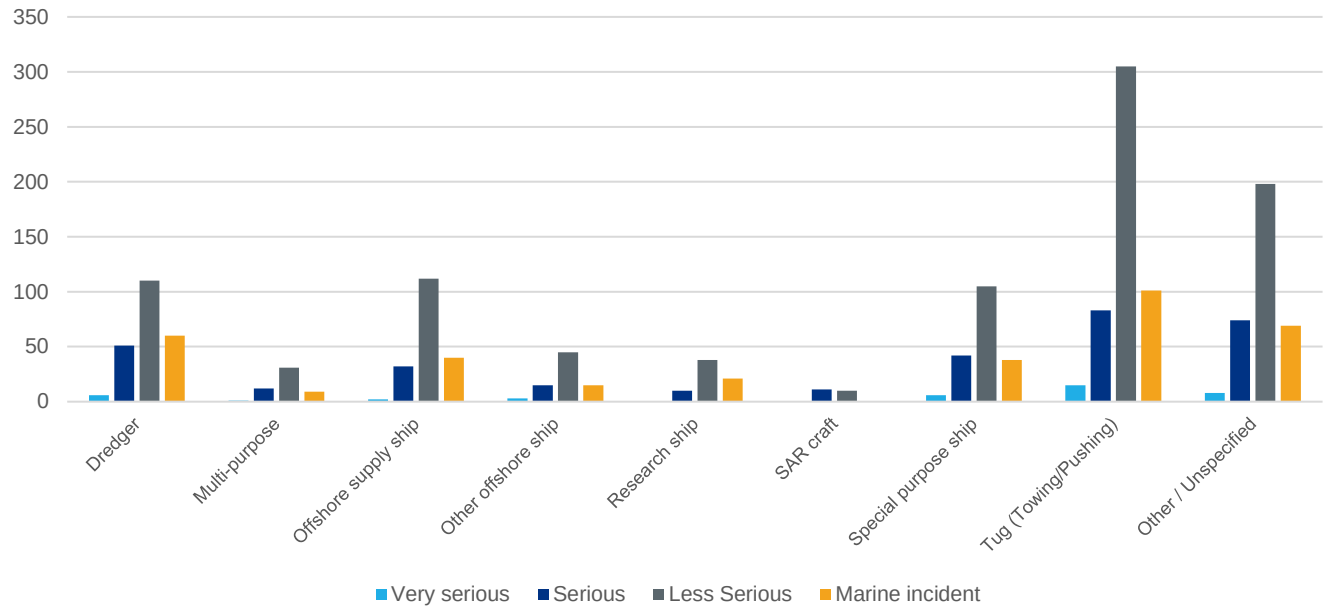
The main location of marine casualties and incidents on-board the service ships were the decks (44%) corresponding to the main working place.

31/07/2019, fall of a crew member on board Inland Waterway Pusher "Atlant 1"

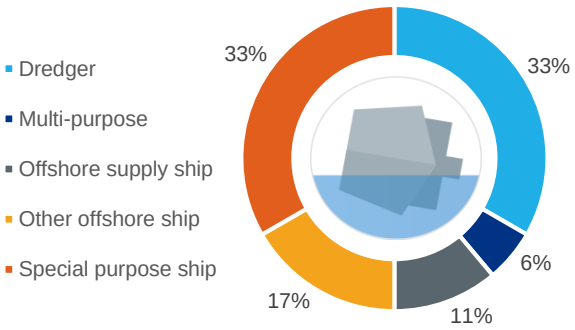
6.2 Nature of marine casualties and incidents

6.2.1 Occurrence with ship(s)

Figure 6.3: Distribution of severity per service ship type for 2014-2019



	Very serious	Serious	Less Serious	Marine incident	Total
Dredger	6	51	110	60	227
Multi-purpose	1	12	31	9	53
Offshore supply ship	2	32	112	40	186
Other offshore ship	3	15	45	15	78
Research ship	0	10	38	21	69
SAR craft	0	11	10	0	21
Special purpose ship	6	42	105	38	191
Tug (Towing/Pushing)	15	83	305	101	504
Other / Unspecified	8	74	198	69	349
Total	41	330	954	353	1678

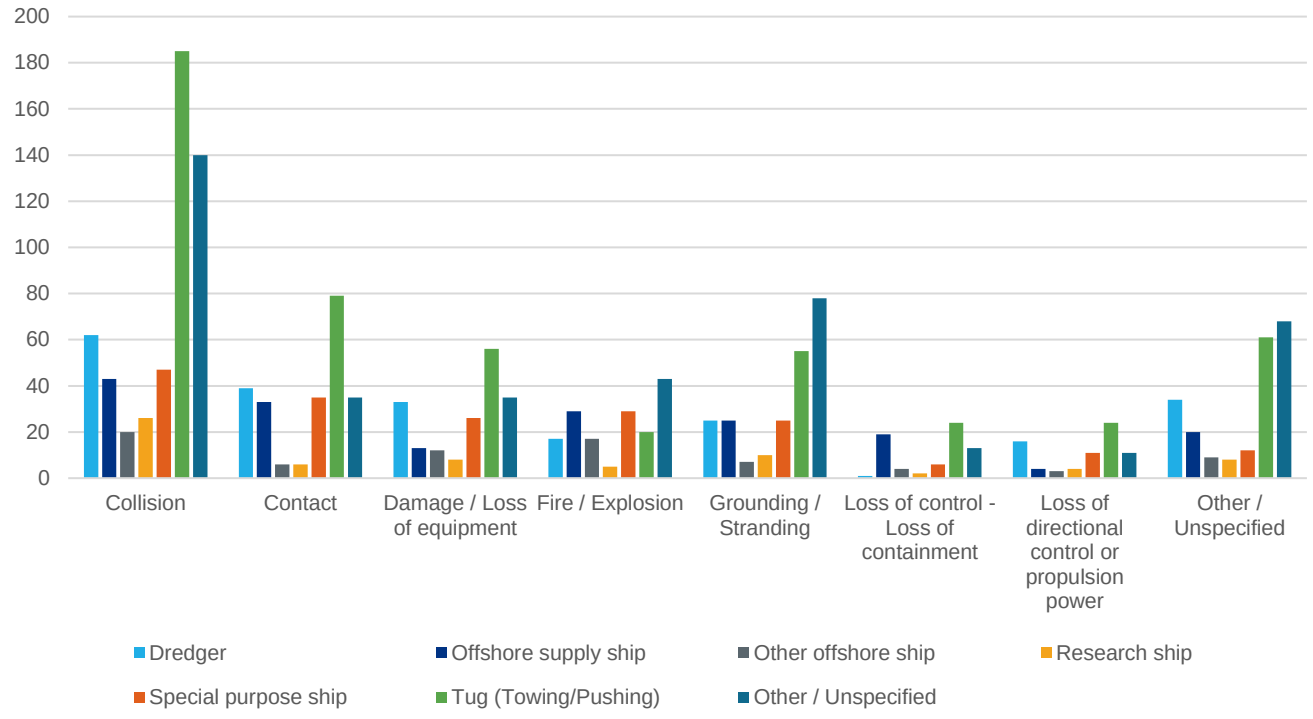


Tugs represent the category that has suffered one third of all very serious accidents.

Very serious encountered for 2.5% of all occurrences, in line with the percentage when looking at all ship types.

In case of serious occurrences, service ships recorded a rate of 19.6%, a bit lower that the 25% of serious for all ship types.

Figure 6.4: Distribution of casualty events per service ship type for 2014-2019

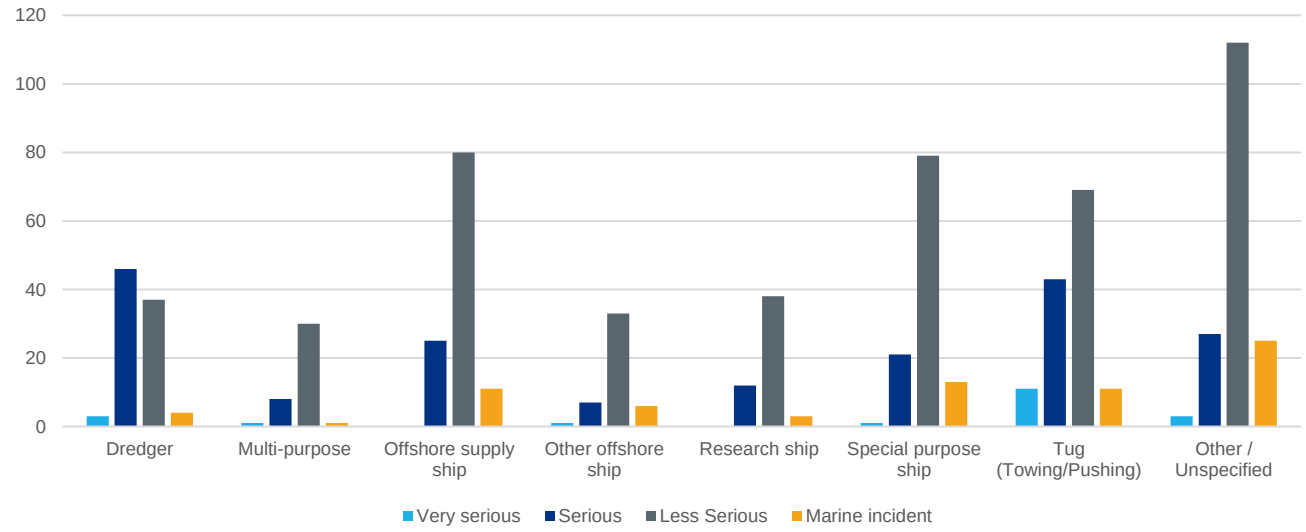


	Collision	Contact	Damage / loss of equipment	Fire / Explosion	Grounding / Stranding	Loss of control - Loss of containment	Loss of directional control or propulsion power	Other / Unspecified	Total
Dredger	62	39	33	17	25	1	16	34	227
Offshore supply ship	43	33	13	29	25	19	4	20	186
Other offshore ship	20	6	12	17	7	4	3	9	78
Research ship	26	6	8	5	10	2	4	8	69
Special purpose ship	47	35	26	29	25	6	11	12	191
Tug (Towing/Pushing)	185	79	56	20	55	24	24	61	504
Other / Unspecified	140	35	35	43	78	13	11	68	423
Total	523	233	183	160	225	69	73	212	1678

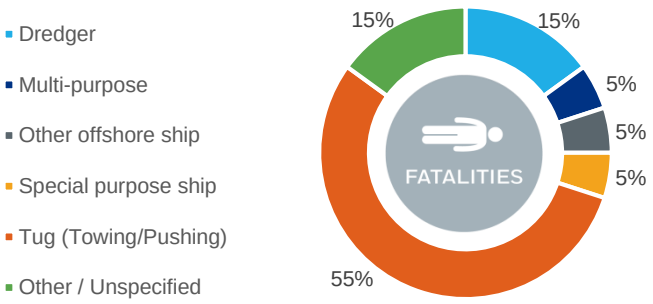
The category collision represents by far the largest number of events (31.1%), tugs being involved in 35% of all collisions related to a service ship.

6.2.2 Occurrence with person(s)

Figure 6.5: Severity of occurrence with person(s)s per service ship type for 2014-2019

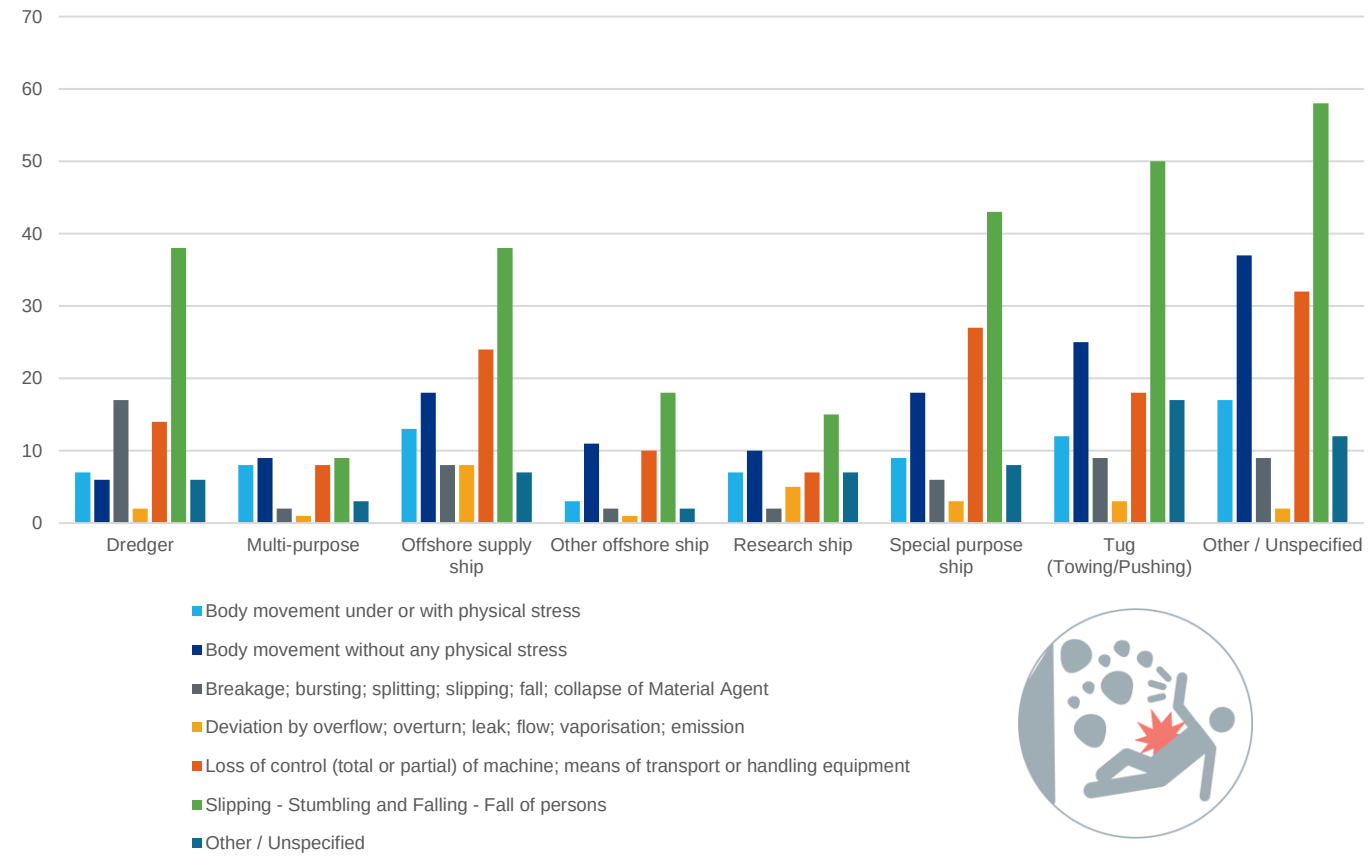


	Very serious	Serious	Less Serious	Marine incident	Total
Dredger	3	46	37	4	90
Multi-purpose	1	8	30	1	40
Offshore supply ship	0	25	80	11	116
Other offshore ship	1	7	33	6	47
Research ship	0	12	38	3	53
Special purpose ship	1	21	79	13	114
Tug (Towing/Pushing)	11	43	69	11	134
Other / Unspecified	3	27	112	25	167
Total	20	189	478	74	761



The majority of the very serious accidents occurred on-board tug ships. The serious ones are equally shared between tugs and dredgers. The highest rate of less serious accidents was noted against the offshore supply ships.

Figure 6.6: Distribution of deviations per service ship type for 2014-2019



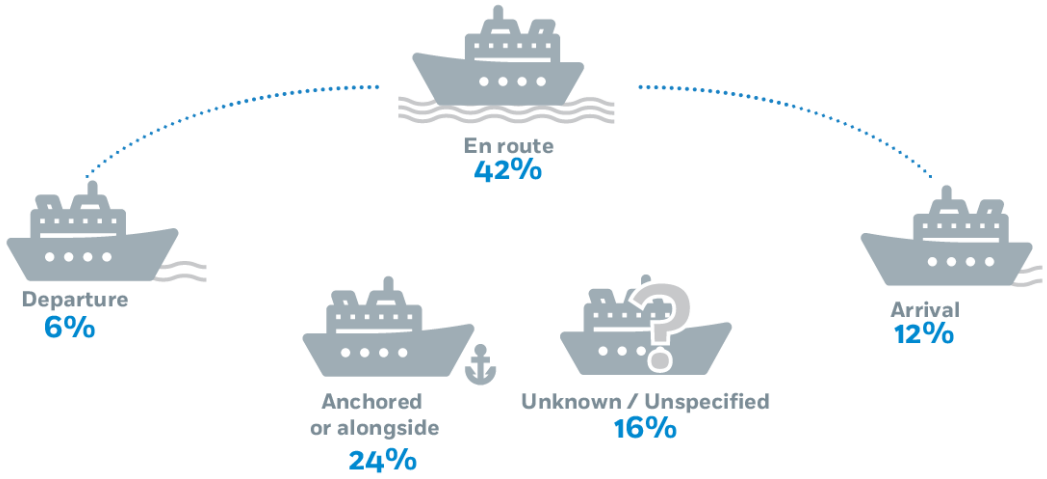
	Body movement under or with physical stress	Body movement without any physical stress	Breakage; bursting; splitting; slipping; fall; collapse of Material Agent	Deviation by overflow; overturn; leak; flow; vaporisation; emission	Loss of control (total or partial) of machine; means of transport or handling equipment	Slipping - Stumbling and Falling - Fall of persons	Other / Unspecified	Total
Dredger	7	6	17	2	14	38	6	90
Multi-purpose	8	9	2	1	8	9	3	40
Offshore supply ship	13	18	8	8	24	38	7	116
Other offshore ship	3	11	2	1	10	18	2	47
Research ship	7	10	2	5	7	15	7	53
Special purpose ship	9	18	6	3	27	43	8	114
Tug (Towing/Pushing)	12	25	9	3	18	50	17	134
Other / Unspecified	17	37	9	2	32	58	12	167
Total	76	134	55	25	140	269	62	761

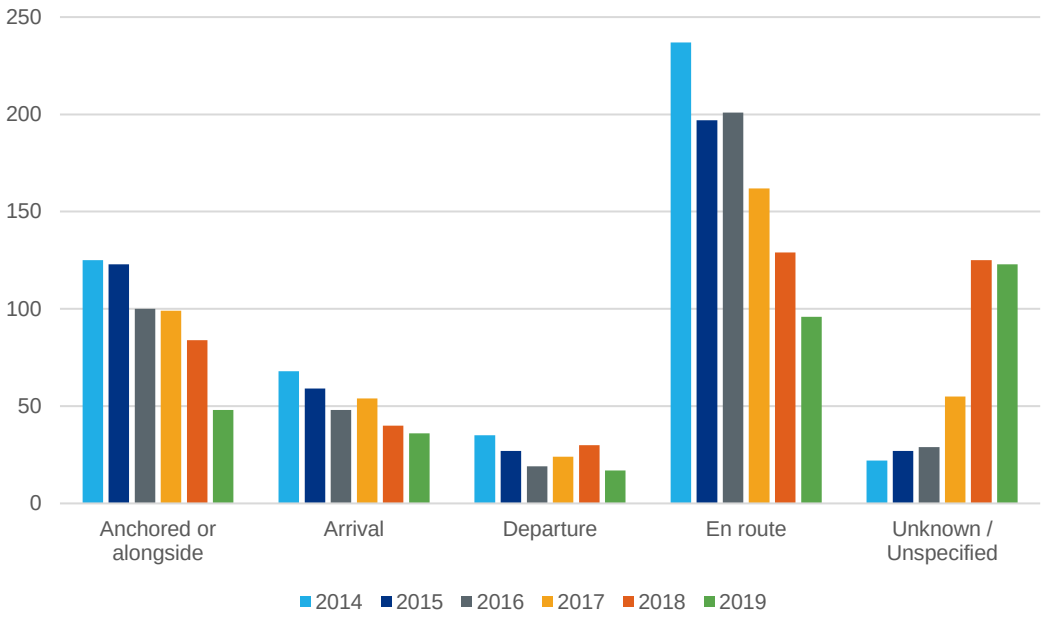
Falls on service ships represent, whatever the type of ships, the main deviation.

6.3 Location of the marine casualties and incidents

6.3.1 Voyage segments

Figure 6.7: Distribution by voyage segment

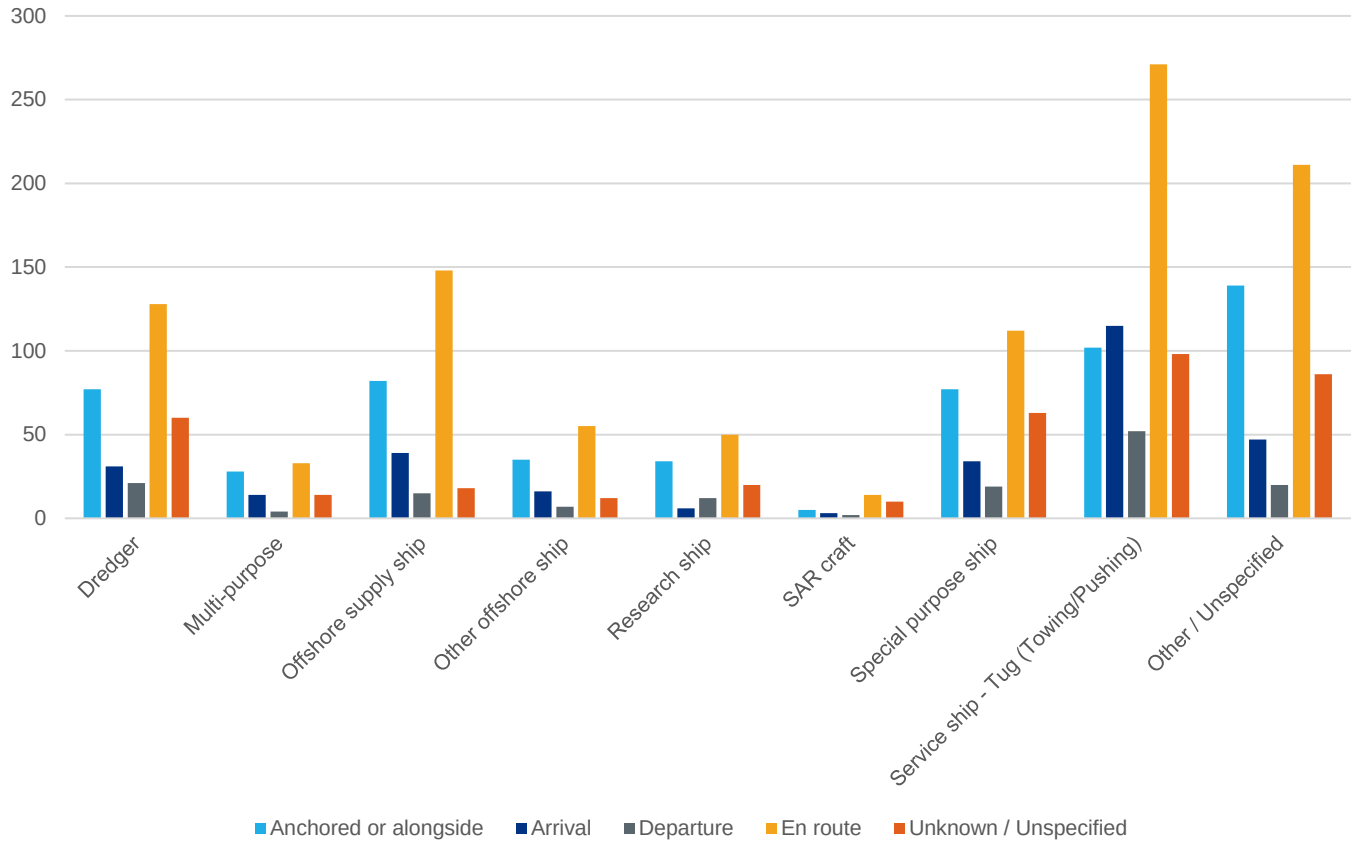




	2014	2015	2016	2017	2018	2019	Total
Anchored or alongside	125	123	100	99	84	48	579
Arrival	68	59	48	54	40	36	305
Departure	35	27	19	24	30	17	152
En route	237	197	201	162	129	96	1022
Unknown / Unspecified	22	27	29	55	125	123	381
Total	487	433	397	394	408	320	2439

The phase “en route” represents the least safe voyage segment with 42% of all occurrences.

Figure 6.8: Distribution by voyage segment per service ship type for 2014-2019

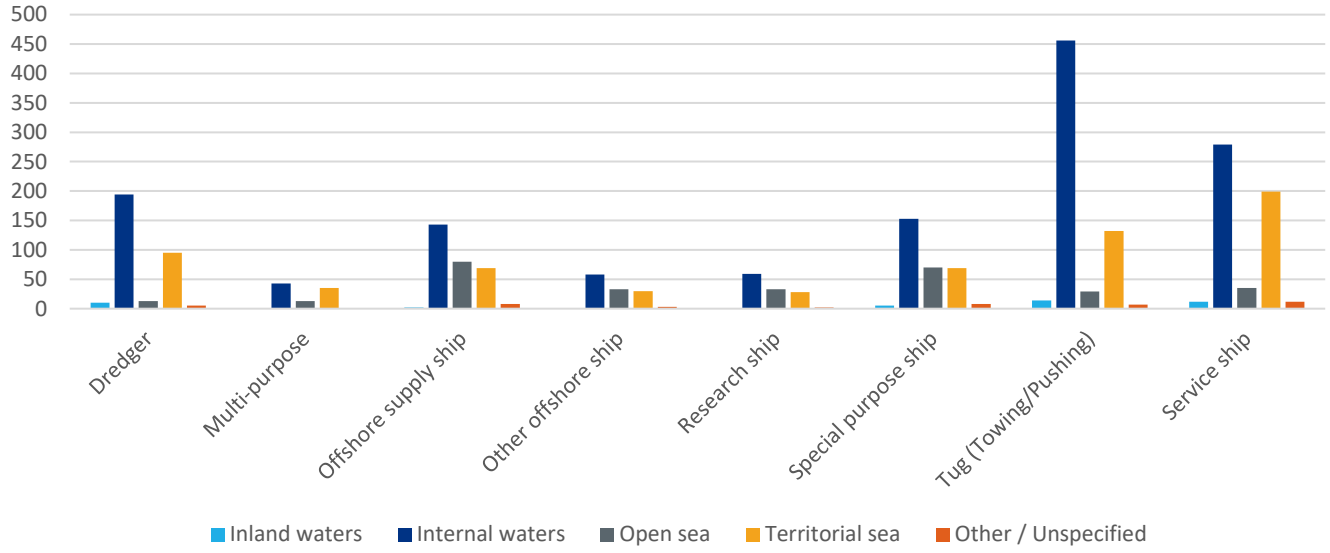


	Anchored or alongside	Arrival	Departure	En route	Unknown / Unspecified	Grand Total
Dredger	77	31	21	128	60	317
Multi-purpose	28	14	4	33	14	93
Offshore supply ship	82	39	15	148	18	302
Other offshore ship	35	16	7	55	12	125
Research ship	34	6	12	50	20	122
SAR craft	5	3	2	14	10	34
Special purpose ship	77	34	19	112	63	305
Service ship - Tug (Towing/Pushing)	102	115	52	271	98	638
Other / Unspecified	139	47	20	211	86	503
Total	579	305	152	1022	381	2439

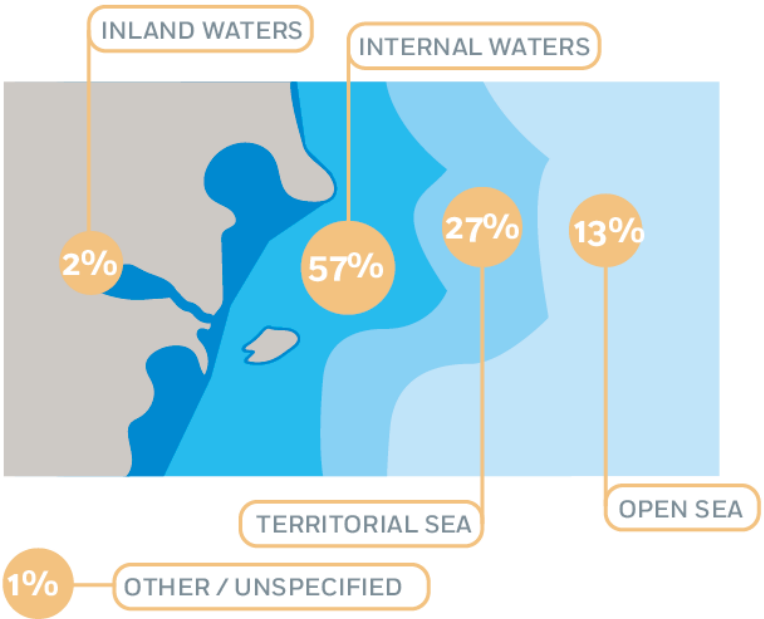
For all types of service ships, the unsafe segments are anchored/alongside or “en route”.

6.3.2 Location

Figure 6.9: Distribution by location of marine casualties and incidents per service ship type for 2014-2019



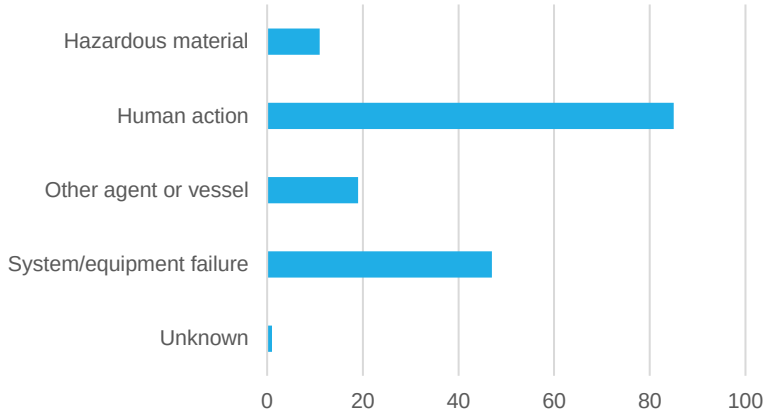
	Inland waters	Internal waters	Open sea	Territorial sea	Other / Unspecified	Grand Total
Dredger	10	194	13	95	5	317
Multi-purpose	1	43	13	35	1	93
Offshore supply ship	2	143	80	69	8	302
Other offshore ship	1	58	33	30	3	125
Research ship	0	59	33	28	2	122
Special purpose ship	5	153	70	69	8	305
Tug (Towing/Pushing)	14	456	29	132	7	638
Service ship	12	279	35	199	12	537
Total	45	1385	306	657	46	2439



Internal waters were by far the main location of accidents 56.8%.

6.4 Accidental Events and Contributing Factors

Figure 6.10: Distribution of accident events in service ships related events for the period 2014-2019

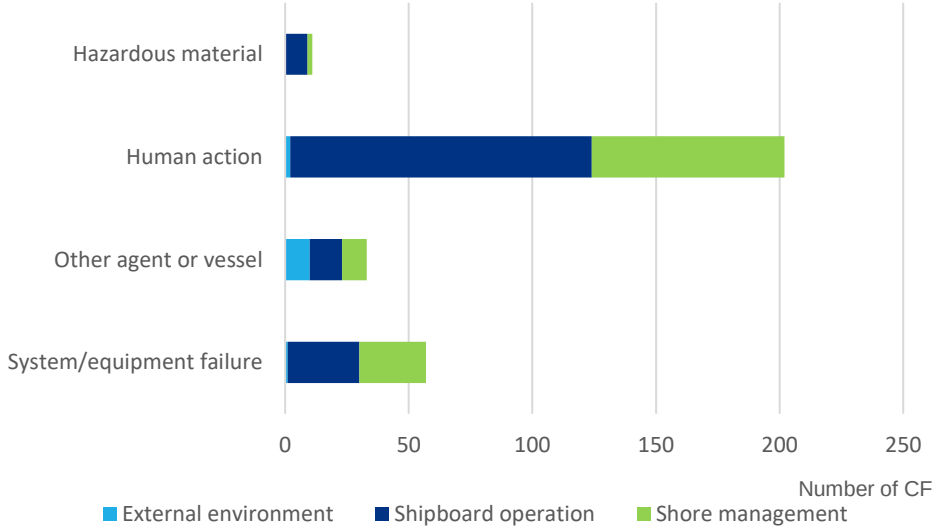


Accident events types	Number of accident events
Hazardous material	11
Human action	85
Other agent or vessel	19
System/equipment failure	47
Unknown	1
Total	163

From a total of 163 accident events in service ships analysed during the investigations, 52.15% were attributed to 'human action' category and 28.83% to 'system/equipment failures'.

Service ships have the same trend for accident event distribution than marine casualties in general.

Figure 6.11: Relationship between accident events and the contributing factors in service ships for 2014-2019

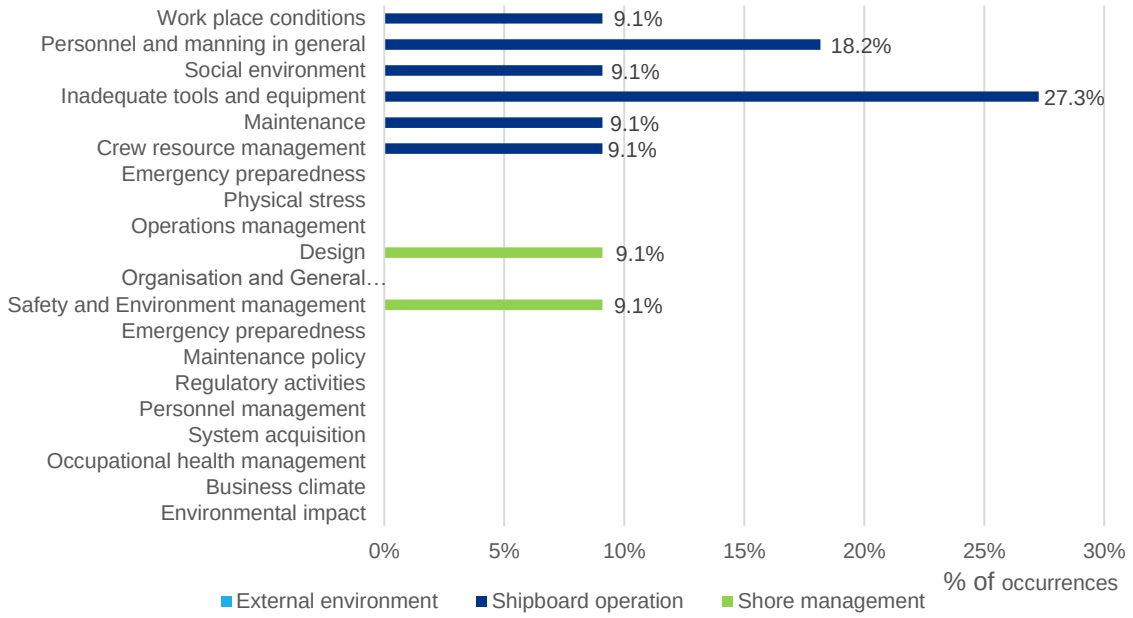


303 contributing factors associated to 163 accident events; this is a medium value of 1.86 contributing factors per accident event in service ships.

The main accident events type was human action failure associated with the factor shipboard operation.

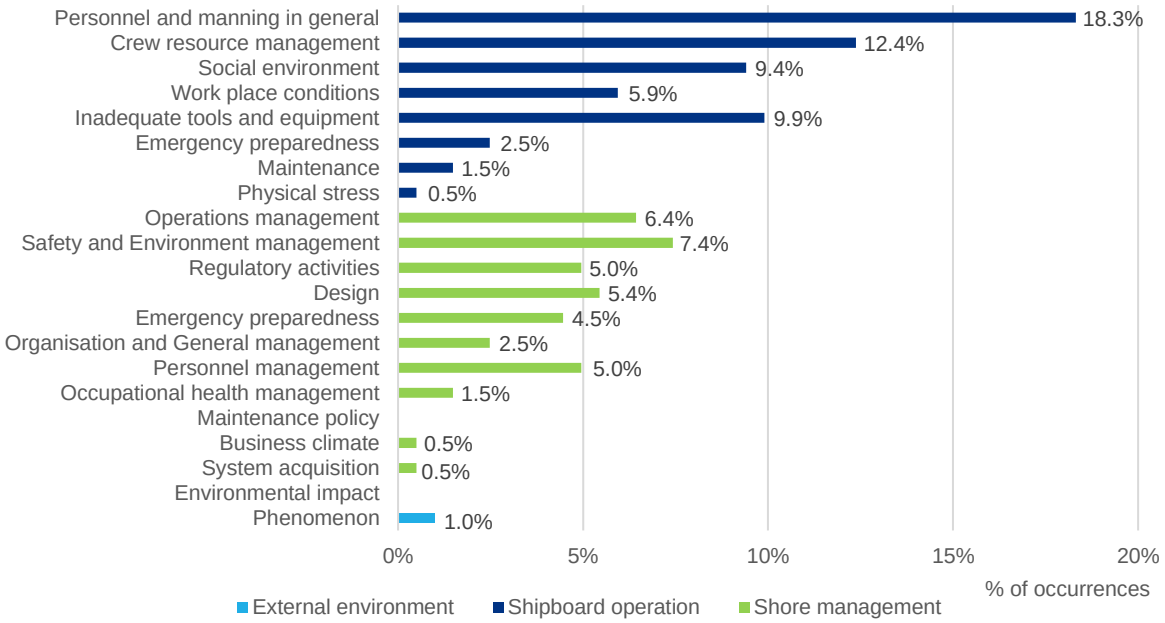
Service ships				
Accident events types	**Number of contributing factors**	**Contributing factors categories involved in each accident events type**		
		External environment	**Shipboard operation**	**Shore management**
Hazardous material	11	0	9	2
Human action	202	2	122	78
Other agent or vessel	33	10	13	10
System/equipment failure	57	1	29	27
Unknown	0	0	0	0
Total	303	13	173	117

Figure 6.12: Contributing factors involved in "Hazardous Material" accident events, distributed by categories



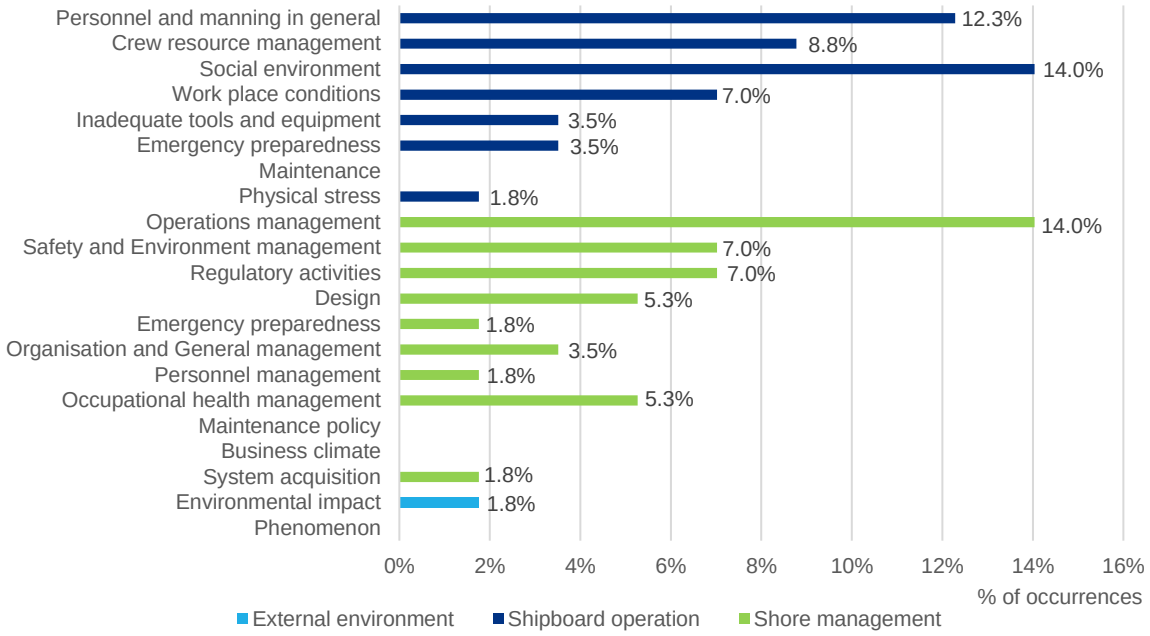
In the area of Hazardous Material, 'inadequate tools and equipment' and 'personnel and manning in general' are the main contributing factors related to shipboard operation. When it is linked to shore management, only 'design' and 'safety and environment management' were reported, at equal level.

Figure 6.13: Contributing factors involved in "Human Action" accident events, distributed by categories



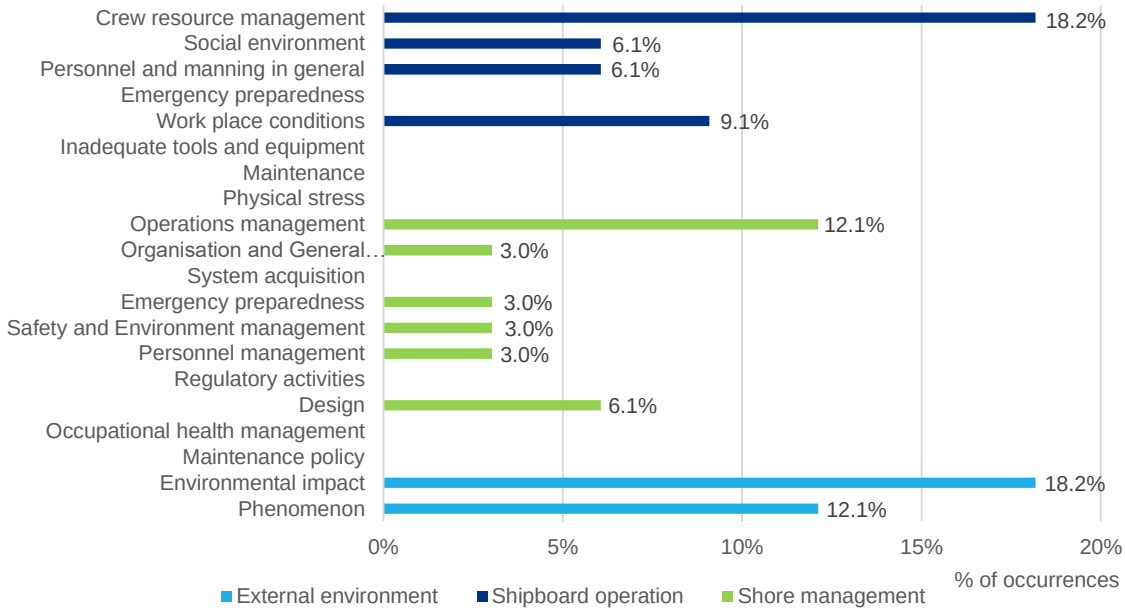
In the category 'Human Action', 'personnel and manning and general' is most reported contributing factor associated to shipboard operation. It is followed by 'crew resource management'.

Figure 6.14: Contributing factors involved in "System / Equipment Failure" accident events, distributed by categories



With regards 'System / Equipment Failure', 'social environment' was more reported than 'personnel and manning in general', which remain an important factor related to shipboard operation. 'Operations management' is the main factor when linked with shore management.

Figure 6.15: Contributing factors involved in "Other Agent or Vessel" accident events, distributed by categories

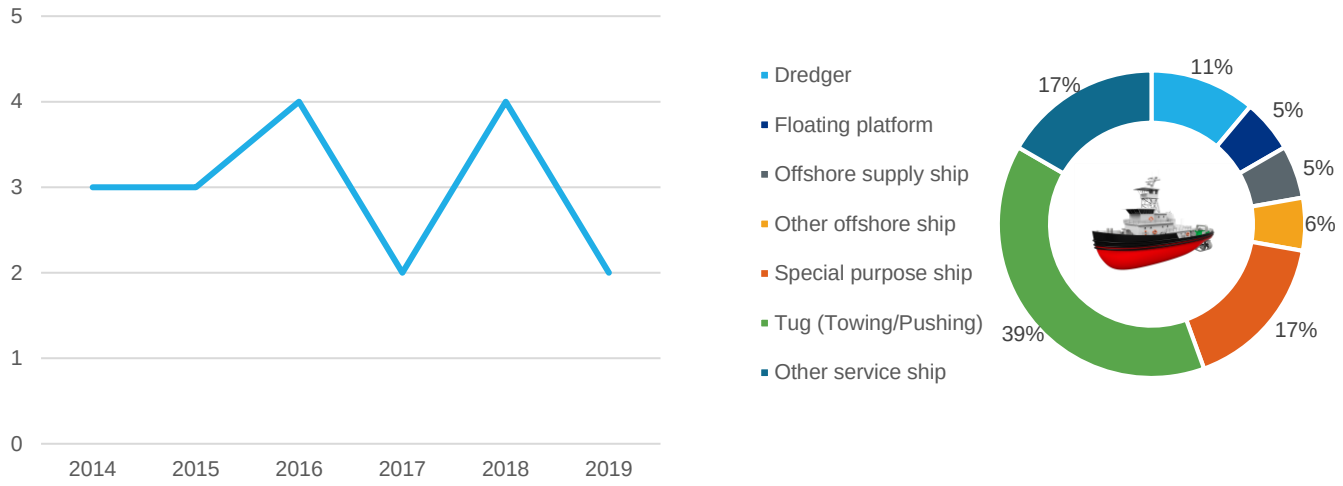


'External environment' is the most important contributing factor in the 'other agent or vessel' events analysed. 'Environmental impact' was more reported than 'Phenomenon', which remained a significant factor.
The factor 'crew resource management' was the main reported one in categories 'shipboard operation' and 'shore management'.

6.5 Consequences

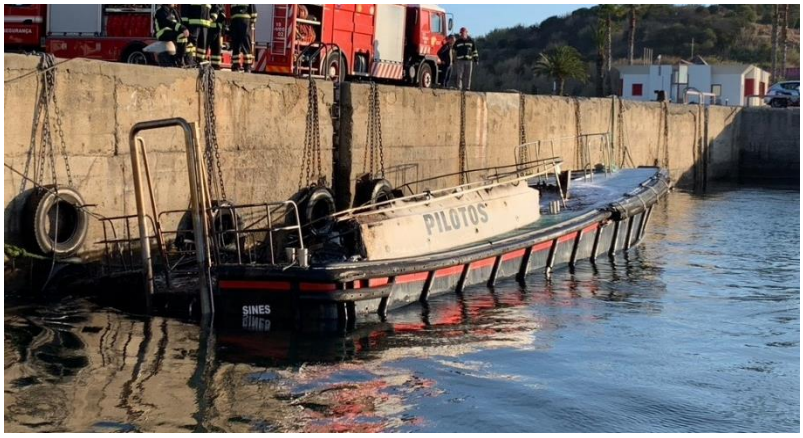
6.5.1 Consequences to ships

Figure 6.16: Service ships lost

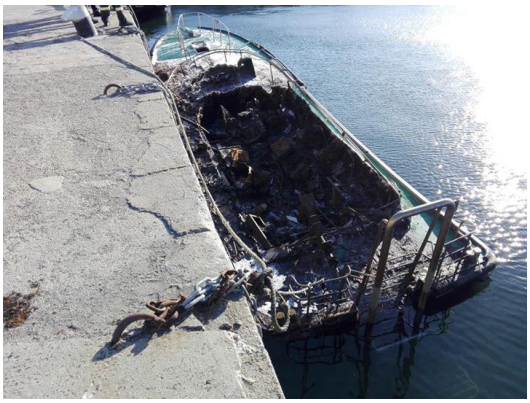


	2014	2015	2016	2017	2018	2019
Service ships lost	3	3	4	2	4	2

In the reference period 2014 – 2019, the average number of service ships lost per year was 3. The total number of lost service ships remained constant during the past years. Of the 18 ships lost one third were tugs.



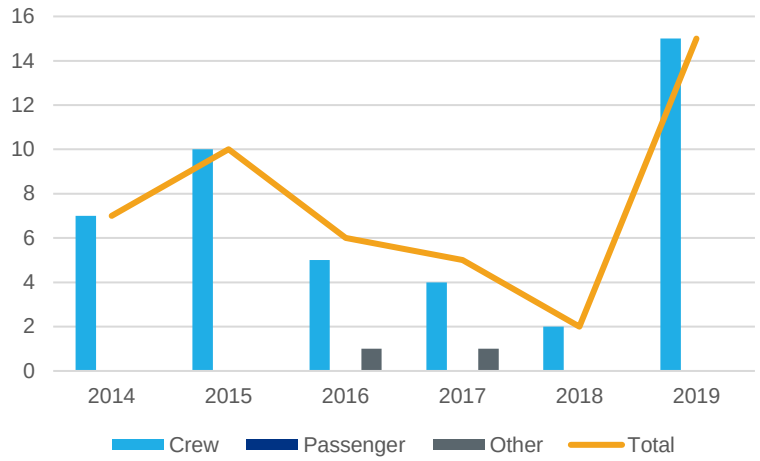
21/06/2019, fire on board pilot boat "Atlantida Azul"



6.5.2 Consequences to persons

6.5.2.1 Fatalities

Figure 6.17: Number of fatalities

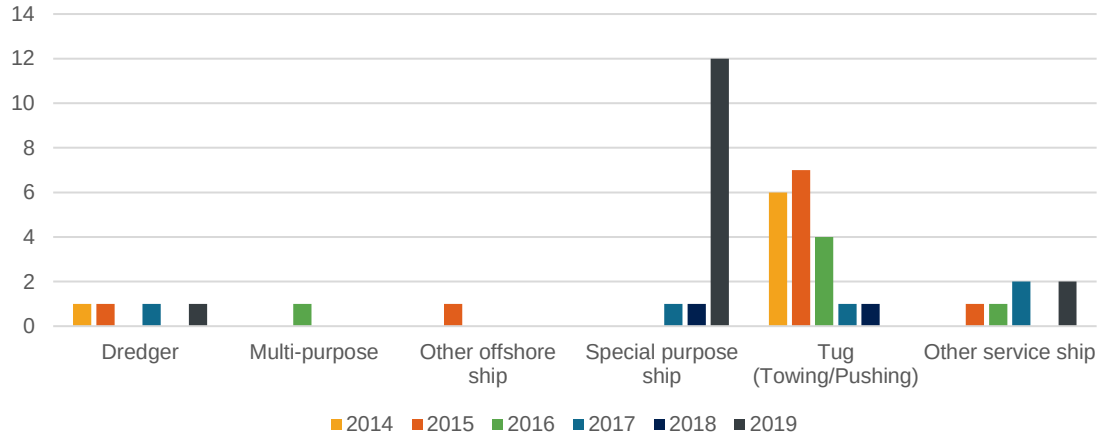


After a regular decrease in the number of fatalities from 2015 to 2018, a significant increase of deaths was noted in 2019. This is due to the sinking of the Bourbon Rhodes on 26 September that led to 4 lives lost and 7 persons being reported as missing.

Almost all victims (95.5%) were crew members.

	2014	2015	2016	2017	2018	2019	Total
Crew	7	10	5	4	2	15	43
Passenger	0	0	0	0	0	0	0
Other	0	0	1	1	0	0	2
Total	7	10	6	5	2	15	45

Figure 6.18: Distribution of fatalities per service ship type

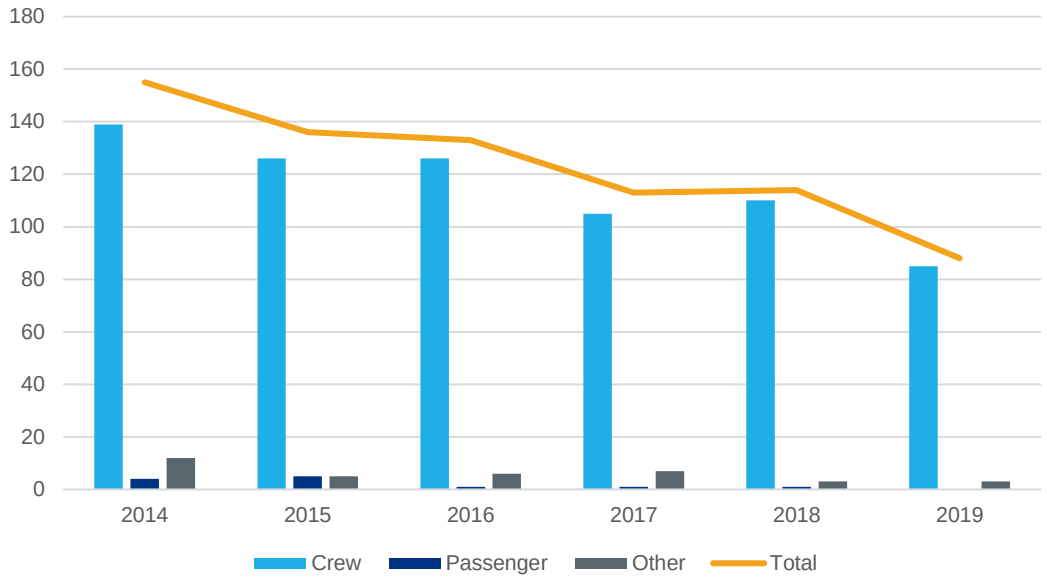


Despite a total of only 2 fatalities since 2017, 42.2% of the fatalities occurred on board tugs.

	2014	2015	2016	2017	2018	2019	Total
Dredger	1	1	0	1	0	1	4
Multi-purpose	0	0	1	0	0	0	1
Other offshore ship	0	1	0	0	0	0	1
Special purpose ship	0	0	0	1	1	12	14
Tug (Towing/Pushing)	6	7	4	1	1	0	19
Other service ship	0	1	1	2	0	2	6
Total	7	10	6	5	2	15	45

6.5.2.2 Injuries

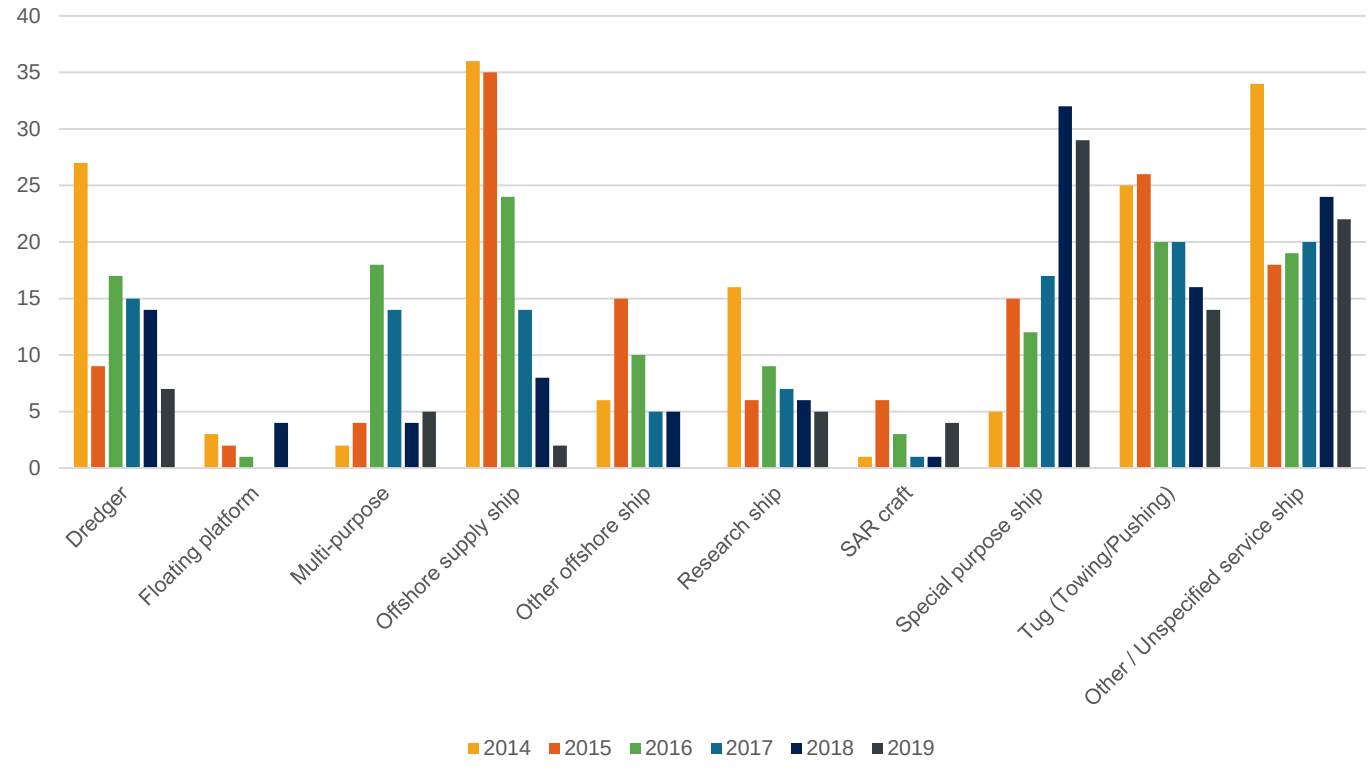
Figure 6.19: Number of injuries



	2014	2015	2016	2017	2018	2019	Total
Crew	139	126	126	105	110	85	691
Passenger	4	5	1	1	1	0	12
Other	12	5	6	7	3	3	36
Total	155	136	133	113	114	88	739

The number of persons injured has continuously decreased since 2014. A reduction of almost 50% was noted between 2014 and 2019. Crew members were the main victims of injuries (93.5%).

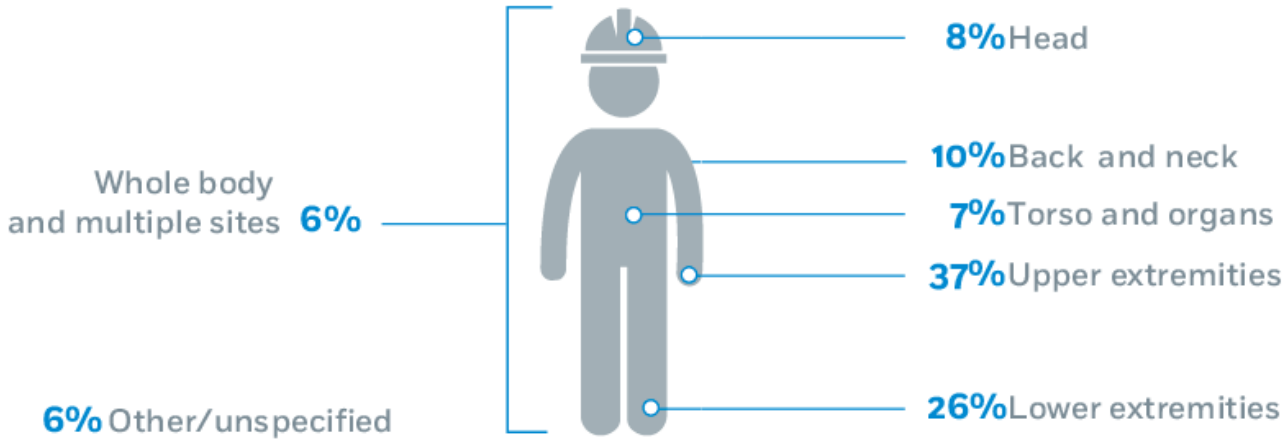
Figure 6.20: Distribution of injuries by service ship type



	2014	2015	2016	2017	2018	2019	Total
Dredger	27	9	17	15	14	7	89
Floating platform	3	2	1	0	4	0	10
Multi-purpose	2	4	18	14	4	5	47
Offshore supply ship	36	35	24	14	8	2	119
Other offshore ship	6	15	10	5	5	0	41
Research ship	16	6	9	7	6	5	49
SAR craft	1	6	3	1	1	4	16
Special purpose ship	5	15	12	17	32	29	110
Tug (Towing/Pushing)	25	26	20	20	16	14	121
Other / Unspecified service ship	34	18	19	20	24	22	137
Total	155	136	133	113	114	88	739

In 2019, the decrease of injuries benefited all service ship types. Over the period, tugs, special purpose ships and offshore supply ships remained the main ones affected.

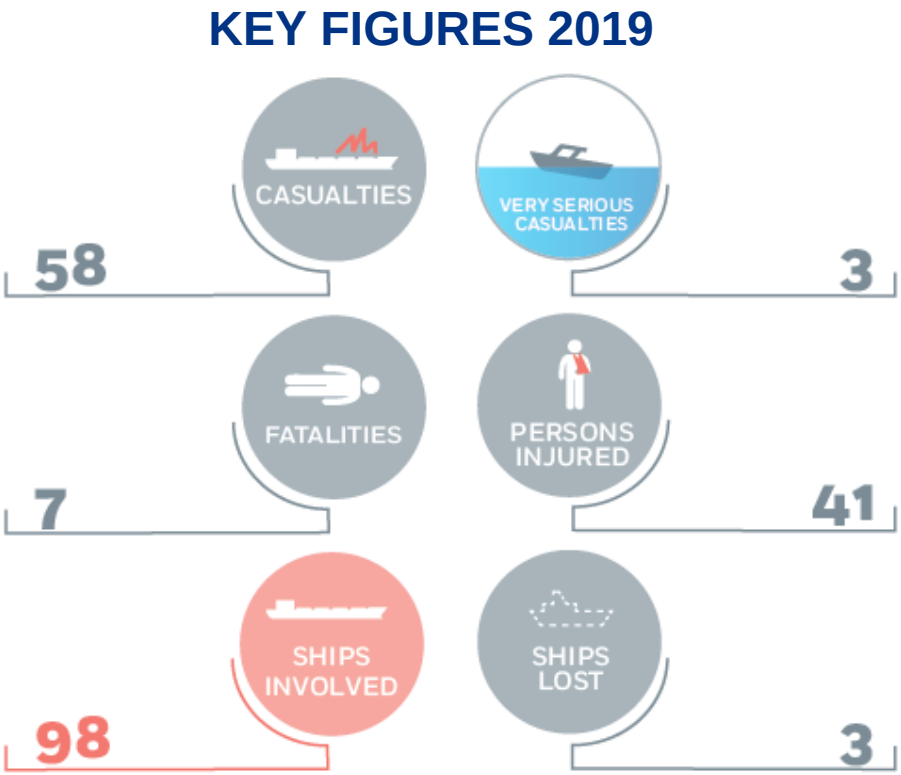
Figure 6.21: Part of body injured



More than 50% of all injuries affected Upper or Lower extremities.

Back & Neck	29
Head	23
Lower Extremities	78
Torso and organs	20
Upper Extremities	108
Whole body and multiple sites	19
Other / Unspecified	17
Total of reported injuries	294

Chapter 7: OTHER SHIPS



23/08/2019, Collision between chemical tanker "Varkan Edge" and sailing boat "Medi Mode"

7.0 Executive summary about Other Ships

Most of the ships included in this category are not directly covered by the Directive on Accident Investigation, unless they are involved in an event with a ship covered by the Directive. This explains the abnormal rate of collisions reported in EMCIP, while the sum of collisions, contacts and groundings represents around 50% of events affecting a particular type of ship.

The situation in 2019 for the ships of other types was negative.

A total of 505 ships of other types than cargo, fishing vessel, passenger ship or service ship were involved in a marine casualty between 2014 and 2019. After a very significant increase in 2018, the number of ships involved was reduced to 60, which is the lowest number over the period 2014-2019.

Among the ships of other type affected, recreational sailboats represented the main type with 42.6% of all ships involved.

The rate of Very Serious casualties is 5.8%, and 12.5% when the severity is Serious. While the serious rate is only half of the average one for all ships, the very serious is almost the double of the one calculated for all ships.

Collisions represented 69.3% of all occurrences. This very high rate is explained by the scope of the Directive on Accident Investigation, which doesn't cover the types of ships addressed in this Chapter, unless they are involved in an accident with a ship covered by the legislation. As concerns occurrences to person(s), 47.7 % were attributed to slipping, stumbling and falling of persons.

In 2019 3 ships were lost in this category.

Over the period, a total of 21 ships were lost. The annual number has continuously fluctuated in the last 5 years, with an average of 3.6 ships per year.

During the 2014-2019 period, 12 accidents involving the ships of other types resulted in a total of 22 lives lost. The number of fatalities over the period fluctuated between 7 and 0 fatalities. The number was 7 in 2019.

In 2019, 197 persons were reported injured. The number continued increasing since 2016. Victims were almost equally shared between crew and passengers.

As for the other ship types, the departure phase appeared to be the safest phase of a voyage and en route the most unsafe. It was noted that 60% of the casualties occurred in internal waters.

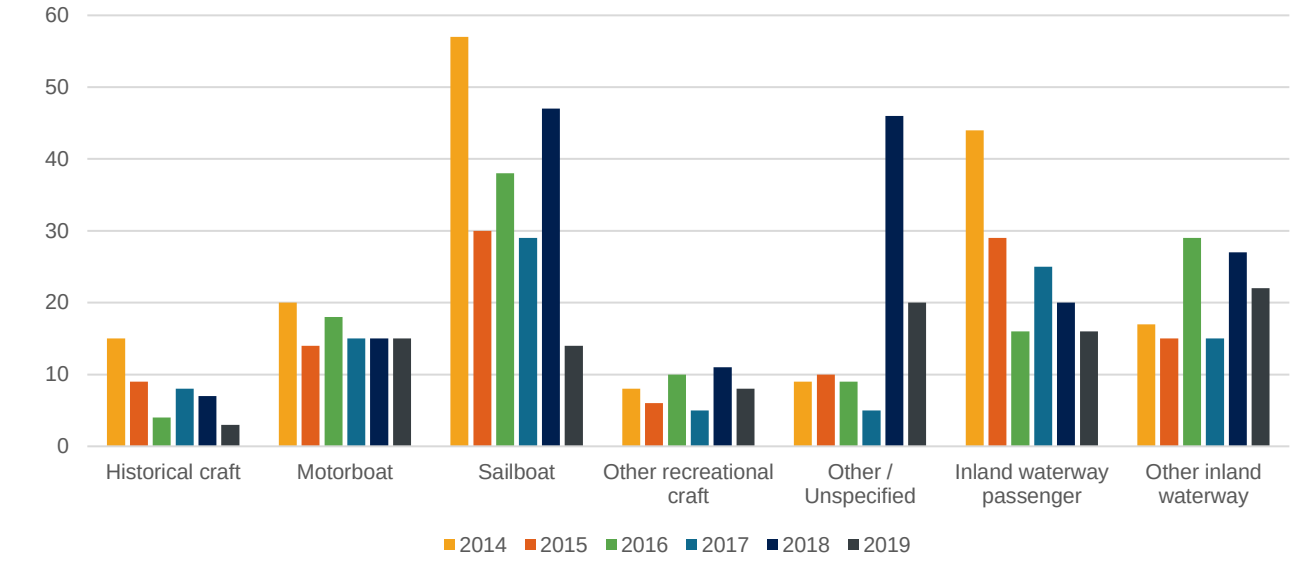
The main underlying factor leading to casualties was the "Human Action", which represented 56.6% of all accident events. In this category of events, 45.7% of the contributing factors were related to shipboard operations. Such figures are similar to the ones when all ship types are considered.

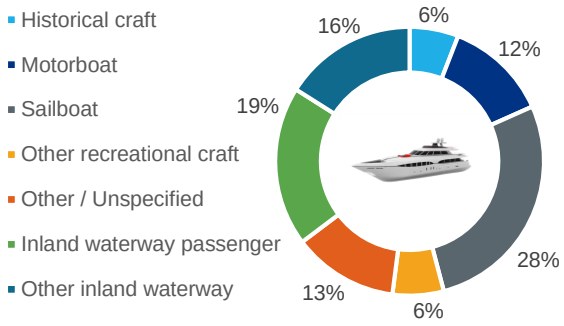
In conclusion, the year 2019 appeared to be negative. Despite a significant reduction of ships involved in an accident, the number of fatalities was high, the number of injured persons continued increasing and the number of ships lost was at the average per year.

The directive does not apply to marine casualties and incidents involving only ships not propelled by mechanical means, wooden ships of primitive build, pleasure yachts and pleasure craft not engaged in trade, unless they are or will be crewed and carrying more than 12 passengers for commercial purposes. Such vessels are considered within the scope of the directive only when they are involved in an occurrence together with a ship which is covered by the directive (e.g. a collision between a cargo ship and a recreational craft).

7.1 Detailed distribution

Figure 7.1: Distribution of Other Ship types involved



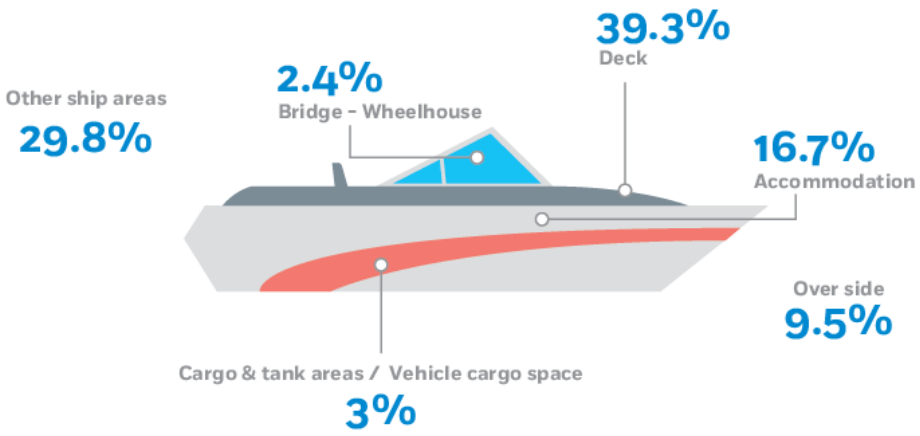


Among the other types of ship involved, the main subcategory was represented by recreational sailboats, followed by inland waterway passenger ships and motorboats.

After a significant increase of the number of other ship types in 2018 (+103%), figures for the year 2019 are back to similar level than the period 2015-2017.

	2014	2015	2016	2017	2018	2019	Total
Historical craft	15	9	4	8	7	3	46
Motorboat	20	14	18	15	15	15	97
Sailboat	57	30	38	29	47	14	215
Other recreational craft	8	6	10	5	11	8	48
Other / Unspecified	9	10	9	5	46	20	99
Inland waterway passenger	44	29	16	25	20	16	150
Other inland waterway	17	15	29	15	27	22	125
Total	109	69	79	62	126	60	505

Figure 7.2: Main places of occurrence with person(s) on board other ship for 2014-2019



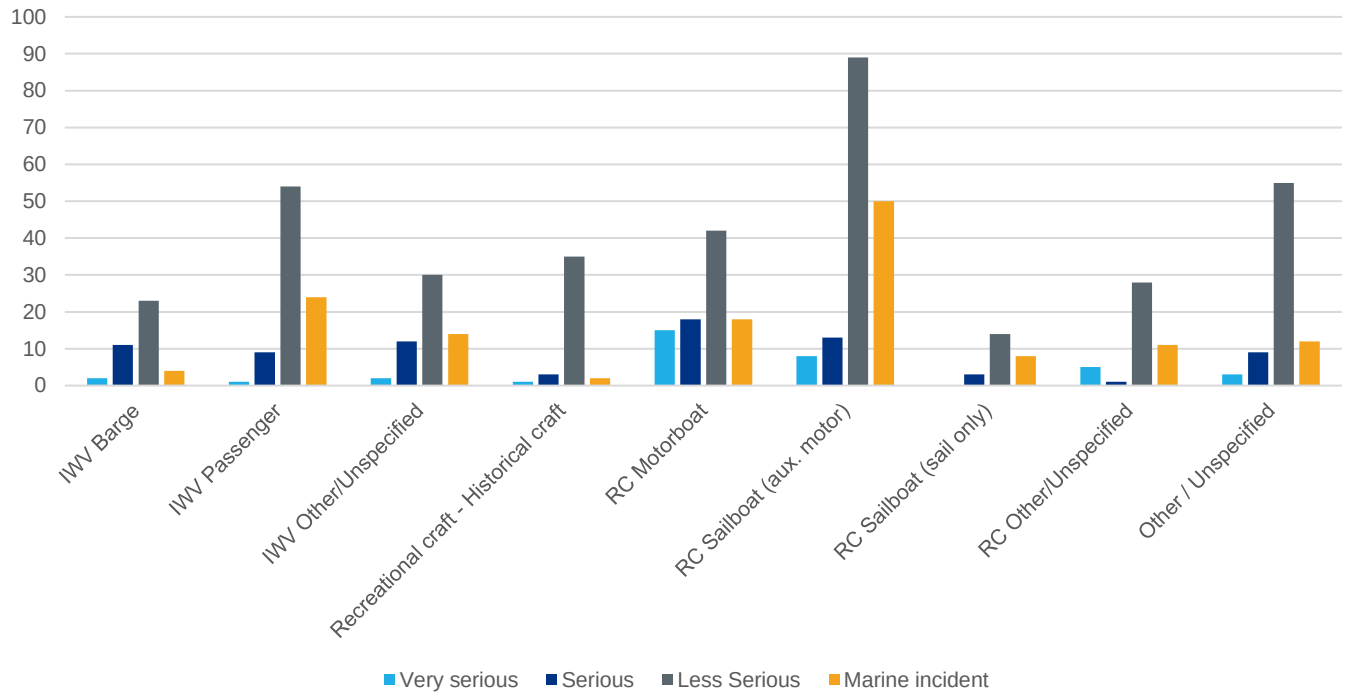
Accommodation	14
Bridge - Wheelhouse	2
Cargo & tank areas - Vehicle cargo space	2
Deck	33
Over side	8
Ship	25
Total	84

The most quoted location of accidents was the deck area.

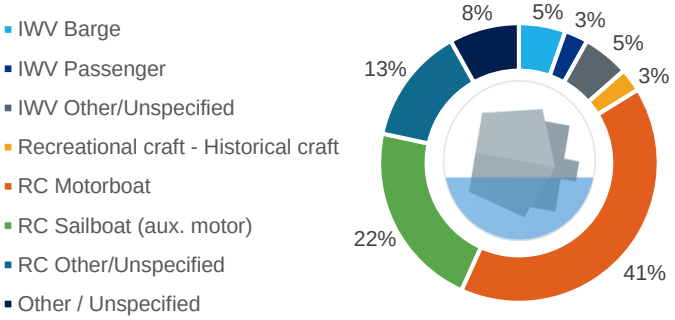
7.2 Nature of marine casualties and incidents

7.2.1 Occurrence with ship(s)

Figure 7.3: Distribution of severity per other ship type for 2014-2019

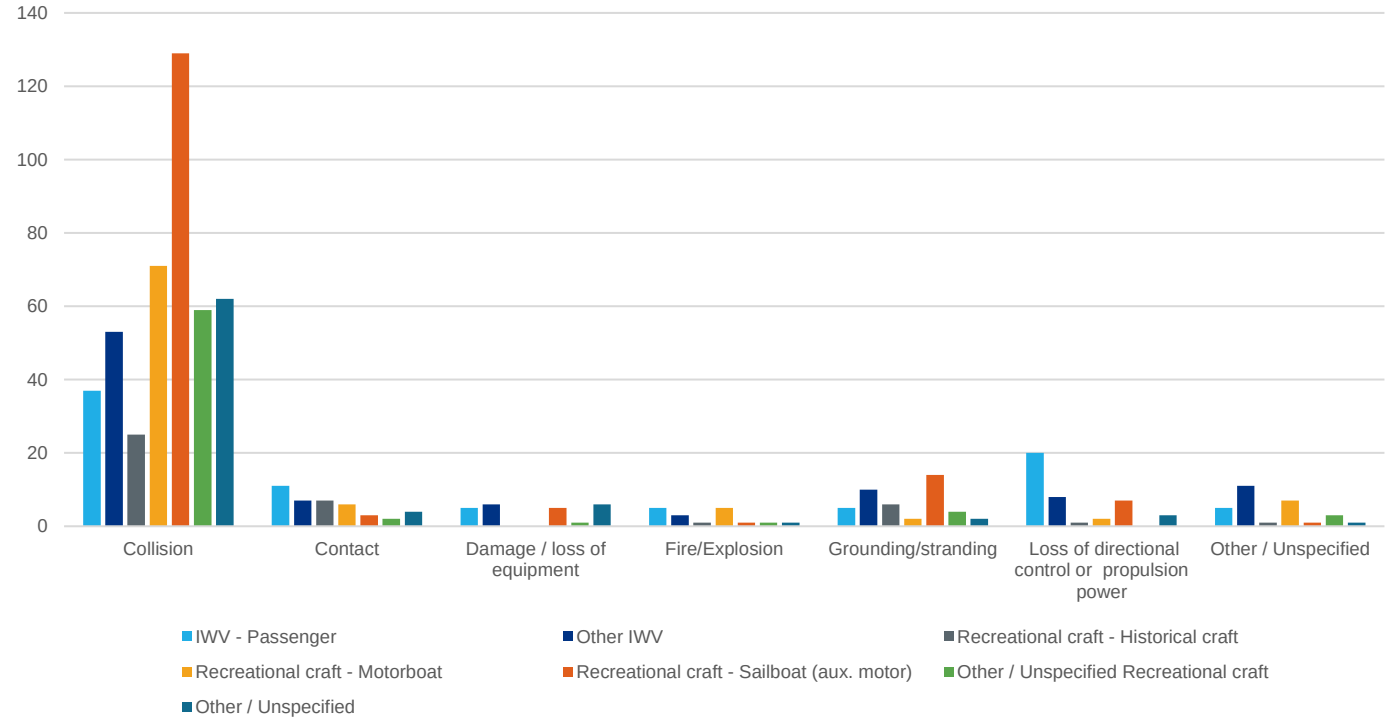


	Very serious	Serious	Less Serious	Marine incident	Total
IWV Barge	2	11	23	4	40
IWV Passenger	1	9	54	24	88
IWV Other/Unspecified	2	12	30	14	58
Recreational craft - Historical craft	1	3	35	2	41
RC Motorboat	15	18	42	18	93
RC Sailboat (aux. motor)	8	13	89	50	160
RC Sailboat (sail only)	0	3	14	8	25
RC Other/Unspecified	5	1	28	11	45
Other / Unspecified	3	9	55	12	79
Total	37	79	370	143	629



Severity rate of occurrences related to recreational craft motorboats and sailboats is very high in comparison with the overall ships: the very serious represents 5.8%, while the rate for all ships is 3%.

Figure 7.4: Distribution of casualty events per other ship type for 2014-2019

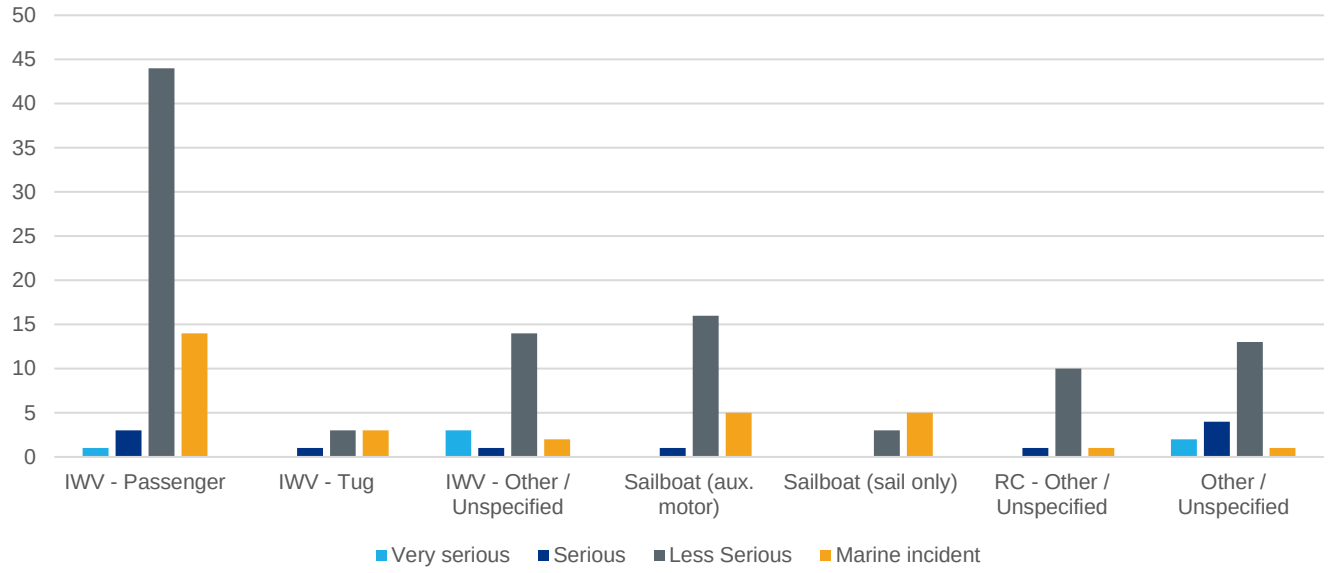


	Collision	Contact	Damage / loss of equipment	Fire / Explosion	Grounding / Stranding	Loss of directional control or propulsion power	Other / Unspecified	Total
IWV - Passenger	37	11	5	5	5	20	5	88
Other IWV	53	7	6	3	10	8	11	98
Recreational craft - Historical craft	25	7	0	1	6	1	1	41
Recreational craft - Motorboat	71	6	0	5	2	2	7	93
Recreational craft - Sailboat (aux. motor)	129	3	5	1	14	7	1	160
Other / Unspecified Recreational craft	59	2	1	1	4	0	3	70
Other / Unspecified	62	4	6	1	2	3	1	79
Total	436	40	23	17	43	41	29	629

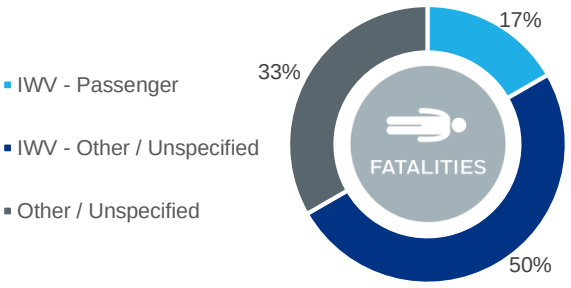
Ships within this category, despite being excluded from the scope of Directive 2009/18/EC, were however recorded as they were involved in a collision with a ship falling under the scope. This explains the very high rate of collisions as a casualty event (69.3%), mainly with recreational craft being motorboats or sailing boats.

7.2.2 Occurrence with person(s)

Figure 7.5: Severity of occurrence with person(s)s per other ship type for 2014-2019

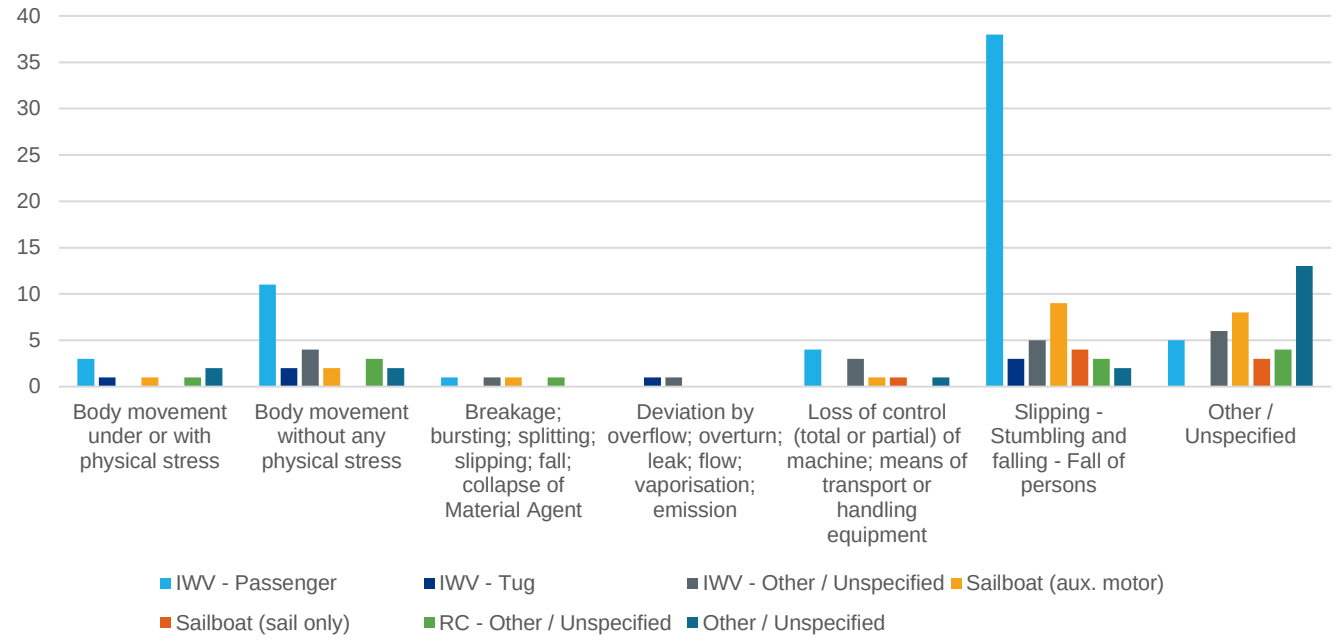


	Very serious	Serious	Less Serious	Marine incident	Total
IWV - Passenger	1	3	44	14	62
IWV - Tug	0	1	3	3	7
IWV - Other / Unspecified	3	1	14	2	20
Sailboat (aux. motor)	0	1	16	5	22
Sailboat (sail only)	0	0	3	5	8
RC - Other / Unspecified	0	1	10	1	12
Other / Unspecified	2	4	13	1	20
Total	6	11	103	31	151



The number of very serious (6) and serious (11) occurrence with person(s) for this category of ships are low, in line with the reduced total number of accidents.

Figure 7.6: Distribution of deviations per other ship type for 2014-2019



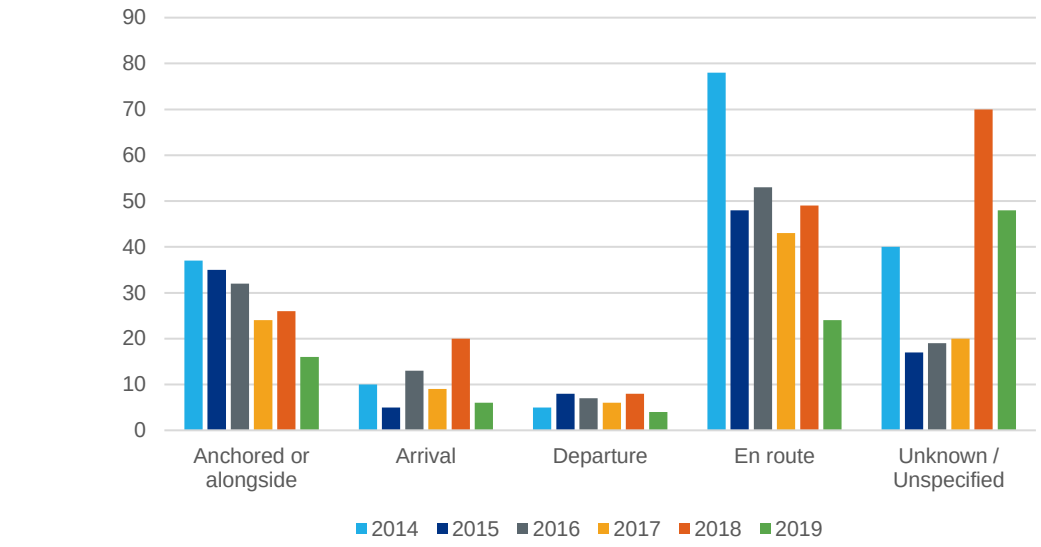
	Body movement under or with physical stress	Body movement without any physical stress	Breakage; bursting; splitting; slipping; fall; collapse of Material Agent	Deviation by overflow; overturn; leak; flow; vaporisation; emission	Loss of control (total or partial) of machine; means of transport or handling equipment	Slipping - Stumbling and falling - Fall of persons	Other / Unspecified	Total
IWV - Passenger	3	11	1	0	4	38	5	62
IWV - Tug	1	2	0	1	0	3	0	7
IWV - Other / Unspecified	0	4	1	1	3	5	6	20
Sailboat (aux. motor)	1	2	1	0	1	9	8	22
Sailboat (sail only)	0	0	0	0	1	4	3	8
RC - Other / Unspecified	1	3	1	0	0	3	4	12
Other / Unspecified	2	2	0	0	1	2	13	20
Total	8	24	4	2	10	64	39	134

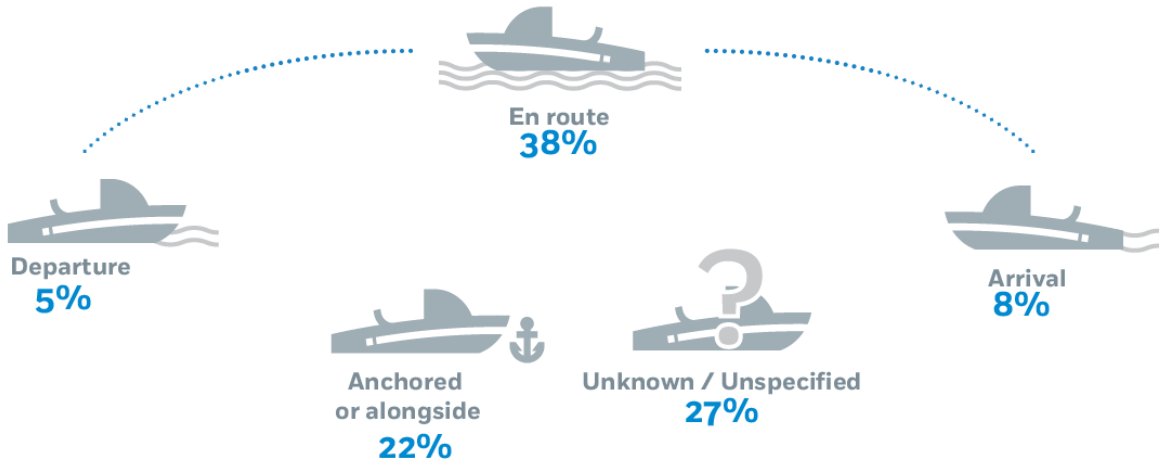
Slipping and falling of persons was the most recorded deviation (47.7%) and almost two thirds of the fall occurred on board of inland waterway passenger ships.

7.3 Location of the marine casualties and incidents

7.3.1 Voyage segments

Figure 7.7: Distribution by voyage segment

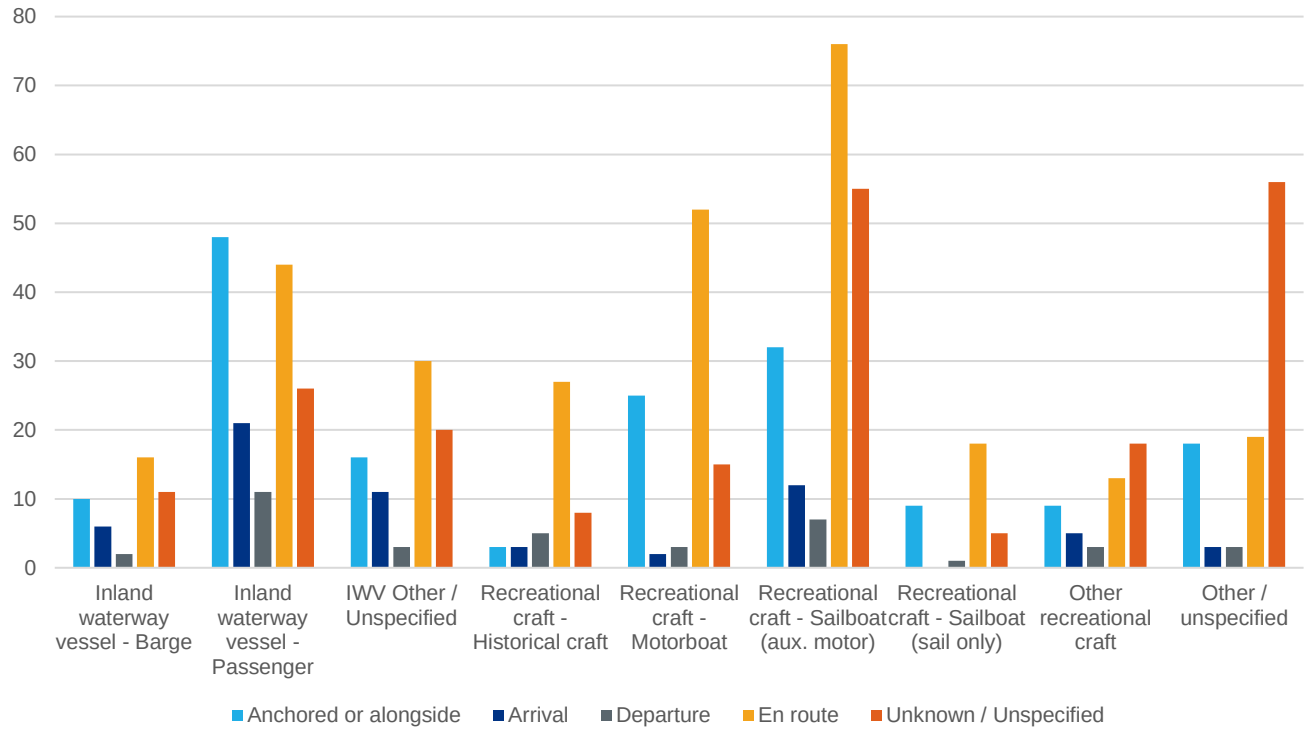




	2014	2015	2016	2017	2018	2019	Total
Anchored or alongside	37	35	32	24	26	16	170
Arrival	10	5	13	9	20	6	63
Departure	5	8	7	6	8	4	38
En route	78	48	53	43	49	24	295
Unknown / Unspecified	40	17	19	20	70	48	214
Total	170	113	124	102	173	98	780

"En route" indicates that the least safe segment with a total of 38% of the occurrences.

Figure 7.8: Distribution by voyage segment per other ship type for 2014-2019

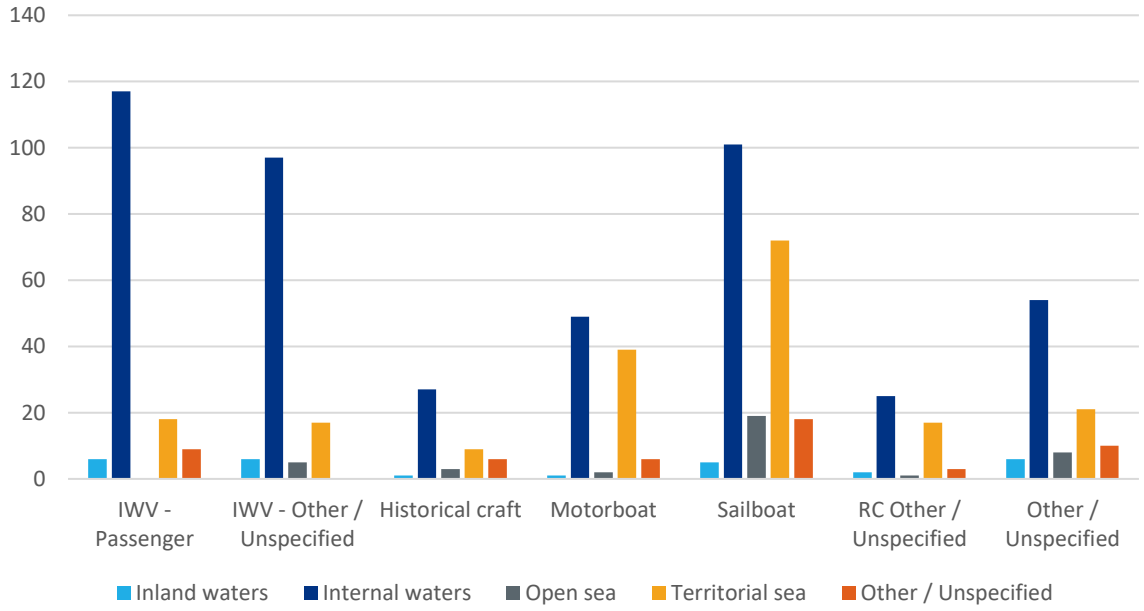


	Anchored or alongside	Arrival	Departure	En route	Unknown / Unspecified	Total
IWV - Barge	10	6	2	16	11	45
IWV - Passenger	48	21	11	44	26	150
IWV - Other / Unspecified	16	11	3	30	20	80
RC - Historical craft	3	3	5	27	8	46
RC - Motorboat	25	2	3	52	15	97
RC - Sailboat (aux. motor)	32	12	7	76	55	182
RC - Sailboat (sail only)	9	0	1	18	5	33
Other recreational craft	9	5	3	13	18	48
Other / unspecified	18	3	3	19	56	99
Total	170	63	38	295	214	780

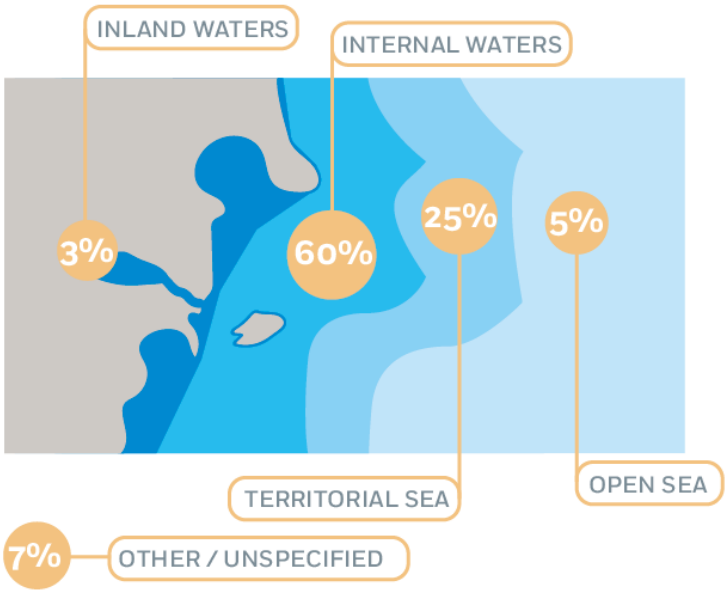
The “en route” phase of a voyage is confirmed to be the least safe, irrespective of the ship type.

7.3.2 Location

Figure 7.9: Distribution by location of marine casualties and incidents per other ship type for 2014-2019



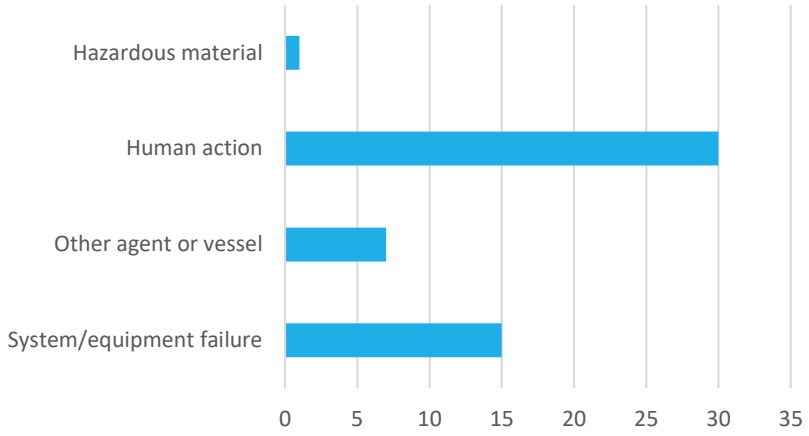
	Inland waters	Internal waters	Open sea	Territorial sea	Other / Unspecified	Total
IWV - Passenger	6	117	0	18	9	150
IWV - Other / Unspecified	6	97	5	17	0	125
Historical craft	1	27	3	9	6	46
Motorboat	1	49	2	39	6	97
Sailboat	5	101	19	72	18	215
RC Other / Unspecified	2	25	1	17	3	48
Other / Unspecified	6	54	8	21	10	99
Total	27	470	38	193	52	780



In line with the area where recreational activities take place, internal waters are the location where the majority of the casualties or incidents took place.

7.4 Accidental Events and Contributing Factors

Figure 7.10: Distribution of accident events in "other ships type" related events for the period 2014-2019

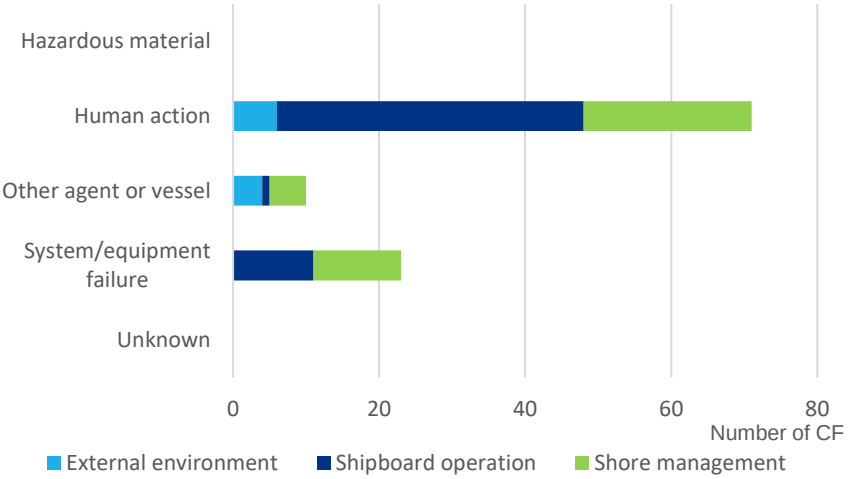


Accident events types	Number of accident events
Hazardous material	1
Human action	30
Other agent or vessel	7
System/equipment failure	15
Unknown	0
Total	53

From a total of 53 accident events in 'other ships' analysed during the investigations, 56.6% were attributed to 'human action' category and 28.3% to 'system/equipment failure'.

'Other ships' have the same trend for accident event distribution than marine casualties in general.

Figure 7.11: Relationship between accident events and the contributing factors in "other ships type" for 2014-2019

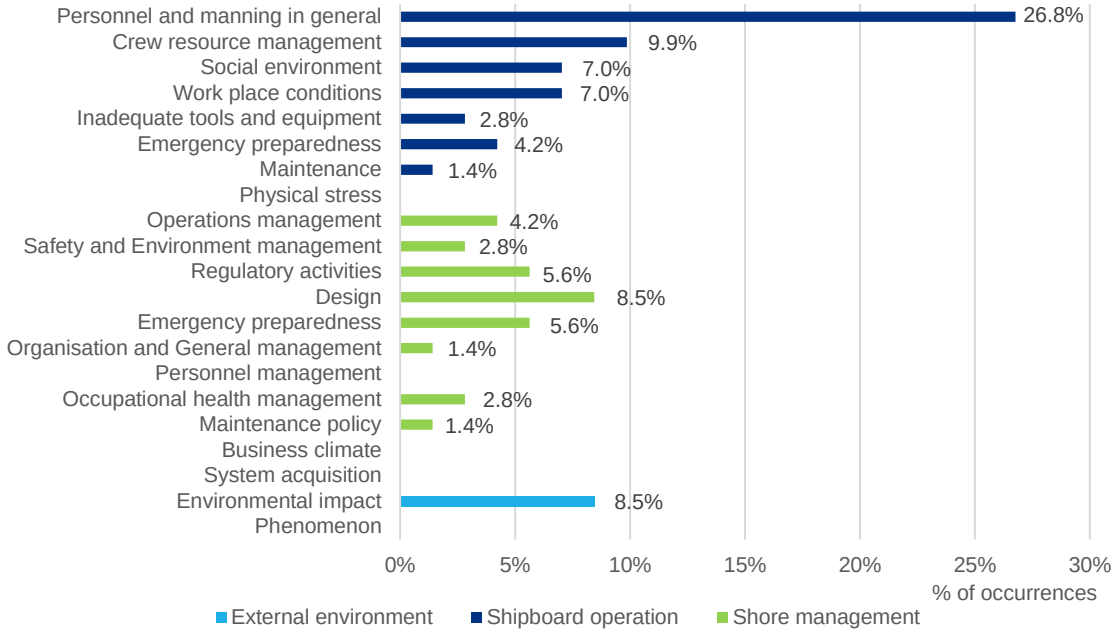


118 contributing factors associated to 53 accident events; this is a medium value of 2.23 contributing factors per accident event in 'other ships'.

The main accident events type was human action failure associated with the factor shipboard operation.

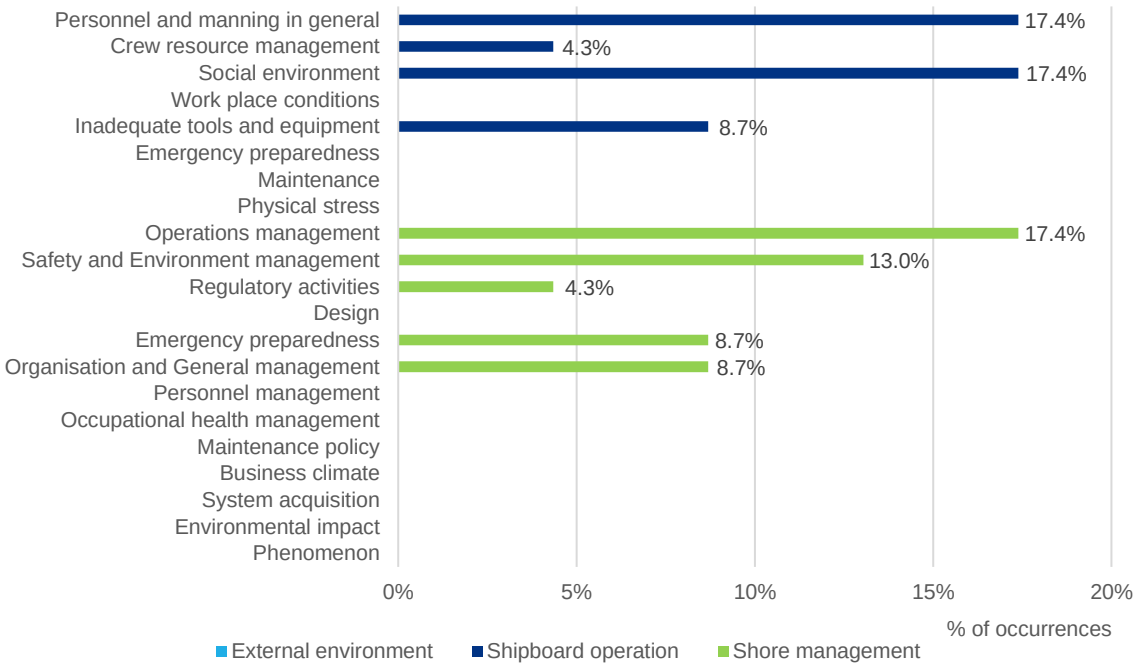
Other ships				
Accident events types	**Number of contributing factors**	**Contributing factors categories involved in each accident events type**		
		External environment	**Shipboard operation**	**Shore management**
Hazardous material	0	0	0	0
Human action	71	6	42	23
Other agent or vessel	10	4	1	5
System/equipment failure	23	0	11	12
Unknown	0	0	0	0
Total	104	10	54	40

Figure 7.12: Contributing factors involved in "Human Action" accident events, distributed by categories



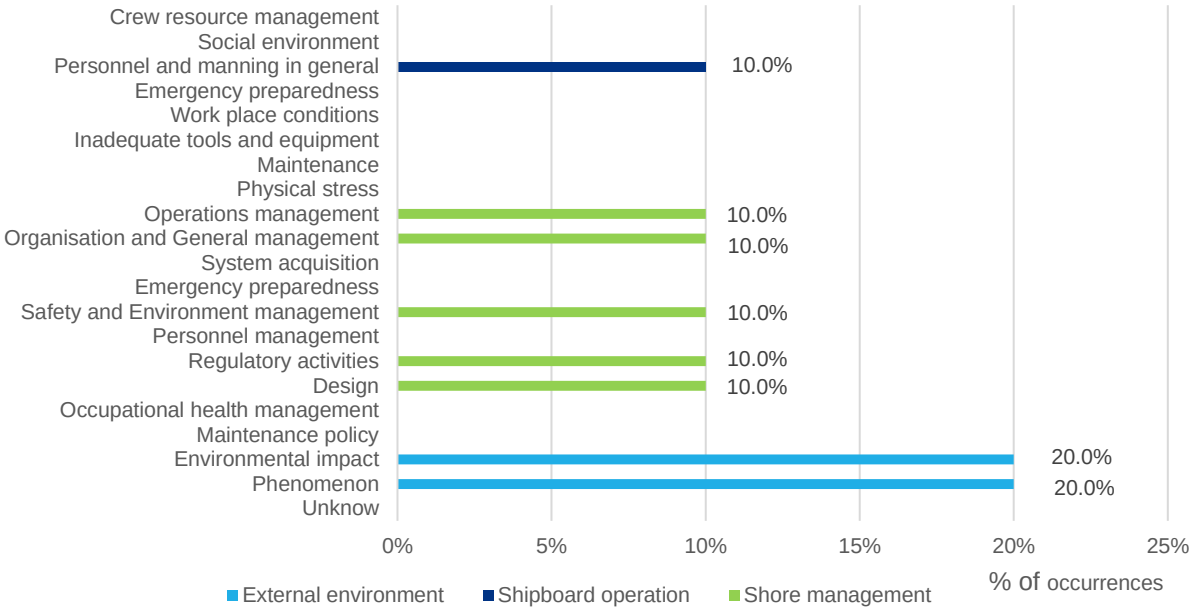
In the category 'Human Action', 'personnel and manning and general' is by far the main contributing factor associated to shipboard operation. Other reported contributing factors are distributed among all other categories.

Figure 7.13: Contributing factors involved in "System / Equipment Failure" accident events, distributed by categories



With regards 'System / Equipment Failure', 'personnel and manning in general' and 'social environment' were equally reported when it related to shipboard operation. 'Operations management' is the main factor when linked with shore management, followed by 'safety and environment management'.

Figure 7.14: Contributing factors involved in "Other Agent or Vessel" accident events, distributed by categories

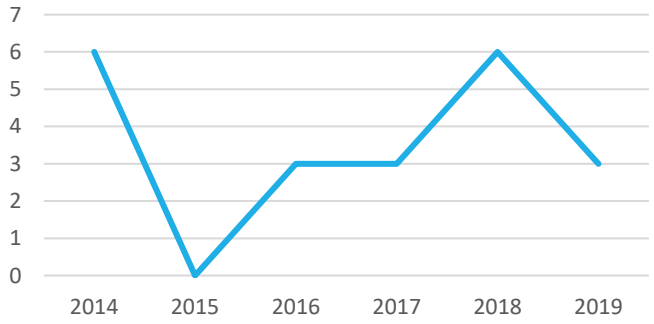


'External environment' is the most important contributing factor in the 'other agent or vessel' events analysed. 'Environmental impact' and 'Phenomenon' were equally reported.
In the categories 'shipboard operation' and 'shore management', a few factors were reported with the same importance.

7.5 Consequences

7.5.1 Consequences to ships

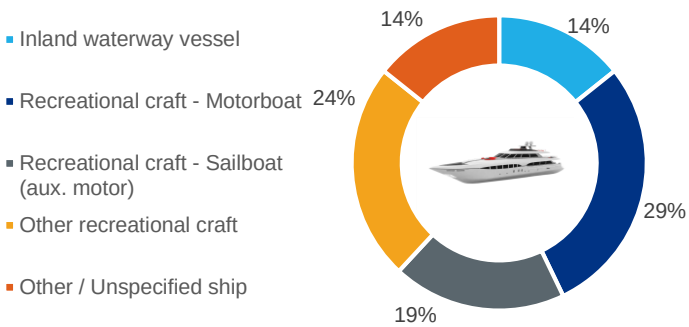
Figure 7.15: Other ships lost



	2014	2015	2016	2017	2018	2019
Other ships lost	6	0	3	3	6	3

After a continuous increase of ships lost since 2015, a reduction of 50% was noted in 2019.

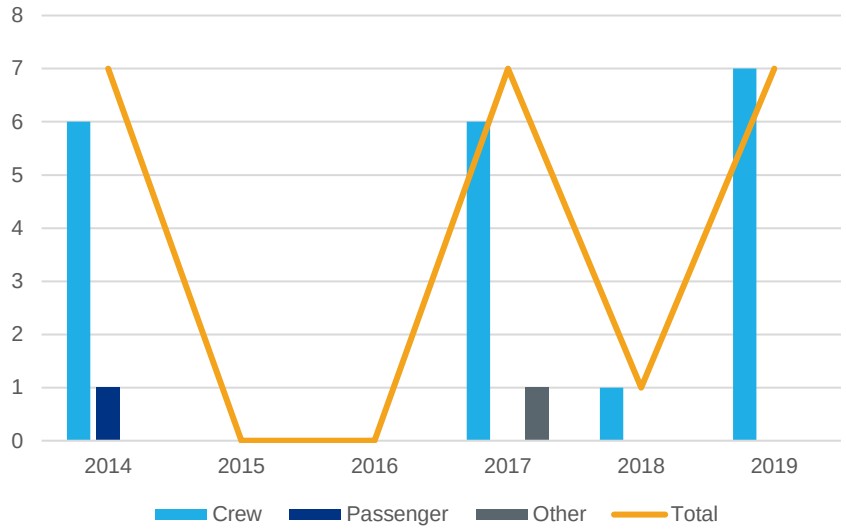
Of the 21 other type ships that were lost, the majority were recreational craft (72%).



7.5.2 Consequences to persons

7.5.2.1 Fatalities

Figure 7.16: Number of fatalities

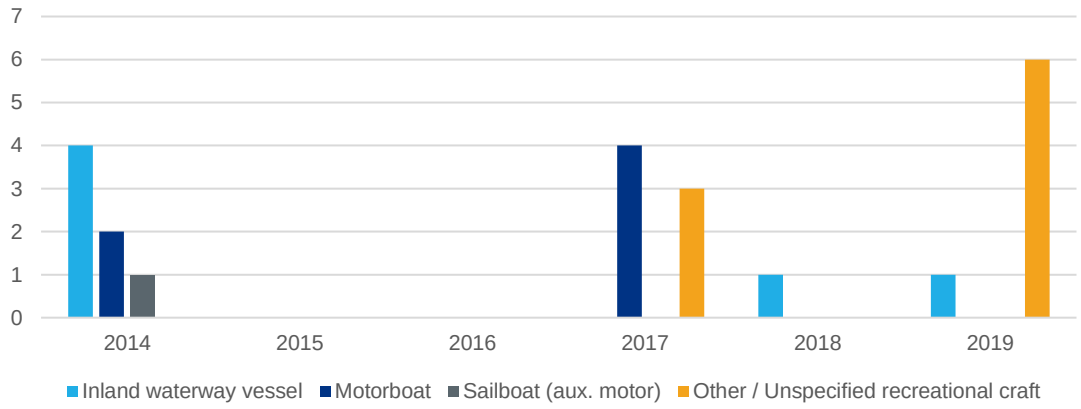


The number of fatalities fluctuated between 7 and 0 or 1 over the period 2014-2019.

In 2019, a total of 7 fatalities was again recorded.

	2014	2015	2016	2017	2018	2019	Total
Crew	6	0	0	6	1	7	20
Passenger	1	0	0	0	0	0	1
Other	0	0	0	1	0	0	1
Total	7	0	0	7	1	7	22

Figure 7.17: Distribution of fatalities per other ship type

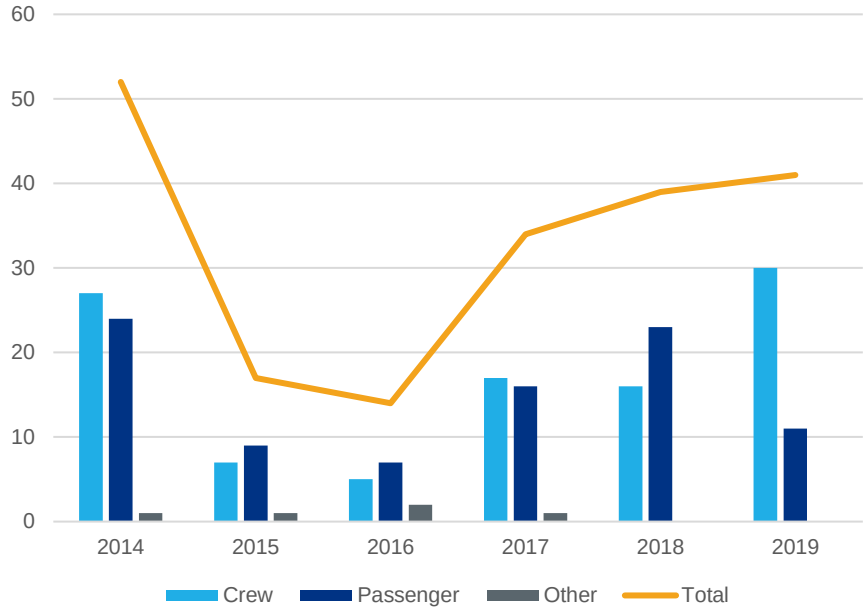


	2014	2015	2016	2017	2018	2019	Total
Inland waterway vessel	4	0	0	0	1	1	6
Motorboat	2	0	0	4	0	0	6
Sailboat (aux. motor)	1	0	0	0	0	0	1
Other / Unspecified RC	0	0	0	3	0	6	9
Total	7	0	0	7	1	7	22

Most fatalities occurred on board recreational craft (72.7%).

7.5.2.2 Injuries

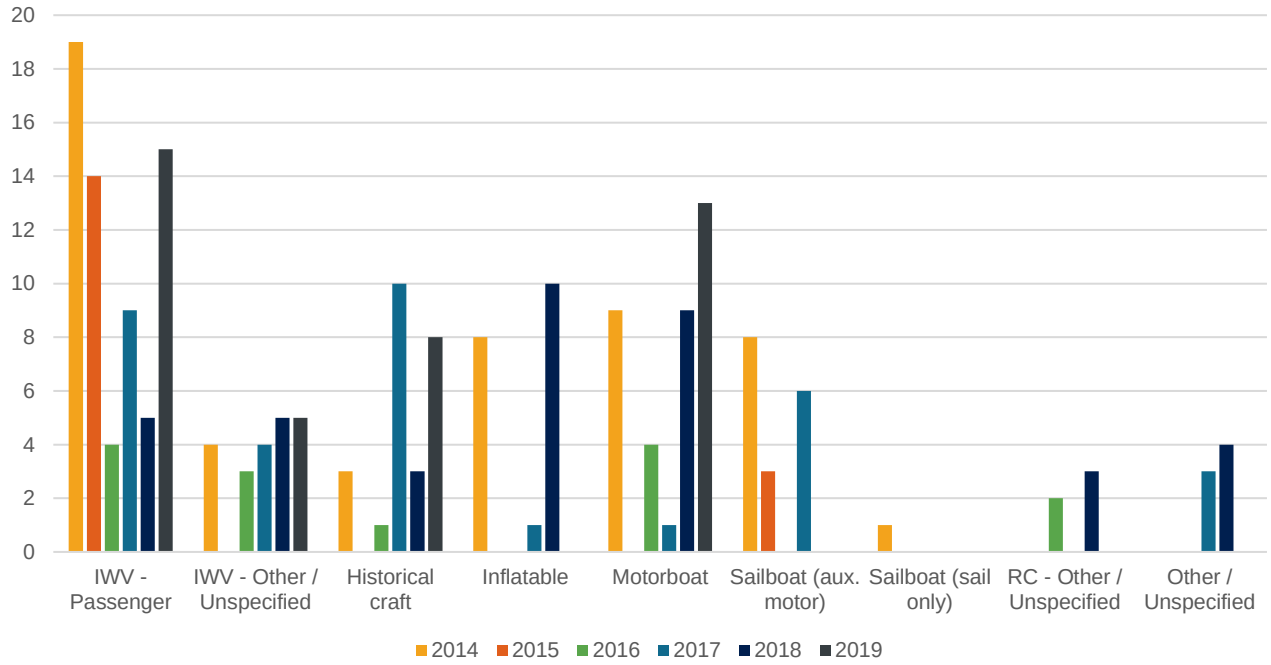
Figure 7.18: Number of injuries



The number of injuries has continued increasing since 2016. While the number of affected passengers was divided by half in 2019, the number of crew members injured was doubled.

	2014	2015	2016	2017	2018	2019	Total
Crew	27	7	5	17	16	30	102
Passenger	24	9	7	16	23	11	90
Other	1	1	2	1	0	0	5
Total	52	17	14	34	39	41	197

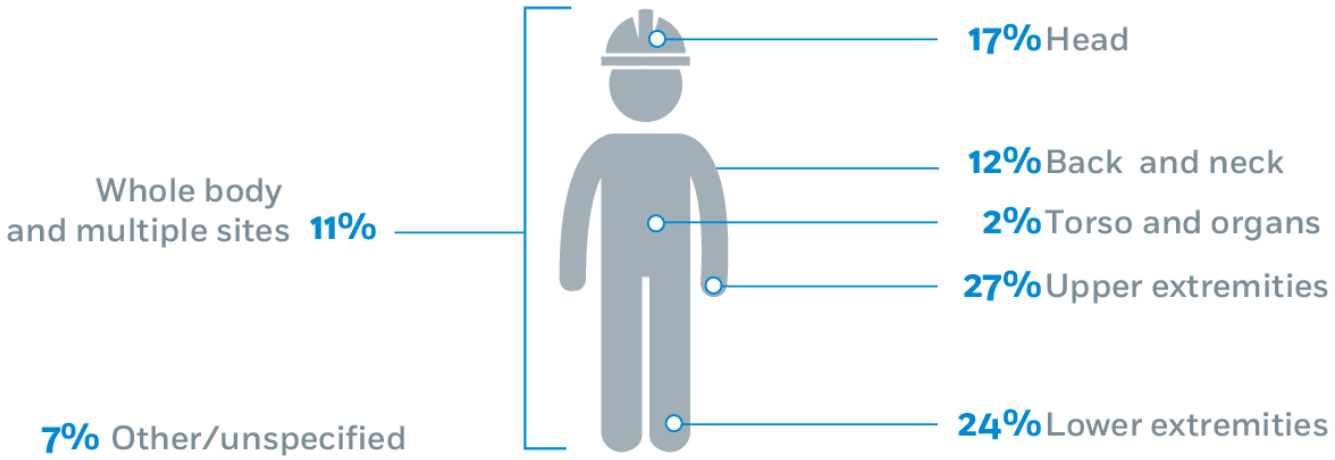
Figure 7.19: Distribution of injuries by other ship type



	2014	2015	2016	2017	2018	2019	Total
IWV - Passenger	19	14	4	9	5	15	66
IWV - Other / Unspecified	4	0	3	4	5	5	21
RC - Historical craft	3	0	1	10	3	8	25
RC -Inflatable	8	0	0	1	10	0	19
RC - Motorboat	9	0	4	1	9	13	36
RC - Sailboat (aux. motor)	8	3	0	6	0	0	17
RC - Sailboat (sail only)	1	0	0	0	0	0	1
RC - Other / Unspecified	0	0	2	0	3	0	5
Other / Unspecified	0	0	0	3	4	0	7
Total	52	17	14	34	39	41	197

Most injuries occurred on board the recreational craft sub-category (52.3%).

Figure 7.20: Part of body injured



Back	10
Head	14
Lower Extremities	20
Torso and organs	2
Upper Extremities	22
Whole body and multiple sites	9
Other / Unspecified	6
Total of reported injuries	83

More than half of the injuries took place on extremities (upper and lower ones).

APPENDICES

Appendix 1: Acronyms and definitions

Acronyms

EMSA: European Maritime Safety Agency

EMCIP: European Marine Casualty Information Platform

EU: European Union

EC: European Commission

IMO: International Maritime Organization

SAR: Search and Rescue

Definitions from the IMO Casualty Investigation Code and the Directive 2009/18/EC

Specific terms used in this publication are also used for marine safety investigation purposes and have the following meanings:

1. A ***coastal State*** means a State in whose territory, territorial sea and internal waters as defined in UNCLOS, a marine casualty or marine incident occurs.

2. ***Flag State*** means a State whose flag a ship is entitled to fly.
3. EMCIP is the European Marine Casualty Information Platform, a centralised database for EU Member States to store and analyse information on marine casualties and incidents.

4. A ***marine casualty*** means an event, or a sequence of events, that has resulted in any of the following which has occurred directly in connection with the operations of a ship:

.1 the death of, or serious injury to, a person;

.2 the loss of a person from a ship;

.3 the loss, presumed loss or abandonment of a ship;

.4 material damage to a ship;

.5 the stranding or disabling of a ship, or the involvement of a ship in a collision;

.6 material damage to marine infrastructure external to a ship, that could seriously endanger the safety of the ship, another ship or an individual; or

.7 severe damage to the environment, or the potential for severe damage to the environment, brought about by the damage of a ship or ships.

However, a marine casualty does not include a deliberate act or omission, with the intention to cause harm to the safety of a ship, an individual or the environment.

5. A ***marine incident*** means an event, or sequence of events, other than a marine casualty, which has occurred directly in connection with the operations of a ship that endangered, or, if not corrected, would endanger the safety of the ship, its occupants or any other person or the environment.

However, a marine incident does not include a deliberate act or omission, with the intention to cause harm to the safety of a ship, an individual or the environment.

6. A ***marine safety investigation*** means an investigation or inquiry into a marine casualty or marine incident, conducted with the objective of preventing marine casualties and marine incidents in the future. The investigation includes the collection and analysis of evidence, the identification of causal factors and the making of safety recommendations as necessary.

7. A ***marine safety investigation report*** means a report that contains:

.1 a summary outlining the basic facts of the marine casualty or marine incident and stating whether any deaths, injuries or pollution occurred as a result;

.2 the identity of the flag State, owners, operators, the company as identified in the safety management certificate, and the classification society (subject to any national laws concerning privacy);

.3 where relevant the details of the dimensions and engines of any ship involved, together with a description of the crew, work routine and other matters, such as time served on the ship;

.4 a narrative detailing the circumstances of the marine casualty or marine incident;

.5 analysis and comment on the causal factors including any mechanical, human and organizational factors;

.6 a discussion of the marine safety investigation's findings, including the identification of safety issues, and the marine safety investigation's conclusions; and

.7 where appropriate, recommendations with a view to preventing future marine casualties and marine incidents.

8. A ***material damage*** in relation to a marine casualty means:

.1 damage that:
.1.1 significantly affects the structural integrity, performance or operational characteristics of marine infrastructure or a ship; and
.1.2 requires major repair or replacement of a major component or components; or

.2 destruction of the marine infrastructure or ship.

9. The term "***serious casualty***" shall be understood in accordance with the updated definition contained in Circular MSC-MEPC.3/Circ.3 of the IMO Maritime Safety Committee and Marine Environment protection Committee of 18 December 2008; it says:

Serious casualties are casualties to ships which do not qualify as very serious casualties and which involve a fire, explosion, collision, grounding, contact, heavy weather damage, ice damage, hull cracking, or suspected hull defect, etc., resulting in:

- immobilization of main engines, extensive accommodation damage, severe structural damage, such as penetration of the hull under water, etc., rendering the ship unfit to proceed∗, or

- pollution (regardless of quantity); and/or

- a breakdown necessitating towage or shore assistance.

* The ship is in a condition, which does not correspond substantially with the applicable conventions, presenting a danger to the ship and the persons on board or an unreasonable threat of harm to the marine environment.

10. A ***serious injury*** means an injury which is sustained by a person, resulting in incapacitation where the person is unable to function normally for more than 72 hours, commencing within seven days from the date when the injury was suffered.

11. A ***severe damage to the environment*** means damage to the environment which, as evaluated by the State(s) affected, or the flag State, as appropriate, produces a major deleterious effect upon the environment.

12. ***Substantially interested State*** means a State:

.1 which is the flag State of a ship involved in a marine casualty or marine incident; or

.2 which is the coastal State involved in a marine casualty or marine incident; or

.3 whose environment was severely or significantly damaged by a marine casualty (including the environment of its waters and territories recognized under international law); or

.4 where the consequences of a marine casualty or marine incident caused, or threatened, serious harm to that State or to artificial islands, installations, or structures over which it is entitled to exercise jurisdiction; or

.5 where, as a result of a marine casualty, nationals of that State lost their lives or received serious injuries; or

.6 that has important information at its disposal that the marine safety investigating State(s) consider useful to the investigation; or

.7 that for some other reason establishes an interest that is considered significant by the marine safety investigating State(s).

13. ***Territorial sea*** *(*section 1 of Part II of the United Nations Convention on the Law of the Sea) refers to the area within which the sovereignty of a coastal State extends, beyond its land territory and internal waters and, in the case of an archipelagic State, its archipelagic waters, to an adjacent belt of sea, described as the territorial sea. It is a belt of coastal water extending at most 12 nautical miles (22.2 km; 13.8 mi) from the baseline (usually the mean low-water mark) of a coastal State.

14. A ***very serious marine casualty*** means a marine casualty involving the total loss of the ship or a death or severe damage to the environment.

Other definitions can be found in the*:*

"IMO Code for the Investigation of Marine Casualties and Incidents" which shall mean the Code for the investigation of Marine Casualties and Incidents annexed to resolution A.849(20) of the IMO Assembly of 27 November 1997. + RESOLUTION MSC.255(84) (adopted on 16 May 2008) ADOPTION OF THE CODE OF THE INTERNATIONAL STANDARDS AND RECOMMENDED PRACTICES FOR A SAFETY INVESTIGATION INTO A MARINE CASUALTY OR MARINE INCIDENT (CASUALTY INVESTIGATION CODE) + RESOLUTION A.1075(28) adopted on 24 February 2014

The scope of the Accident Investigation Directive 2009/18/EC can be found in its Article 2.

Other information can be found on: http://www.emsa.europa.eu/implementation-tasks/accident-investigation.html or on https://portal.emsa.europa.eu/emcip-public/#/dashboard

Other expressions, as per EMCIP taxonomy

1. ***Accidental event*** is an event that is assessed to be inappropriate and significant in the sequence of events that led to the marine casualty or marine incident.

2. ***Casualty events*** are unwanted events in which there was some kind of energy release with impact on people and/or ship including its equipment and its cargo or environment. They are classified in:

- Capsizing/Listing is a casualty where the ship no longer floats in the right-side-up mode due to negative initial stability (negative metacentric height), or transversal shift of the centre of gravity, or the impact of external forces.
- **Capsizing** when the ship is tipped over until disabled;
- **Listing** when the ship has a permanent heel or angle of loll.

- Collision - a casualty caused by ships striking or being struck by another ship, regardless of whether the ships are underway, anchored or moored. This type of casualty event does not include ships striking underwater wrecks. The collision can be **with other ship** or **with multiple ships** or **ship not underway**.

- Contact - a casualty caused by ships striking or being struck by an external object. The objects can be: **Floating object** (**cargo, ice, other or unknown**); **Fixed object**, but not the sea bottom; or **Flying object**.

- Damage to equipment - damage to equipment, system or the ship not covered by any of the other casualty type.

- Grounding/stranding - a moving navigating ship, either under command, under **Power**, or not under command, **Drift**(ing), striking the sea bottom, shore or underwater wrecks.

- Fire/explosion - an uncontrolled ignition of flammable chemicals and other materials on board of a ship:
- **Fire** is the uncontrolled process of combustion characterised by heat or smoke or flame or any combination of these.
- **Explosion** is an uncontrolled release of energy which causes a pressure discontinuity or blast wave.

- Flooding/foundering is a casualty event when the ship is taking water on board.
- **Foundering** will be considered when the vessel has sunk. Foundering should only be regarded as the first casualty event if we do not know the details of the flooding which caused the vessel to founder. In the chain of events foundering can be the last casualty event in this case there is the need to add accidental events.
- **Flooding** – refers to a casualty when a vessel takes water on board and can be:
  - **Progressive** if the water flow is gradual.
  - **Massive** if the water flow is extensive.

- Hull failure - a failure affecting the general structural strength of the ship.

- Loss of control - a total or temporary loss of the ability to operate or manoeuvre the ship, failure of electric power, or to contain on board cargo or other substances:
- **Loss of electrical power** is the loss of the electrical supply to the ship or facility;
- **Loss of propulsion power** is the loss of propulsion because of machinery failure;
- **Loss of directional control** is the loss of the ability to steer the ship;
- **Loss of containment** is an accidental spill or damage or loss of cargo or other substances carried on board a ship.

- Missing - a casualty to a ship whose fate is undetermined with no information having been received on the loss and whereabouts after a reasonable period of time.

- Non-accidental events are intentional events as a result of illegal or hostile acts therefore they are not marine casualties or incidents. They are:

-**Acts of war,** any act, against a ship or the people on board, by a State that would effectively terminate the normal international law of peacetime and activate the international law of war;
-**Criminal acts,** any crime, including an act, omission, or possession under the laws of a State or local government, which poses a substantial threat to people on board of a ship or to property (e.g. terrorism, sabotage, piracy);
-**Illegal discharge** is an intentional discharge of polluting substances, oil or other noxious substances, from ships; and
-**other,** other intentional act that incur loss of or damage to a ship or environmental damage or harm to people on board.

Non-accidental events are not considered as marine casualties or incidents and are not covered by the scope of the Accident Investigation Directive (2009/18/EC).

3. **Contributing factor** is a condition that may have contributed to an accidental event or worsened its consequence (e.g. man/machine interaction, inadequate illumination).

4. **Occurrence with person(s)** are grouped under ***deviations***, which consist in the description of the event deviating from normality leading to the accident:

- Deviation due to electrical problems, explosion, fire - Not specified
-Electrical problem due to equipment failure - leading to indirect contact
-Electrical problem - leading to direct contact
-Explosion
-Fire, flare up
-Other Deviations not listed above

- Deviation by overflow, overturn, leak, flow, vaporisation, emission
-Solid state - overflowing, overturning
-Liquid state - leaking, oozing, flowing, splashing, spraying
-Gaseous state - vaporisation, aerosol formation, gas formation
-Pulverulent material - smoke generation, dust/particles in suspension/emission of
-Other Deviations not listed above

- Breakage, bursting, splitting, slipping, fall, collapse of Material Agent
-Breakage of material - at joint, at seams
-Breakage, bursting - causing splinters (wood, glass, metal, stone, plastic, others)
-Slip, fall, collapse of Material Agent - from above (falling on the victim)
-Slip, fall, collapse of Material Agent - from below (dragging the victim down)
-Slip, fall, collapse of Material Agent - on the same level
-Other deviations not listed above

- Loss of control (total or partial) of machine, means of transport or handling equipment, handheld tool, object, animal
-Loss of control (total or partial) - of machine (including unwanted start-up) or of the material being worked by the machine
-Loss of control (total or partial) - of means of transport or handling equipment, (motorised or not)
-Loss of control (total or partial) - of hand-held tool (motorised or not) or of the material being worked by the tool
-Loss of control (total or partial) - of object (being carried, moved, handled, etc.)
-Loss of control (total or partial) - of animal
-Other Deviations not listed above

- Slipping - Stumbling and falling - Fall of persons
-Fall of person - to a lower level
-Slipping - Stumbling and falling - Fall of person - on the same level
-Fall overboard of person
-Other deviations not listed above

- Body movement without any physical stress (generally leading to an external injury)
-Walking on a sharp object
-Kneeling on, sitting on, leaning against
-Being caught or carried away, by something or by momentum
-Uncoordinated movements, spurious or untimely actions
-Other Deviations not listed above

- Body movement under or with physical stress (generally leading to an internal injury)
-Lifting, carrying, standing up
-Pushing, pulling
-Putting down, bending down
-Twisting, turning
-Treading badly, twisting leg or ankle, slipping without falling
-Other Deviations not listed above

- Shock, fright, violence, aggression, threat, presence
-Shock, fright
-Violence, aggression, threat - between company employees subjected to the employer's authority
-Violence, aggression, threat - from people external to the company towards victims performing their duties
-Aggression, jostle - by animal
-Presence of the victim or of a third person in itself creating a danger for oneself and possibly others
-Other Deviations not listed above

- Other Deviations not listed above in this classification.

5. Categories describing the ***location*** where the casualty or accident occurred are:
- Outside territorial sea it will be regarded as **open sea**.
- If it is in waters up to 12 nautical miles from the baseline it is **coastal waters ≤ 12 nm**.
- If it is in the waters on the landward side of the baseline of the territorial sea it is regarded as **internal waters** (**archipelago fairway, channel/river, port area**).
- Inland waters, which includes any area of water defined by EU Member States and not categorized as 'sea'- e.g. canals, tidal and non-tidal rivers, lakes, and some estuarial waters (an arm of sea that extends inland to meet the mouth of a river).
- Repair yard and **unknown** are the two other possible values.

6. **Occurrence with person(s)** type means the mode in which only a person(s)on board was injured or died. Accidents not related to ship operations, illness, suicide and homicides are not covered by the scope of the Directive 2009/18/EC.

7. ***Persons on board*** are categorised as follow:
- Crew members / seafarers (any person who is employed or engaged or works in any capacity on board a ship);
- Passengers; and
- Others, for example persons working in harbours to load or unload ships.

8. A ***safety recommendation*** is derived from the analysis and conclusions of the investigation and is related to particular subject areas, such as legislation, training, maintenance, etc.

Safety recommendations are addressed to those best placed to implement them, such as ship owners, maritime authorities, etc.

Member States shall ensure that safety recommendations are duly taken into account by the addressees and, where appropriate, be given an adequate follow-up in accordance with Community and International law.

9. The ***ship type*** is decided according to the ship's main activity:

- **Cargo ship** is a commercial ship designed for the carriage of various types of cargo, goods or products and up to a maximum of 12 passengers.

- **Fishing vessel** is a vessel equipped or used commercially for catching fish or other living resources at sea.

- **Passenger ship** is a ship designed to transport more than 12 passengers.

- **Service ship** is a ship designed for special services, like a tug or a dredger.

- **Other ship,** may be:
    - **Inland waterway vessel** is a vessel intended solely or mainly for navigation on inland waterways.
    - **Recreational craft** is a boat of any type, regardless of the means of propulsion, intended for sports or leisure purposes.
    - **Navy ship** is a ship operating under the Navy or other military organization.
    - **Unknown ship type**: occurrence for which it was not possible to identify the vessel type.

Such vessels are considered within the scope of the Directive only when they are involved in an occurrence together with a ship which is covered by the Directive (e.g. a collision between a cargo ship and a recreational craft).

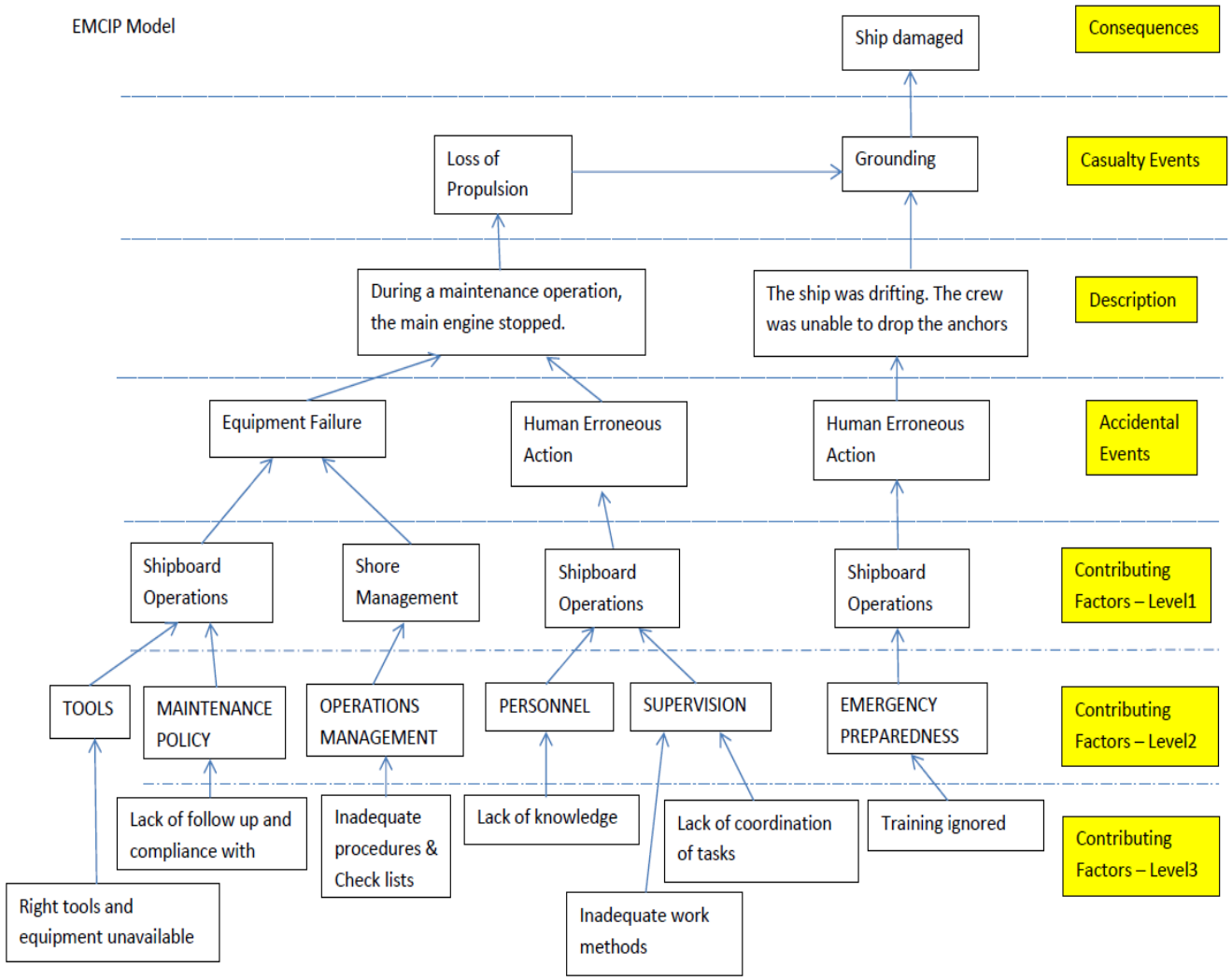
The nature of marine casualties and incidents are separated into two different categories: a *"**occurrence with ship(s)**"*, when a ship, its equipment or cargo is affected by an accident and an *"**occupational accident**"*, where the accident affects only a person.

10. As a consequence of a breakdown or immobilisation of the main engines or other event, the ships concerned might need **towage** or **shore assistance.**

11. ***Unfit to proceed*** means that the ship is in a condition, which does not correspond substantially with the applicable international conventions or national legislation, presenting a danger to the ship and the persons on board or an unreasonable threat of harm to the marine environment.

12. The ***voyage segment*** determines the section of the voyage being undertaken at the time of the marine casualty or incident. It can be:
- **Anchored or alongside;**
- **Departure;**
- **En route** (after the departure and before arrival, when she is underway at sea);
- **Arrival;** or
- **Unknown.**

Appendix 2: EMCIP model



In order to harmonise the reporting in a meaningful and comprehensive way, the information resulting from marine casualties, a codification of the various specific information was defined. Such codification provides also practical advice for a systematic investigation of marine casualties and incidents and allows the development of effective analysis and preventive action. It covers the different elements that connect the consequences of an accident to its root events.

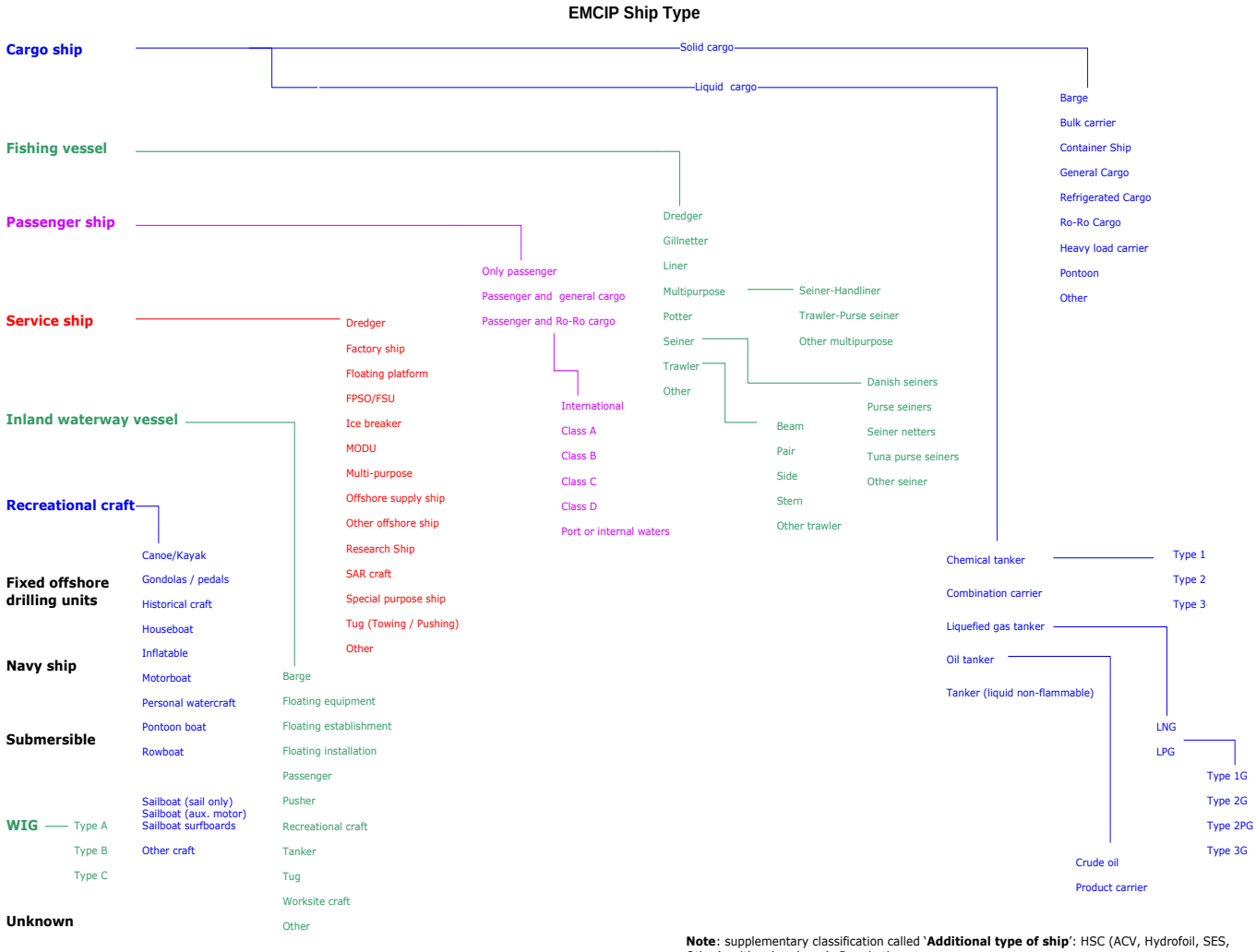
Such model is not only implemented at European level, but also at international level through the IMO resolution A28/Res.1075.

To support this model, a specific taxonomy related to marine casualties and incidents, composed by 630 fields, has been developed in the EMCIP database to store the various information collected during the investigation.

Safety Recommendations issued by the investigation bodies aim at "cutting the links" between the Contributing Factors, Accidental Events and Casualty events.

When safety issues have been properly identified during a safety investigation, and followed by relevant safety recommendations, a proper consideration by the addressee should prevent similar casualties.

Appendix 3: EMCIP ship types



Note: supplementary classification called '**Additional type of ship**': HSC (ACV, Hydrofoil, SES, Other), with sub-values A, B and other.

Appendix 4: List of national investigation bodies in the EU

Member State	Name of the national investigative body	Acronym	Website
Austria	Safety Investigation Authority of Austria	BAV/SUB	http://www.bmvit.gv.at/
Belgium	Federal Bureau for the Investigation of Maritime Accidents	FEBIMA	https://mobilit.belgium.be/en/shipping/federal_bureau_investigation_maritime_accidents_febima
Bulgaria	Maritime Accident Investigation Unit	MTITC	http://www.mtitc.government.bg
Croatia	Air, Maritime and Railway Traffic Accidents Investigation Agency	AIN	www.ain.hr
Cyprus	Marine Accident and Incident Investigation Committee	MAIC	www.maic.gov.cy/mcw/dms/maic/maic.nsf/
Czech Republic	Ministry of Transport, Czech Maritime Administration Navigation Department	MT_ND	http://www.mdcr.cz
Denmark	Danish Maritime Accident Investigation Board	DMAIB	http://www.dmaib.com
Estonia	Safety Investigation Bureau of Estonia	ESIB	www.ojk.ee
Finland	Safety Investigation Authority of Finland	SIA	http://www.onnettomuustutkinta.fi
France	French Marine Casualties Investigation Board	BEAmer	http://www.bea-mer.developpement-durable.gouv.fr/
Germany	Federal Bureau of Maritime Casualty Investigation	BSU	http://www.bsu-bund.de
Greece	Hellenic Bureau for Marine Casualties Investigation	HBMCI	http://www.hbmci.gov.gr
Hungary	Transportation Safety Bureau of Hungary	TSB	http://www.kbsz.hu
Iceland	Icelandic Marine Accident Investigation Board	ITSB	www.rnsa.is
Ireland	Marine Casualty Investigation Board	MCIB	http://www.mcib.ie
Italy	General Directorate for Railway and Maritime Accident Investigation	DIGIFEMA	http://www.mit.gov.it
Latvia	Transport Accident and Incident Investigation Bureau	TAIIB	http://www.taiib.gov.lv
Lithuania	Transport Accident and Incident Investigation Division	TAITS	https://tm.lrv.lt/en/fields-of-activity/transport-accident-and-incident-investigations
Luxembourg	Administration of Technical Investigations	AET	http://www.mt.public.lu/transports/AET
Malta	Marine Safety Investigation Unit	MSIU	http://www.transport.gov.mt
The Netherlands	Dutch Safety Board	DSB	www.safetyboard.nl
Norway	Accident Investigation Board of Norway	AIBN	http://www.aibn.no
Poland	State Marine Accident Investigation Commission	PKBWM/SMAIC	www.pkbwm.gov.pl
Portugal	Maritime Accident Investigation Office and Aeronautical Meteorology Authority	GAMA	www.gama.mm.gov.pt
Romania	Marine Accidents Investigation Department	MAID	http://www.mt.ro
Slovenia	Maritime Accident and Incident Investigation Services	MAIIS	http://www.telecom.gov.sk
Spain	Standing Commission for Maritime Accident and Incident Investigation	CIAIM	https://www.fomento.gob.es/organos-colegiados/ciaim
Sweden	Swedish Accident Investigation Authority	SHK	http://www.havkom.se
United Kingdom	Marine Accident Investigation Branch	MAIB	http://www.maib.gov.uk
UK/Gibraltar	Marine Accident Investigation Compliance Officer	MAICO	http://www.gibraltarship.com

ABOUT THE EUROPEAN MARITIME SAFETY AGENCY

The European Maritime Safety Agency is one of the European Union's decentralised agencies. Based in Lisbon, the Agency provides technical assistance and support to the European Commission and Member States in the development and implementation of EU legislation on maritime safety, pollution by ships and maritime security. It has also been given operational tasks in the field of oil pollution response, vessel monitoring and in long-range identification and tracking of vessels.

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