European Maritime Safety Agency

ANNUAL OVERVIEW OF MARINE CASUALTIES AND INCIDENTS 2021

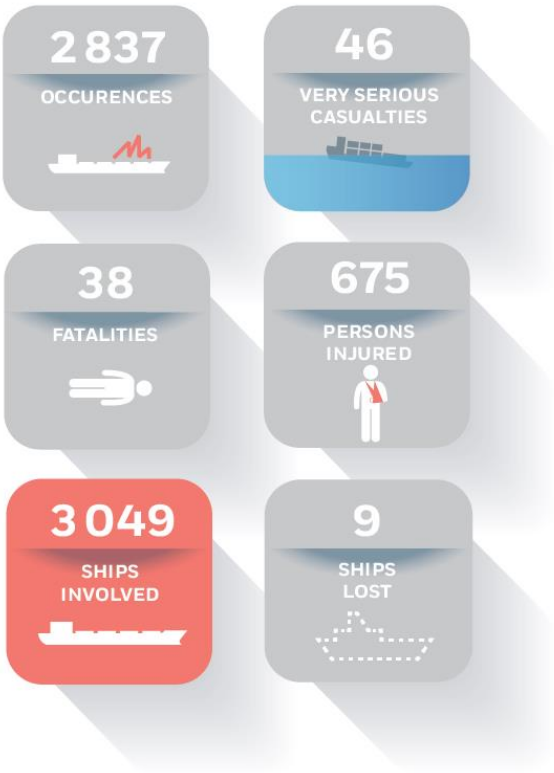
Date: 15.12.2021

EMSA

Photo credits: DMAIB/DK, WSA NOK/DE, Panama Canal Authority, MCIB/IE, Danish Maritime Authority – SAR/DK, GAMA/PT, SMAIC/PL, BEAMer/FR

Front page: Contact of MV ELSE on 29/08/2020 with a gate in the Kiel-Holtenau lock in the NOK, Germany.

KEY FIGURES 2020



Capsizing and foundering of FV Susanne N on 03/06/2020.
She sits on the seaflor at a depth of approximately 20 meters.

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, as reported by Member States in the EU database for maritime incidents EMCIP (European Marine Casualty Information Platform).
The figures from the EMCIP database cover the period from **1 January 2014 to 31 December 2020**.

The year 2020 appeared to have been a positive year considering the decrease or stabilisation of most of the indicators, such as the number of occurrences, ships lost, fatalities or injuries. However, consequences of COVID pandemic are very likely to have affected the area of marine casualties and incidents, taking into consideration its significant impact on shipping in 2020[1]: reduced traffic in general, cruise ships and ferries activities heavily disrupted, *etc*.

In 2020, 2837 occurrences were reported. A reduction of 466 casualties in comparison with the year 2019 was recorded, after a 6-year period of stable number of occurrences (average of 3282 casualties between 2014 and 2019). The total number of occurrences stored in the EMCIP database has reached more than 22500 in 2020.

In order to draw objective comparisons between the different types of ship, ratios between the number of occurrences involving each type of ship and its corresponding fleet size over 2014-2020 were calculated. Due to data unavailability regarding non-EU flag ships, calculations were limited to ships carrying an EU Flag, and with an IMO number when it related to cargo ships, passenger ships and service ships. For fishing vessels, EU flag vessels with a length above 15 m. were considered. It resulted that the overall average occurrence indicator was 181[2]. It was noted that it reduced from 216 in 2015 to 131 in 2020, meaning a reduction of 39.4%.
At ship categories level, both passenger ships and cargo ships had their average indicators above the average, namely 350 and 214. However, a continuous decrease of annual indicators was observed since 2015 for both ship types: from 432 to 167 for passenger ships, and from 294 to 158 in 2020, while the average indicator for all ships in 2020 is 131. Regarding service ships, this category had the lowest indicator, with an average of 77 over the period 2014-2020 and a total of 64 in 2020. Finally, the occurrence indicator about fishing vessels was 84 over the period. However, it was noted that it continuously increased from 2014 (58) to 2020 (137) and therefore, safety level related to fishing vessels has negatively evolved during the past years.

After a peak of 110 very serious casualties reported in 2018 and a total of 81 in 2019, the number of very serious marine casualties was 46 in 2020, showing a reduction of 43.3% in one year.

A similar evolution regarding the number of ships lost was noted: after an increase of up to 35 in 2018, a decrease in 2019 was recorded, with 22 ships lost. Only 9 losses of ships were recorded in 2020.

During the 2014-2020 period, 367 casualties resulted in a total of 550 lives lost. After a continuous important decrease until 2017 when 46 fatalities were recorded, an increase up to 72 was recorded in 2019. In 2020, 38 fatalities were recorded. 89.1% of the victims were crew members. The main event resulting in fatalities was collision, when it related to a ship, and slipping / falls when it related to a person.

[1] Impact of COVID-19 on the Maritime Sector in the EU: Publications - Impact of COVID-19 on the Maritime Sector in the EU - EMSA - European Maritime Safety Agency (europa.eu)
[2] The methodology to determine the occurrence indicator can be found in Appendix 4 of this document

Over the period 2014-2020, 6921 injuries were recorded, corresponding to 6211 occurrences. Again, crew members represent the main category of persons injured at sea with 81% of the victims.

In 2020, apart from the fishing vessels, the number of all other types of ships involved in casualties and incidents indicated a reduction. Excluding individual variations, such as passenger ships in 2019 or service ships in 2018, such general descending trends were noted over the period 2014-2020, except for fishing vessels where an overall increase was noted.

In 2020, 1386 cargo ships were involved in marine casualties or incidents resulting in 21 fatalities. It should be noticed that only one cargo ship was lost.

With a total of 106, fishing vessels remain the category of ships with the highest number of ships lost over 2014-2020. In 2020, the number of occurrences involving fishing vessels continued increasing; however, the number of ships lost reduced to six (in comparison with 15 in 2019) and the number of injuries remained stable, around 220.

Almost half of the casualties that occurred on board a passenger ship involved a ro-ro passenger ship, also known as "ferries". No passenger ship was lost in 2020; the number of fatalities and injuries has continued its decreasing trend.

In 2020, one service ship was lost. The number of service ships involved in a casualty continued decreasing, as well as the number of fatalities and injured persons.

In 2020, 90 ships of other types were involved in marine casualties and incidents, mainly recreational motorboats and sailing boats. One ship was lost, and three fatalities were reported.

Over the period 2014-2020, accidents of navigational nature, (collisions, contacts and groundings/strandings) represented 43% 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 22%, meaning an average of 503 losses of propulsion per year. Regarding occurrences to person(s), 36% were attributed to slipping, stumbling and falling of persons. Among the falls, 9.8% were fall overboard.

From 2014 to 2020, the departure phase appeared to be the safest segment of a voyage (9% of the occurrences) and the *en route* portion the most unsafe (43%).

It was noted that half of the casualties occurred in internal waters, more precisely in port areas (41%).

EU Member States investigation bodies have launched 966 investigations over the 2014-2020 period and 823 safety investigation reports were made public. In 2020, 84 investigations were reported to have been launched, meaning a decrease of about 30% in comparison with the year 2019.

From analysis conducted during safety investigations, it was determined that, from 2014 to 2020, either at accident event or contributing factor levels, 89.5% of all occurrences were related to human action.

Over the period 2014-2020, almost 3000 actions were taken or safety recommendations issued. 45% were related to ship procedures, in particular when dealing with operation of ships.

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Chapter 1: INTRODUCTION

1.1 Background

The main purpose of accident investigation is to improve maritime safety and prevent pollution by ships to reduce the risk of future marine casualties, by:

- Understanding why marine casualties and incidents occur;
- Preventing or lessening the seriousness of marine casualties or marine incidents in the future; and
- Developing lessons learned after accidents at sea.

At international level, the IMO adopted the Casualty Investigation Code in 2008 by resolution MSC.255(84) and made it mandatory. The Code put forward standards and recommended practices for a safety investigation into a marine casualty or marine incident.
At EU level, Directive 2009/18/EC[3] (AI Directive) established the fundamental principles governing the investigation of accidents in the maritime transport sector. It aims at facilitating the expeditious holding of safety investigations and proper analysis of marine casualties and incidents to determine their causes, ensuring the timely and accurate reporting of safety investigations and proposals for remedial action

Following the entry into force of the AI Directive 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:

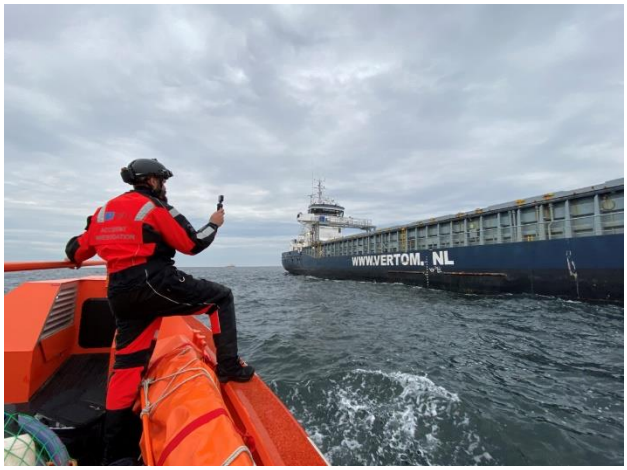
    - involve ships flying the flag of one of the Member States;
    - occur within Member States' territorial seas and internal waters;
    - involve other substantial interests of the Member States;

- 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.



Investigator at work, DMAIB

[3] 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 was given the mandate to publish 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[4]; or involve other substantial interests of EU Member States.

This publication covers the period from **1 January 2014 to 31 December 2020**. 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 **09 July 2021** 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 methodology to determine the “Occurrence Indicator” can be found in Appendix 4”. The list of investigative bodies in Europe can be found in Appendix 5.

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

Chapter 2: GENERAL INFORMATION

KEY FIGURES for 2014 – 2020

Contact of MV Bluebill with the Old Gaboa Railway Bridge in Panama Canal on 23/06/2020, following a loss of control / direction power.

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.

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;

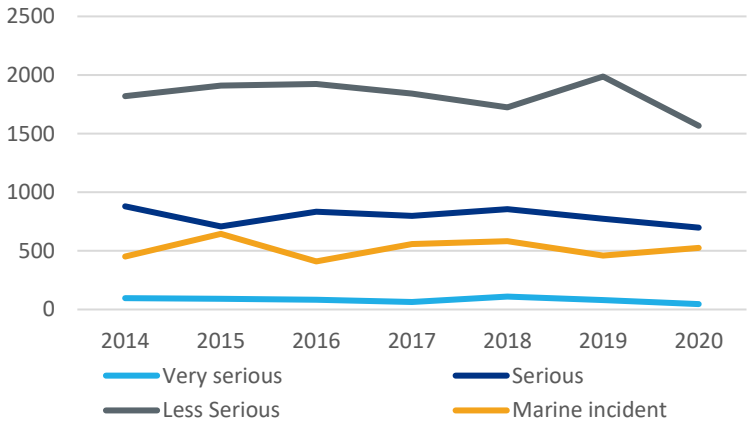
.6 material damage to marine infrastructure external to a ship, that could seriously endanger the safety of the ship, another ship or an individual; or

.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.

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.

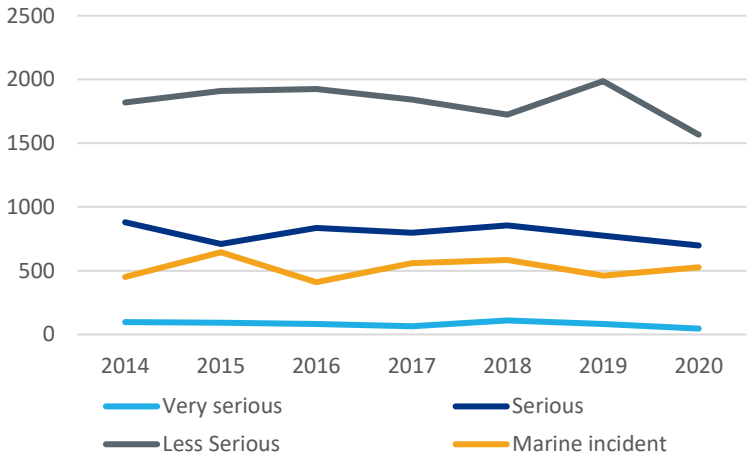
Figure 2.1: Number of reported marine casualties and incidents

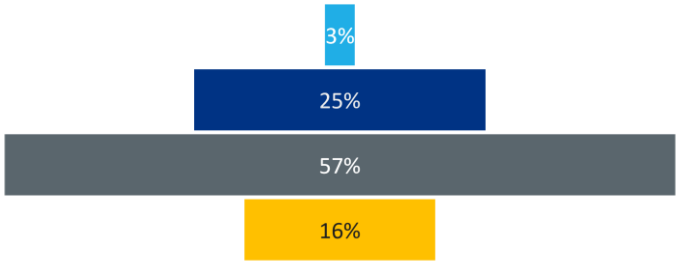


The total number of reported marine casualties and incidents over the period 2014-2020 is 22532. The yearly average number of marine casualties or incidents is 3218.

	2014	2015	2016	2017	2018	2019	2020	Total
Nr. occurrences	3247	3356	3252	3264	3273	3303	2837	22532

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



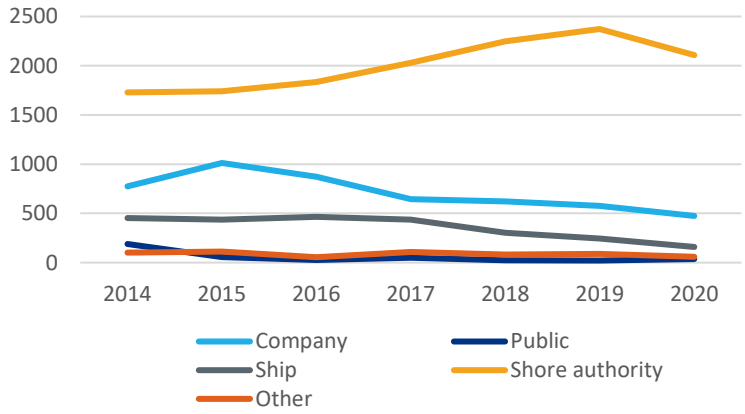


In 2020, the number of very serious casualties continued decreasing. It reduced of 58% in comparison with the year 2018. A general decrease of occurrences was noted between 2020 and 2019 (16%).

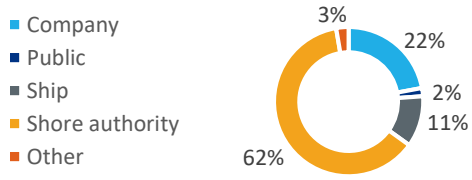
Since 2014, the number of reported casualties has stabilised at around 3200 per year.

	2014	2015	2016	2017	2018	2019	2020	Total
Very serious	96	91	83	64	110	81	46	571
Serious	880	709	835	799	855	774	698	5550
Less Serious	1820	1911	1924	1842	1724	1987	1567	12775
Marine incident	451	645	410	559	584	461	526	3636
Total	3247	3356	3252	3264	3273	3303	2837	22532

Figure 2.3: Notifying entities



Despite remaining the main reporting entity to the to the investigation bodies, shore authorities reported significantly less occurrences in 2020 than in the two previous years. Over the period, reporting by the ship or the company has continuously decreased.

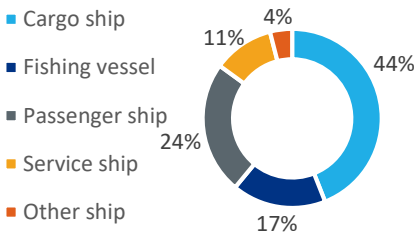


	2014	2015	2016	2017	2018	2019	2020	Total
Company	775	1012	872	643	621	576	474	4973
Public	189	57	26	48	22	21	36	399
Ship	452	435	465	435	302	246	159	2494
Shore authority	1729	1740	1834	2029	2247	2373	2108	14060
Other	102	112	55	109	81	87	60	606
Total	3247	3356	3252	3264	3273	3303	2837	22532

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 22532 marine casualties and incidents that happened from 2014 to 2020, the total number of ships involved was 24772. In line with the reduction of accidents in 2020, the number of ships involved has also diminished.

During the 2014-2020 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 fishing vessels, where a limited increase of 3% in comparison with 2018 was noted.

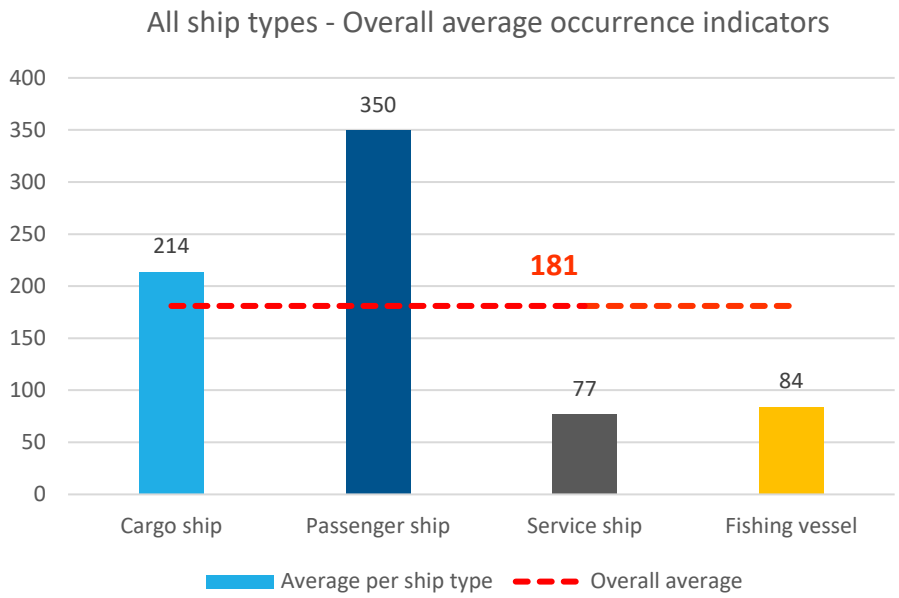
	2014	2015	2016	2017	2018	2019	2020	Total
Cargo Ship	1515	1801	1581	1575	1568	1555	1386	10981
Fishing vessel	574	466	586	628	603	629	646	4132
Passenger ship	868	858	919	880	865	962	574	5926
Service ship	487	435	397	395	408	381	353	2856
Other ship	170	112	123	101	162	119	90	877
Total	3614	3672	3606	3579	3606	3646	3049	24772

Figure 2.5: Occurrences indicators per ship types

In order compare the number of occurrences in relation with the fleet evolution over 2014-2020, occurrence indicators related to cargo ships, fishing vessels, passenger ships and service ships were determined.

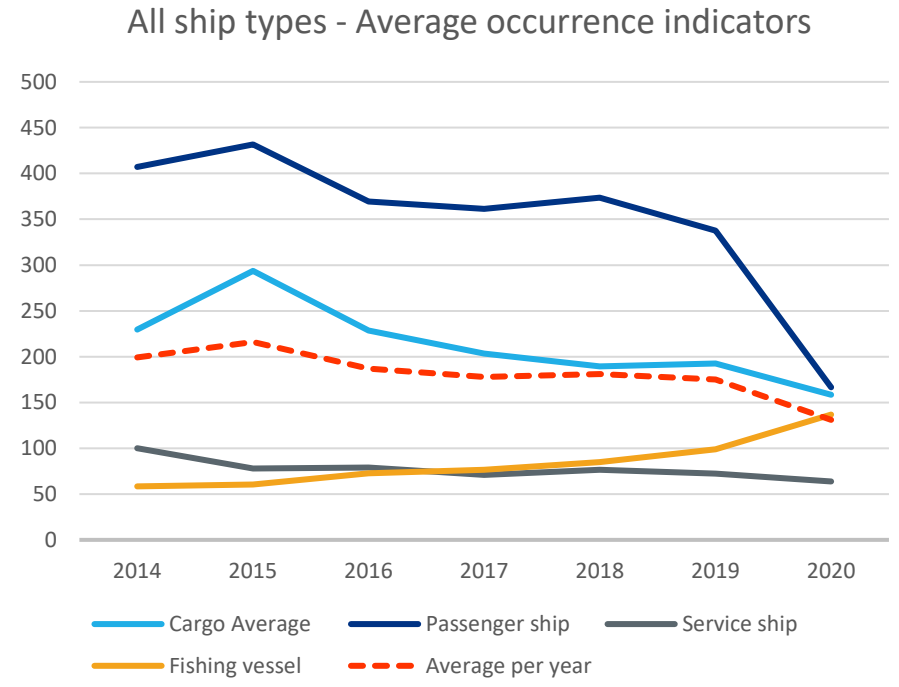
The table provides the ratio of occurrence versus the corresponding fleet. Due to data availability regarding non-EU flag ships, calculations were limited to ships carrying an EU Flag, and with an IMO number when it related to cargo ships, passenger ships and service ships. For fishing vessels, EU flag vessels (EU28) with a length above 15 m. were considered.

Occurrence Indicators	2014	2015	2016	2017	2018	2019	2020	Average per ship type
Cargo Average	230	294	229	203	189	192	158	**214**
Passenger ship	407	432	369	361	374	337	167	**350**
Service ship	100	78	79	71	77	72	64	**77**
Fishing vessel	58	61	73	77	85	99	137	**84**
Average per year	**199**	**216**	**187**	**178**	**181**	**175**	**131**	**181**



While cargo ships have an indicator slightly above the average, passenger ships are two times above the overall average, with an indicator of 350. On the other side, fishing vessels and service ships have indicators more than two time the overall average, the last category presenting the best indicator.

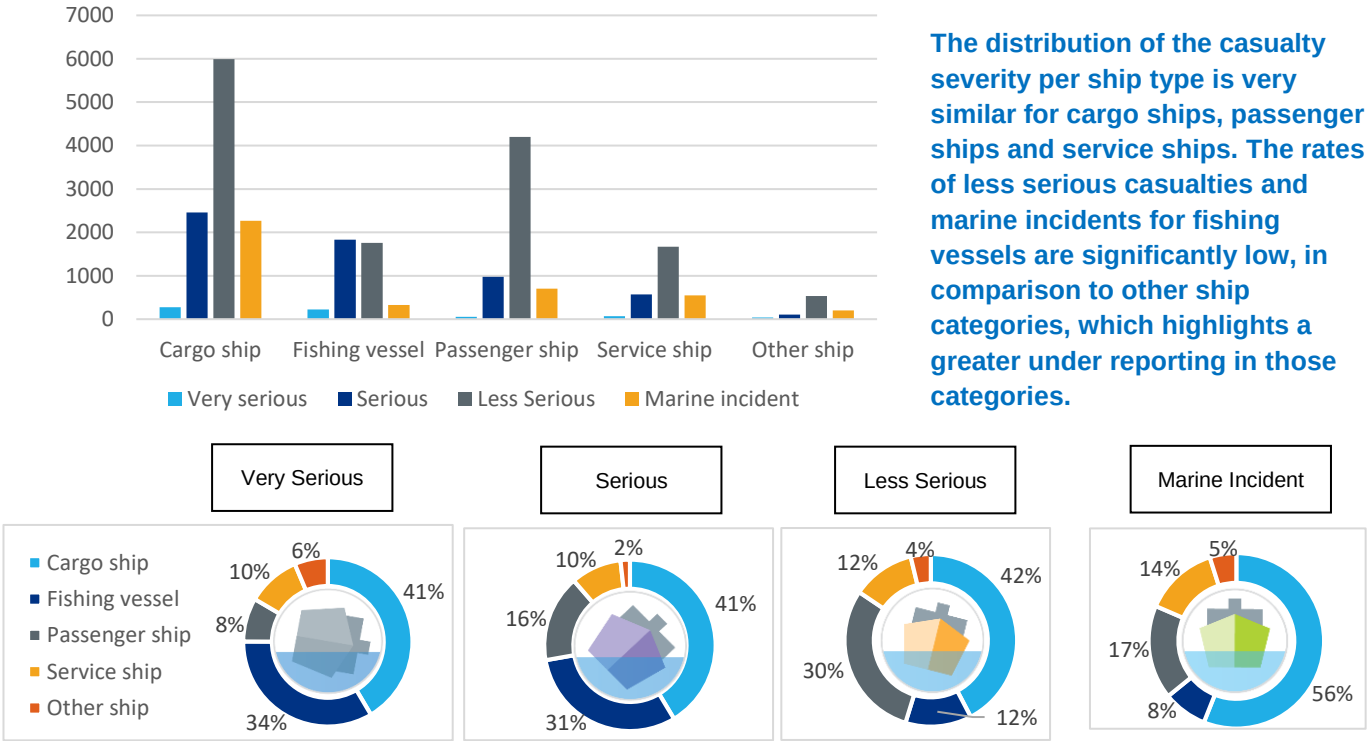
The main cause of the higher indicator related to passenger ships could be explained by some more developed safety management systems and staff available, whereas fishing vessels, on the opposite, would probably report mainly casualties which are more severe or visible to the authorities. It must be noted that reporting accidents has an associated administrative burden which in cases where the resources are scarce and the safety culture is not the priority, the incentives to avoid reporting are likely to be more significant.



When looking at the evolution of the indicators, at ship type level, over 2014-2020, a general decrease is visible, apart for fishing vessels.

With an indicator above 400 in 2014, passenger vessels show the most important decrease, and apart when comparing with service ships, it appears that cargo, passengers and fishing vessels are almost equal in 2020, just above the average of the year. The lowest indicators during the period belonged to service ships, including a limited but continuous decrease over the years.

Figure 2.6: Distribution of severity per ship type for 2014-2020



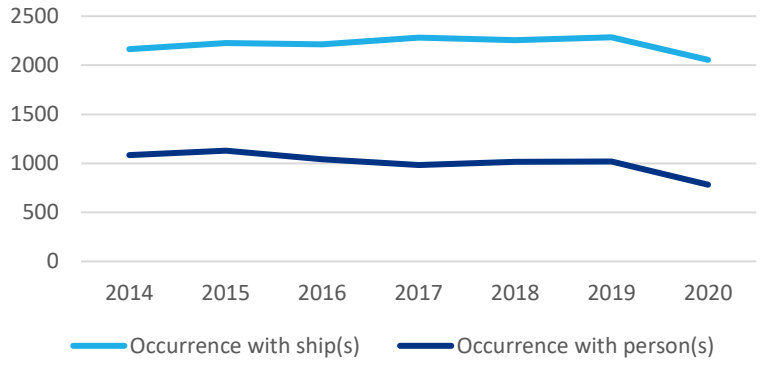
The distribution of the casualty severity per ship type is very similar for cargo ships, passenger ships and service ships. The rates of less serious casualties and marine incidents for fishing vessels are significantly low, in comparison to other ship categories, which highlights a greater under reporting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

	Very serious	Serious	Less Serious	Marine incident	Total
Cargo ships	273	2455	5989	2264	10981
Fishing vessel	221	1828	1755	328	4132
Passenger ship	55	973	4198	700	5926
Service ship	67	569	1670	550	2856
Other ships	42	105	532	198	877
Total	658	5930	14144	4040	24772

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



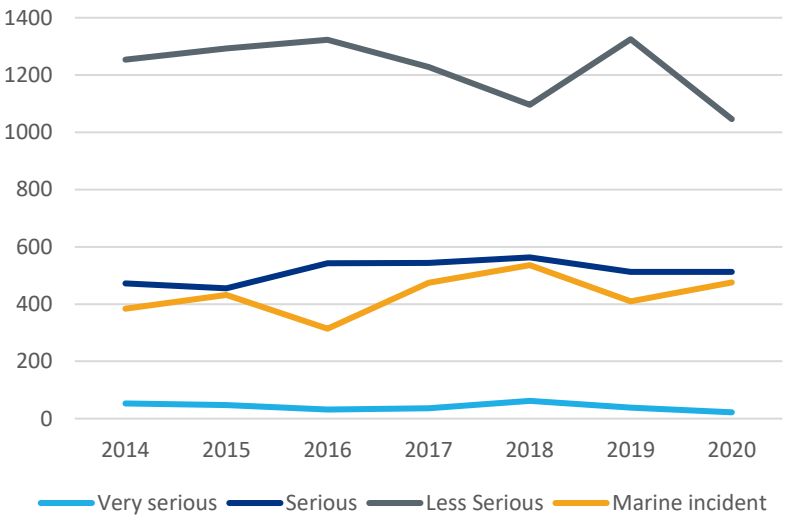
A total of 15481 casualties or incidents with a ship and 7051 occurrences with person(s) were recorded from 2014 to 2020. A decrease was noticed in both categories, respectively 10% and 23%.69% were occurrences with ship(s) and 31% occurrence with person(s). This repartition remained stable since the EU legislation on Accident Investigation has been implemented in 2011.

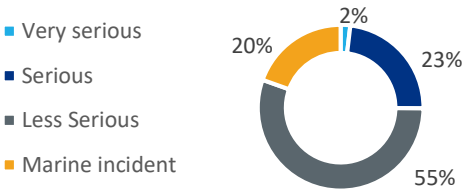
	2014	2015	2016	2017	2018	2019	2020	Total
Occurrence with ship(s)	2163	2227	2212	2282	2257	2285	2055	15481
Occurrence with person(s)	1084	1129	1040	982	1016	1018	782	7051
Total	3247	3356	3252	3264	33273	3303	2837	22532

2.3.1 Occurrence with ship(s)

Marine casualties and incidents related to 'occurrence with ship(s)' are classified as 'casualty event'.

Figure 2.8: Severity of occurrences with ship(s)





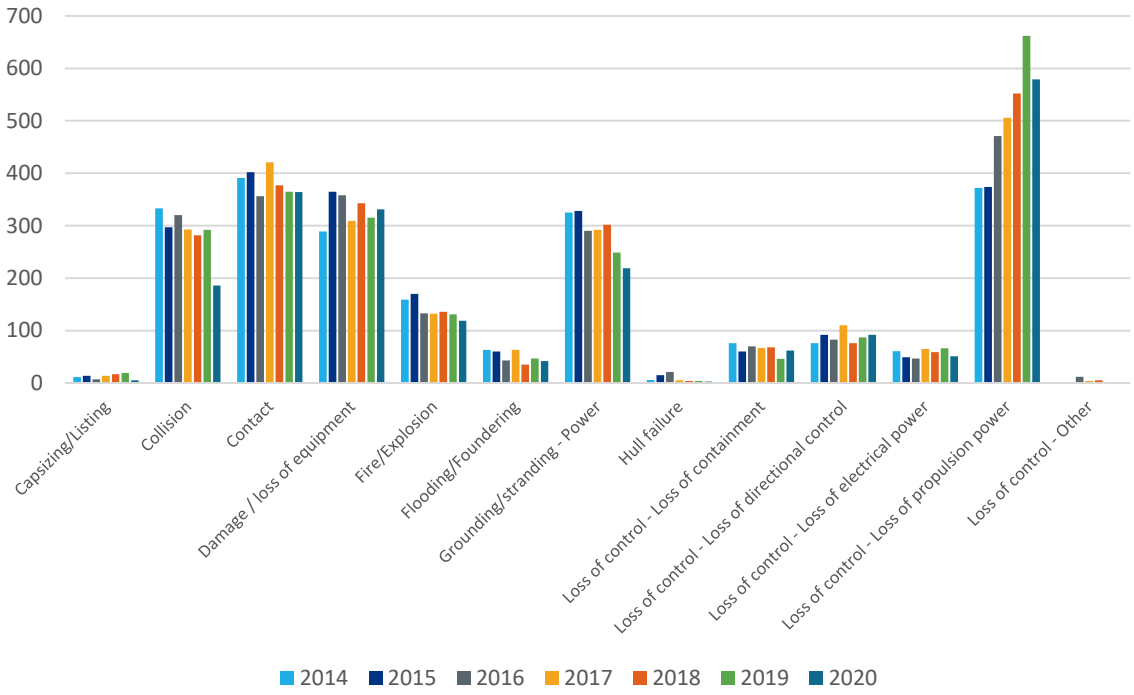
In 2020, a 42% reduction of very serious casualties with a ship was noted. The number was divided by 3 since 2018.

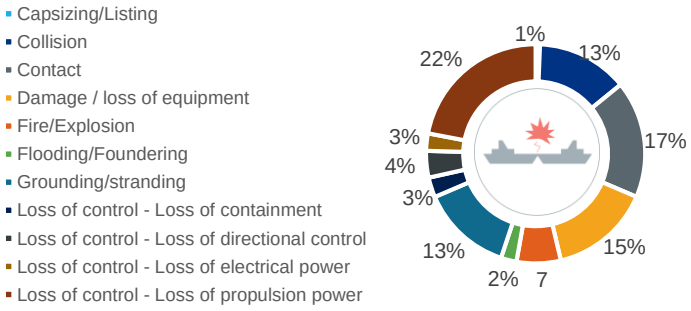
The repartition of severities in case of casualty with a ship is similar to the one when considering all occurrences. Less than 2% of the occurrences with a ship were very serious over the period.

	2014	2015	2016	2017	2018	2019	2020	Total
Very serious	53	47	32	36	62	38	22	290
Serious	472	455	543	544	563	512	512	3601
Less Serious	1254	1293	1323	1228	1096	1325	1046	8565
Marine incident	384	432	314	474	536	410	475	3025
Total	2163	2227	2212	2282	2257	2285	2055	15481

Grounding of MV Alta in Ballycotton, County Cork, Ireland on 16/02/2020

Figure 2.9: Distribution of casualty events with a ship



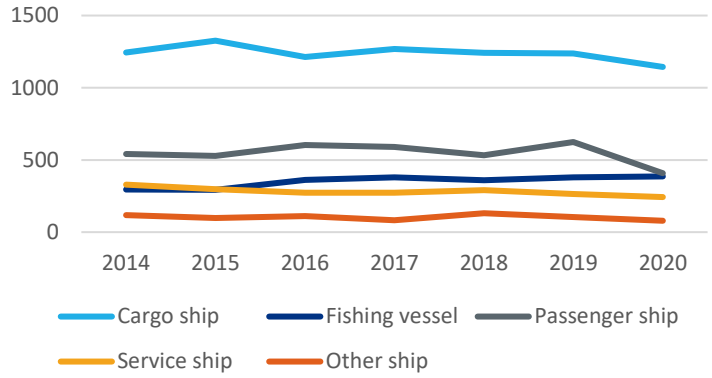


The main casualty event over 2014-2019 is "Loss of control – Loss of propulsion power". It is the only casualty event that increased continuously since 2014, until a 12.6% decrease in 2020.

The navigational casualties, constituted by collision, contact and grounding/stranding, represent 43% of all casualty events.

	2014	2015	2016	2017	2018	2019	2020	Total
Capsizing/Listing	11	14	7	14	17	19	5	87
Collision	333	297	320	293	282	292	186	2003
Contact	391	402	356	421	377	365	364	2676
Damage / loss of equipment	289	365	358	309	343	315	331	2310
Fire/Explosion	159	170	133	132	136	131	119	980
Flooding/Foundering	63	60	43	63	35	47	42	353
Grounding/stranding	325	328	290	292	302	249	219	2005
Hull failure	6	15	21	5	4	4	3	58
Loss of control - Other	1	1	12	4	5	0	1	24
Loss of control - Loss of containment	76	60	70	67	68	46	62	449
Loss of control - Loss of directional control	78	92	83	110	76	87	92	616
Loss of control - Loss of electrical power	61	49	47	65	59	66	51	398
Loss of control - Loss of propulsion power	372	374	471	506	552	662	579	3516
Missing	0	0	1	1	1	2	1	6
Total	2163	2227	2212	2282	2257	2285	2055	15481

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



During the 2014-2020 period, cargo ship was the most frequent ship type involved in an occurrence with ship(s) (49%), followed by passenger ship (22%).

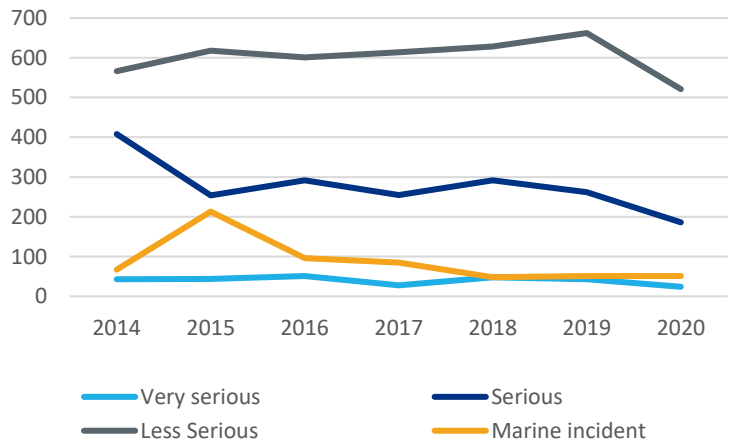
17646 ships were involved in a 'occurrence with ship(s)occurrence with ship(s)'.

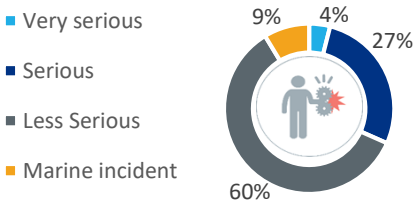
	2014	2015	2016	2017	2018	2019	2020	Total
Cargo ship	1243	1326	1213	1268	1242	1237	1144	8673
Fishing vessel	295	293	361	380	360	379	386	2454
Passenger ship	541	527	603	590	533	624	408	3826
Service ship	329	298	272	273	290	265	243	1970
Other ship	117	97	111	83	131	105	79	723
Total	2525	2541	2560	2594	2556	2610	2260	17646

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: Severity of occurrences with person(s)

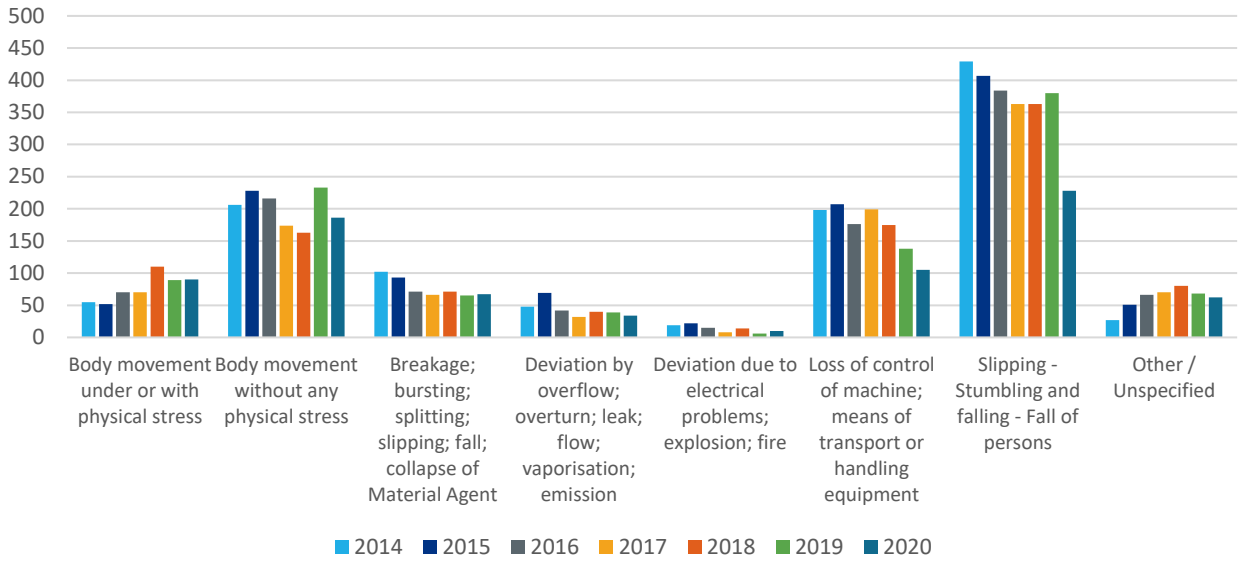


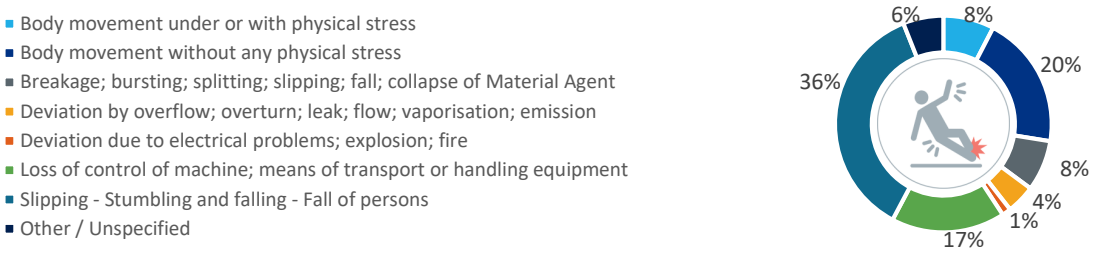


From 2014 to 2020, 4% of the occurrence with person(s) were very serious. A decrease in all severity categories was noted.

	2014	2015	2016	2017	2018	2019	2020	Total
Very serious	43	44	51	28	48	43	24	281
Serious	408	254	292	255	292	262	186	1949
Less Serious	566	618	601	614	628	662	521	4210
Marine incident	67	213	96	85	48	51	51	611
Total	1084	1129	1040	982	1016	1018	782	7051

Figure 2.12: Distribution of deviations

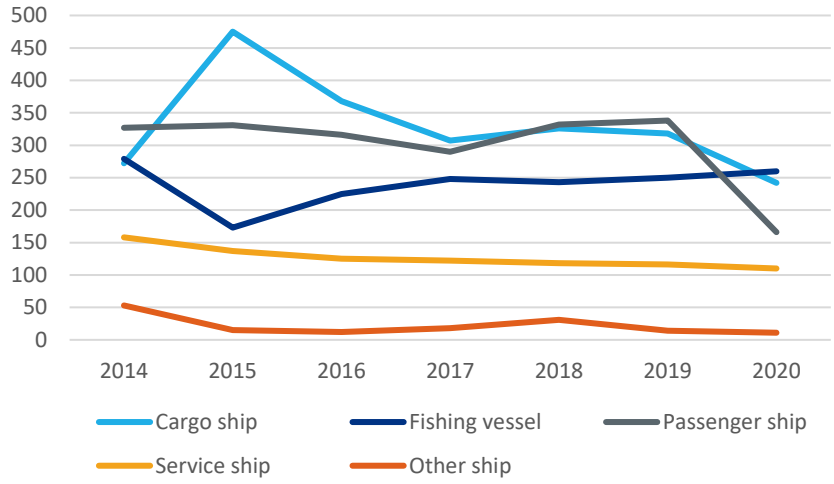


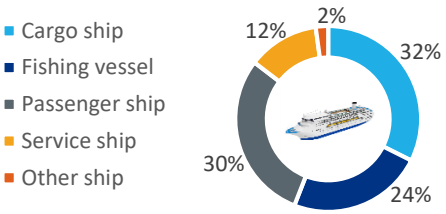


3 specific events are by far the most frequent ones, as they represent almost 50% of all deviations: "Fall of person – on the same level" was the main event (1218 times), followed by "being caught or carried out away; by something or by momentum" (1021) and "fall of person – to a lower level" (1033).

	2014	2015	2016	2017	2018	2019	2020	Total
Body movement under or with physical stress	55	52	70	70	110	89	90	536
Body movement without any physical stress	206	228	216	174	163	233	186	1406
Breakage; bursting; splitting; slipping; fall; collapse of Material Agent	102	93	71	66	71	65	67	535
Deviation by overflow; overturn; leak; flow; vaporisation; emission	48	69	42	32	40	39	34	304
Deviation due to electrical problems; explosion; fire	19	22	15	8	14	6	10	94
Loss of control of machine; means of transport or handling equipment	198	207	176	199	175	138	105	1198
Slipping - Stumbling and falling - Fall of persons	429	407	384	363	363	380	228	2554
Other / Unspecified	27	51	66	70	80	68	62	424
Total	1084	1129	1040	982	1016	1018	782	7051

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





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

In 2020, the number of occurrences with person(s) has decreased and reached its lowest level since 2014.

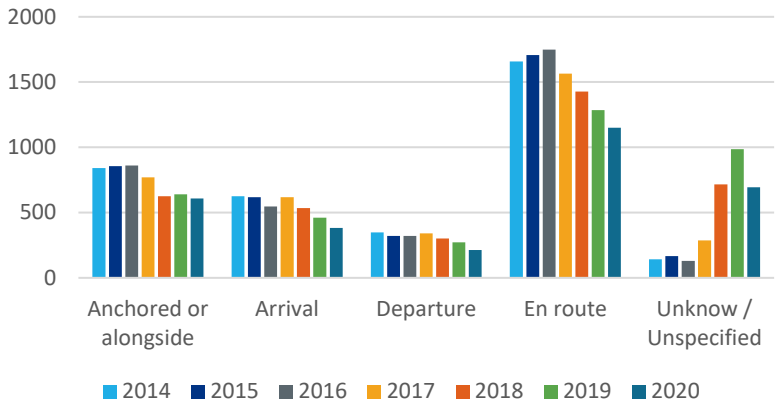
	2014	2015	2016	2017	2018	2019	2020	Total
Cargo	272	475	368	307	326	318	242	2301
Fishing vessel	279	173	225	248	243	250	260	1678
Passenger ship	327	331	316	290	332	338	166	2100
Service ship	158	137	125	122	118	116	110	886
Other ship	53	15	12	18	31	14	11	154
Total	1089	1131	1046	985	1050	1036	789	7126

Contact of general cargo Aramis in inland waters in France, on 28/09/2021

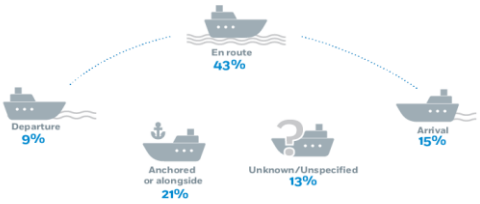
2.4 Location of marine casualties and incidents

2.4.1 Voyage segments

Figure 2.14: Distribution of voyage segments

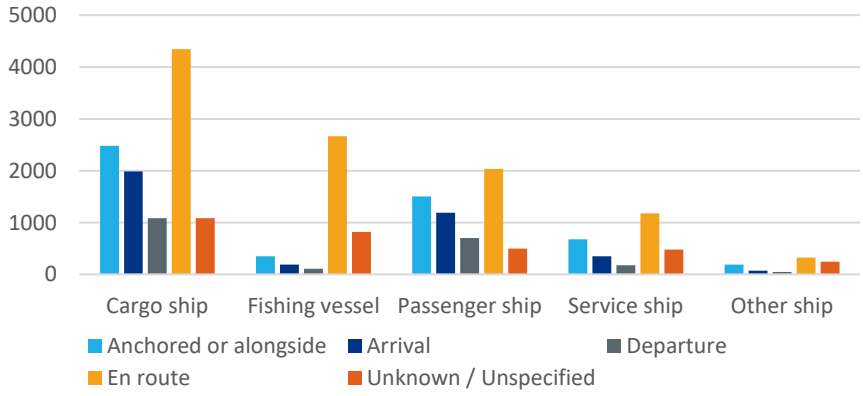


While the departure is the safest segment for all types of ship, the "en route" phase is the least safe in general (43%). "Anchored or alongside", meaning when the ship is not sailing, is the second segment when occurrences happened.



	2014	2015	2016	2017	2018	2019	2020	Total
Anchored or alongside	841	857	860	769	626	640	607	5200
Arrival	626	619	548	618	535	461	383	3790
Departure	347	322	321	340	302	272	214	2118
En route	1659	1707	1748	1566	1427	1286	1150	10543
Unknown / Unspecified	141	167	129	286	716	984	695	3117
Total	3614	3672	3606	3579	3606	3646	3049	24772

Figure 2.15: Distribution of voyage segments per ship type 2014-2020

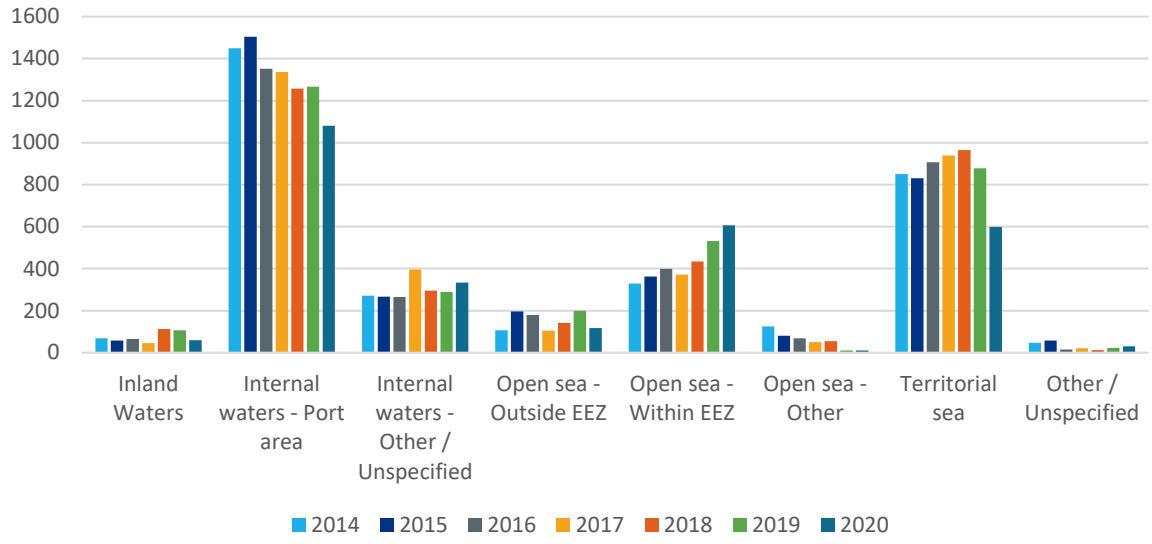


The most unsafe voyage segment is "en route". If for all ship types, the departure segment is the safest one, still a several casualties take place during the arrival, but also when ships are anchored or alongside.

	Anchored or alongside	Arrival	Departure	En route	Unknown / Unspecified	Total
Cargo ship	2481	1985	1086	4343	1086	10981
Fishing vessel	352	190	110	2663	817	4132
Passenger ship	1503	1189	703	2036	495	5926
Service ship	674	352	174	1179	477	2856
Other ships	190	74	45	322	246	877
Total	5200	3790	2118	10543	3121	24772

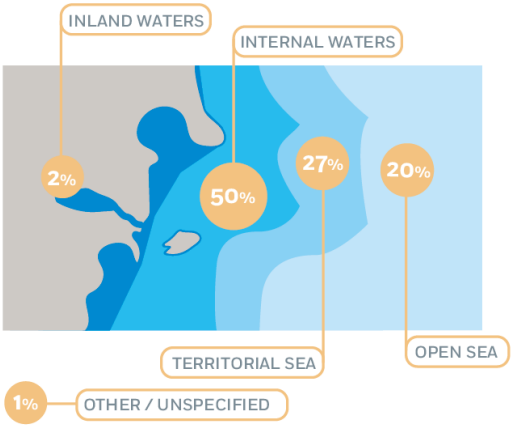
2.4.2 Location of occurrences

Figure 2.16: Distribution by location of marine casualties and incidents



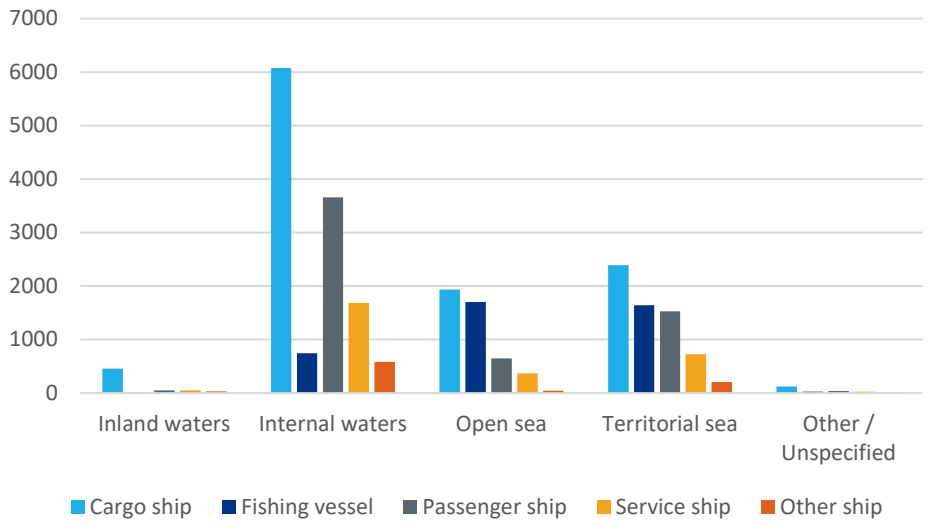
Internal waters are the location where more than half of the casualties take place. The sub-category port area represented 41.5% of all accidents.

However, accidents in port areas continued decreasing since 2015. At the same time, the increase of casualties in open seas also continued, and almost doubled over the period.



	2014	2015	2016	2017	2018	2019	2020	Total
Inland waters	69	58	66	46	113	106	59	517
Internal waters - Port area	1449	1504	1351	1351	1257	1266	1081	9245
Internal waters - Other / Unspecified	271	266	265	396	296	290	334	2118
Open sea - Outside EEZ	107	196	180	105	142	200	117	1047
Open sea - Within EEZ	329	363	399	371	434	531	606	3033
Open sea - Other	125	81	69	50	55	10	11	401
Territorial sea	850	830	907	938	964	878	599	5966
Other / Unspecified	47	58	15	21	12	22	30	205
Grand Total	3247	3356	3252	326	3273	3303	2837	22532

Figure 2.17: Location of marine casualties and incidents per ship type for 2014-2020



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 territorial sea 40% and open sea 41%.

	Inland waters	Internal waters	Open Sea	Territorial sea	Other / Unspecified	Total
Cargo ship	457	6076	1935	2392	121	10981
Fishing vessel	11	745	1703	1645	28	4132
Passenger ship	52	3657	650	1530	37	5926
Service ship	50	1683	367	730	26	2856
Other ship	33	583	45	204	12	877
Grand Total	603	12744	4700	6501	224	24772

2.5 Accident events and contributing factors

Investigators look for the factors contributing to marine casualties and incidents in the analysis phase. 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.

Each marine casualty can have one or more casualty events. More than one accident events can be associated to a casualty event. The five accident events types are: human action, system or equipment failure, other agent or vessel, hazardous material and unknown.

Each casualty event can have one or several contributing factors. Contributing factors have the following three main categories: external environment, shore management and shipboard operation.

2.5.1 Analysis of Accident events

Each investigated marine casualty with analysis data included in EMCIP can have one or more accident events so, it is possible to obtain two distributions:

- Distribution of accident event types; and
- Distribution of accident event types related to the investigated marine accidents.

The procedure to obtain the distribution of accident event types is:

- In the sample extracted from EMCIP, for each accident event type count the times this accident event type appears. For the accident event type number *i* a value N_i will be obtained.
- Obtain the total number of appearances of accident event types in the sample extracted from EMCIP, T, as the sum of all the values N_i for all the accident event types.

- The percentage of each accident event type is then obtained dividing the correspondent value N_i by T.

This distribution gives information about the influence of each accident event type in the total of accident events and the sum of all the percentages will be 100%.

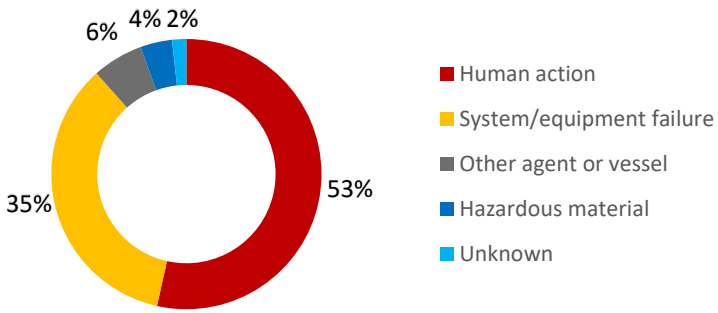
The procedure to obtain the distribution of accident event types related to the investigated marine accidents:

- In the sample extracted from EMCIP, for each accident event type count the number of investigated marine casualties where the accident event type appears at least once. For the accident event type number i a value M_i will be obtained.
- The percentage of each accident event type is then obtained dividing the correspondent value M_i by the total number of investigated marine casualties in the sample extracted from EMCIP.

This distribution gives information about the influence of each accident event type in the investigated marine casualties, that means the percentage of investigated marine casualties influenced by each accident event type.

In this case the sum of the percentages will be greater than 100% because each investigated marine casualty can have one or more accident events and accident event types.

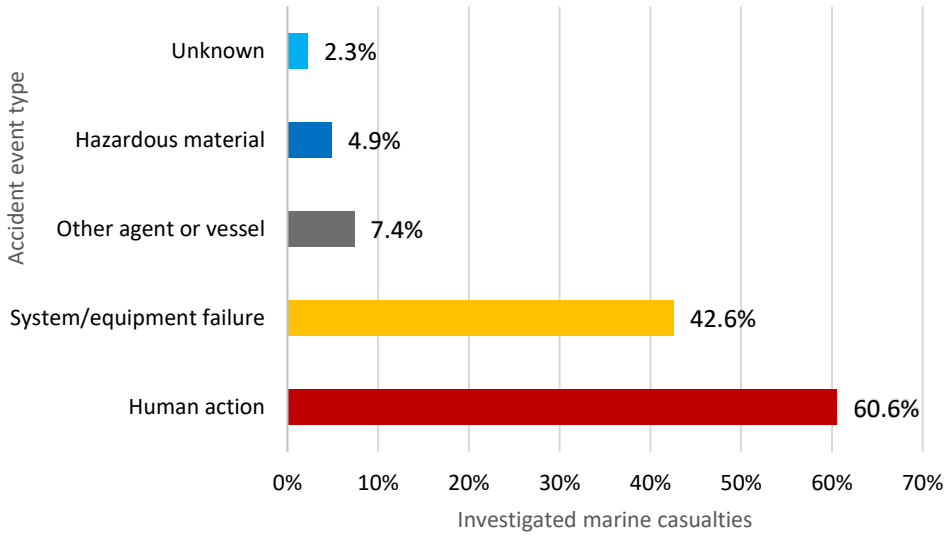
Figure 2.18: Distribution of accident events types for the period 2014-2020



The figure considers the distribution of all individual accident events recorded during analysis of safety investigation. There could be more than one AE per investigated occurrence.

The distribution of the accident events by type has the same trend than from period from 2014 to 2019, with 53.5% of human action accident events and 34.9% of system/equipment failure accident events as the main values of the distribution. In comparison with the period from 2014 to 2019, only system/equipment failure accident events have increased the percentage.

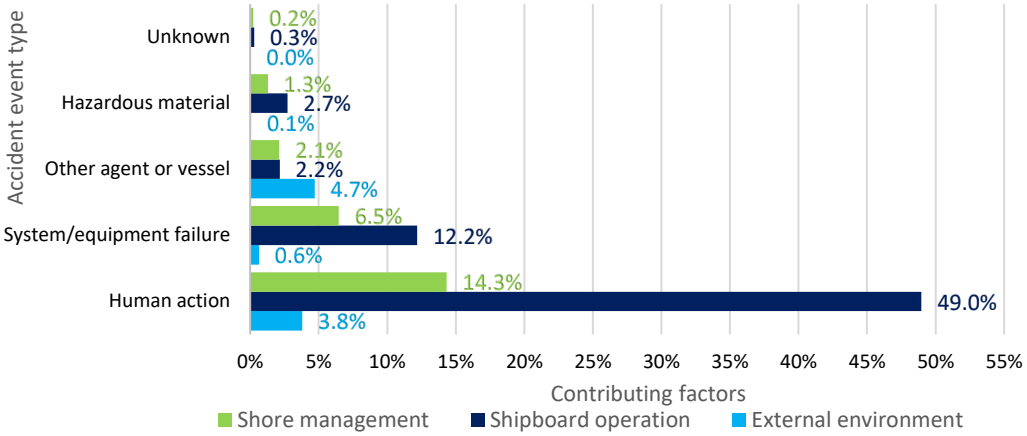
Figure 2.19: Distribution of accident event types related to the investigated marine accidents for the period 2014-2020



The figure indicates the percentage of investigations for which at least one AE type was found. For example, out 1499 of reported investigations, System equipment failure was considered 111 times, meaning 7.4%. Human action is related to the 60.6% of the investigated marine casualties with data in EMCIP. Human action and system/equipment failure accident events are the most important accident event types.

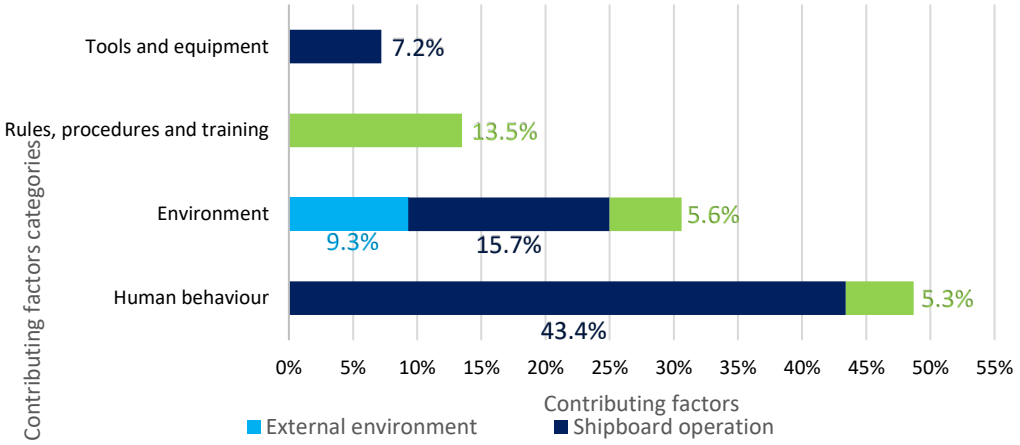
2.5.2 Analysis of contributing factors

Figure 2.20: Distribution of contributing factors in the accident event types for the period 2014-2020



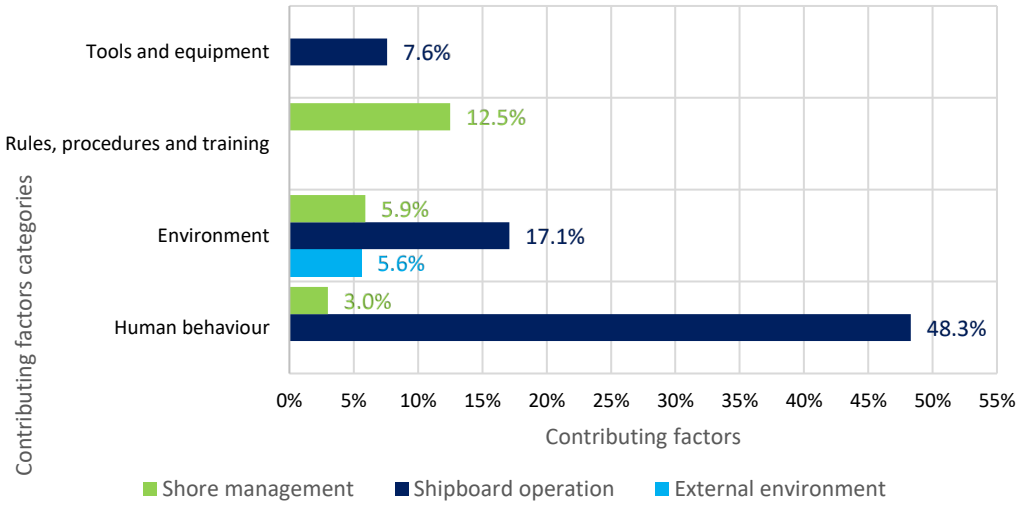
67.1% of the contributing factors in EMCIP are related to human action accident events. 19.3% to system /equipment failure accident events. Shipboard operation contributing factors are the most frequently associated to accident events with a 66.4%. Shore management contributing factors are the second most frequently associated to accident events with a 24.4%. There are few unknown accident events with contributing factors.

Figure 2.21: Contributing factors distributed by categories



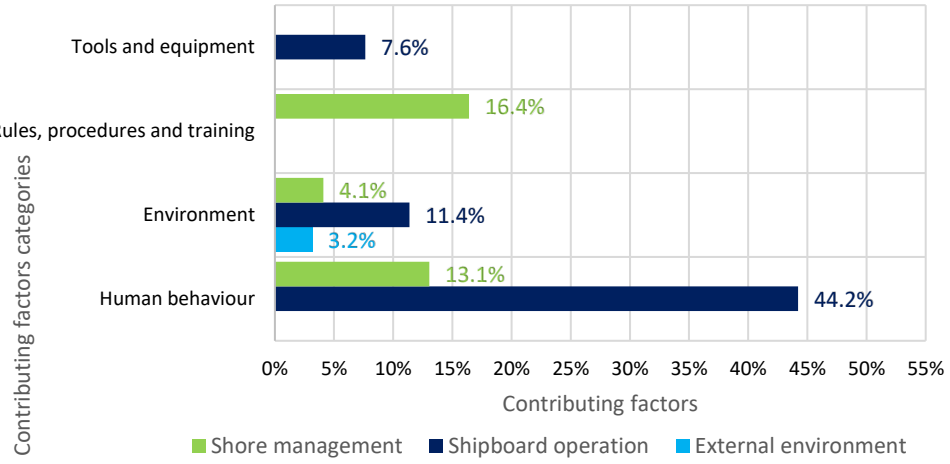
48.7% of the contributing factors in EMCIP are related to human behaviour. 30.6% of the contributing factors in EMCIP are related to environment. 13.5% of the contributing factors in EMCIP are related to rules, procedures and training.

Figure 2.22: Contributing factors involved in human action accident events, distributed by categories



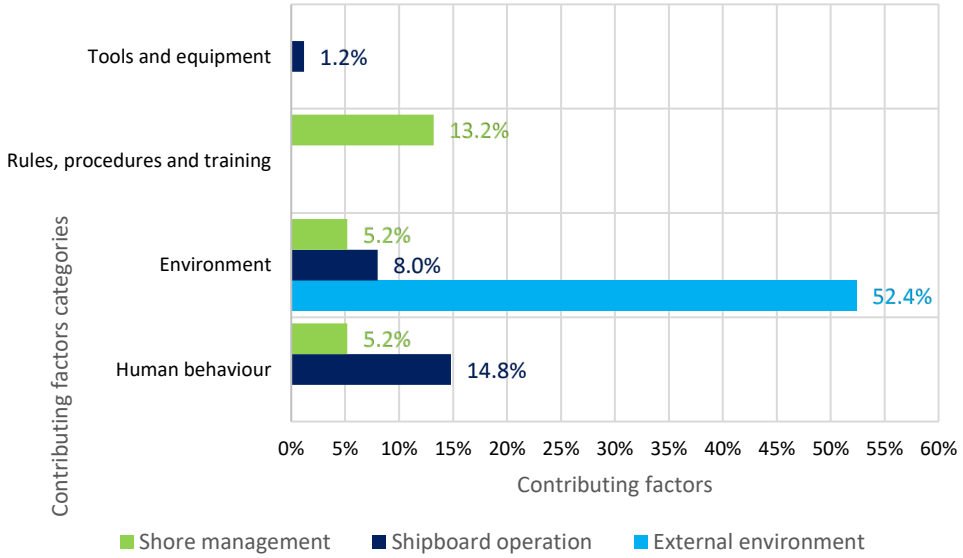
For human action accident events, the trend is the same than in the analysis of all the contributing factors for all the accident events. 51.3% of the contributing factors are related to human behaviour. 28.6% to environment and 12.5% rules, procedures and training.

Figure 2.23: Contributing factors involved in system/equipment failure accident events, distributed by categories



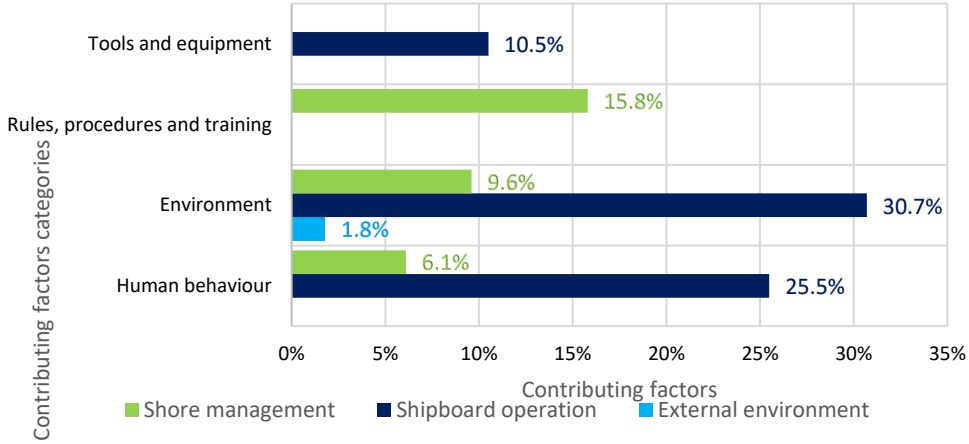
For system/equipment failure accident events, the trend is the same than in the analysis of all the contributing factors for all the accident events. 57.3% of the contributing factors in EMCIP are related to human behaviour. 18.7% of the contributing are related to environment. 16.4% of the contributing factors are related to rules, procedures and training.

Figure 2.24:Contributing factors involved in other agent or vessel accident events, distributed by categories



For other agent or vessel accident events, the trend has changed in environment and human behaviour, comparing with the analysis of all the contributing factors for all the accident events. 65.6% of the contributing factors in EMCIP are related to environment. 20.0% of the contributing factors in EMCIP are related to human behaviour. 13.2% of the contributing factors in EMCIP are related to rules, procedures and training.

Figure 2.25: Contributing factors involved in hazardous material accident events, distributed by categories



For hazardous material accident events, 42.1% of the contributing factors are related to environment, 31.6% of the contributing factors to human behaviour and 15.8% of the contributing factors to rules, procedures and training.

2.5.3 Analysis of human element

89.5% of the reported safety investigations have human action accident events or contributing factors catalogued as human behaviour, so they are affected by human element.

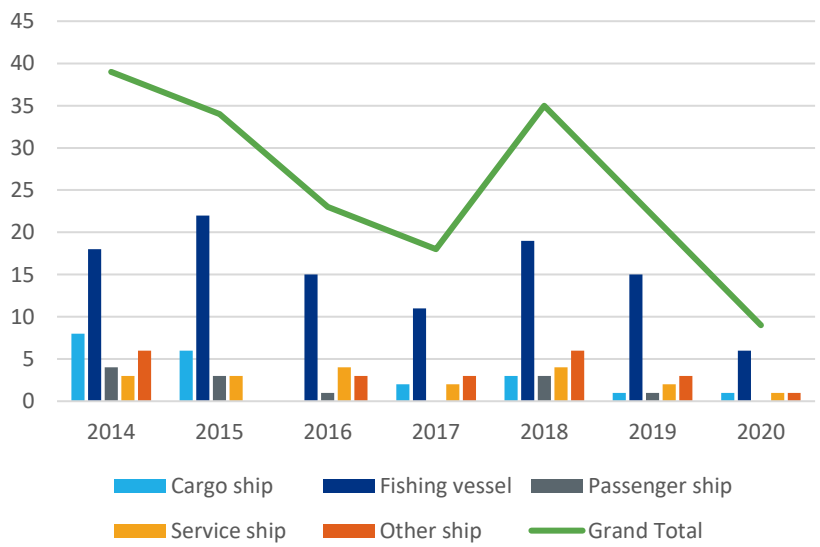
Figure 2.26 Influence of human element

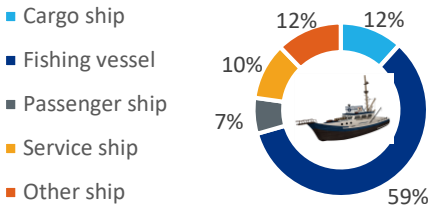
2.6 Consequences

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

2.6.1 Consequences to ship

Figure 2.27: Number of ships lost



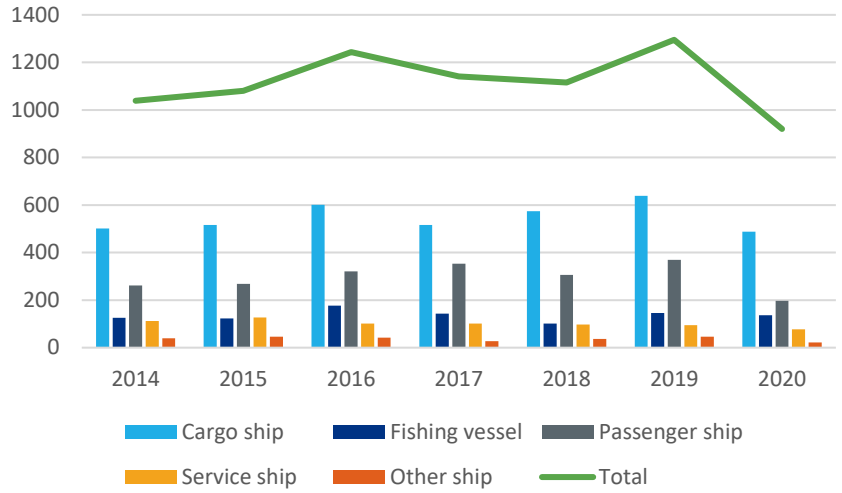


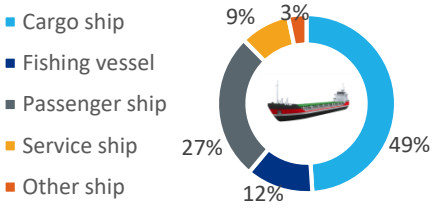
A total of 180 ships were lost over the 2014-2020 period.

The number of ships lost dropped down since 2018 . Fishing vessels continued representing the main affected type of ships.

	2014	2015	2016	2017	2018	2019	2020	Total
Cargo ship	8	6	0	2	3	1	1	21
Fishing vessel	18	22	15	11	19	15	6	106
Passenger ship	4	3	1	0	3	1	0	12
Service ship	3	3	4	2	4	2	1	19
Other ship	6	0	3	3	6	3	1	22
Total	39	34	23	18	35	22	9	180

Figure 2.28: Number of ships damaged

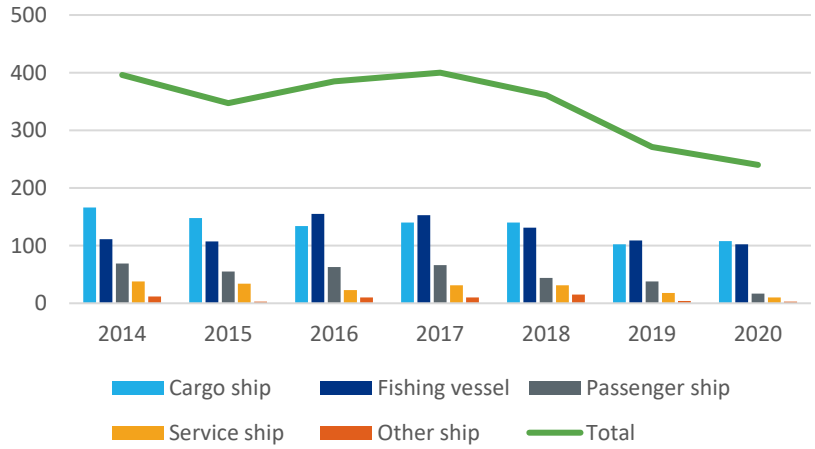


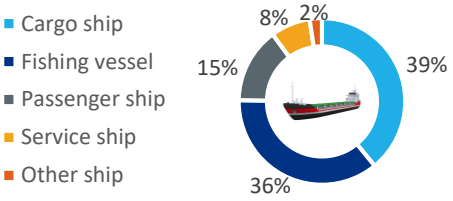


In the period 2014 to 2020, 7835 ships reported some damage, the largest category being cargo ships (49%).

	2014	2015	2016	2017	2018	2019	2020	Total
Cargo ship	501	516	601	516	574	639	488	3835
Fishing vessel	125	123	177	143	102	146	136	952
Passenger ship	261	269	321	353	306	370	197	2077
Service ship	112	127	102	102	97	94	77	711
Other ship	40	46	42	27	37	46	22	260
Total	1039	1081	1243	1141	1116	1295	920	7835

Figure 2.29: Number of ships considered unfit to proceed



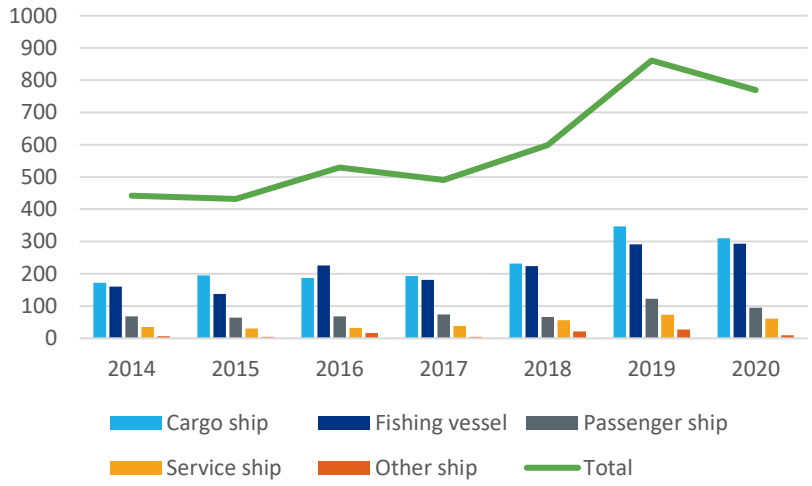


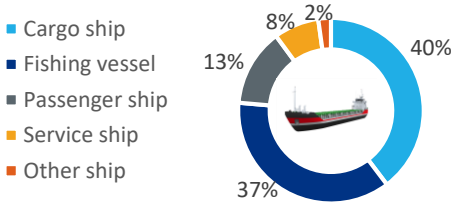
The number of ships unfit to proceed continuously decreased since 2017.

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

	2014	2015	2016	2017	2018	2019	2020	Total
Cargo ship	166	148	134	140	140	102	108	938
Fishing vessel	111	107	155	153	131	109	105	868
Passenger ship	69	55	63	66	44	38	17	352
Service ship	38	34	23	31	31	18	10	185
Other ship	12	3	10	10	15	4	3	57
Total	396	347	385	400	361	271	240	2400

Figure 2.30: Number of ships requiring shore assistance

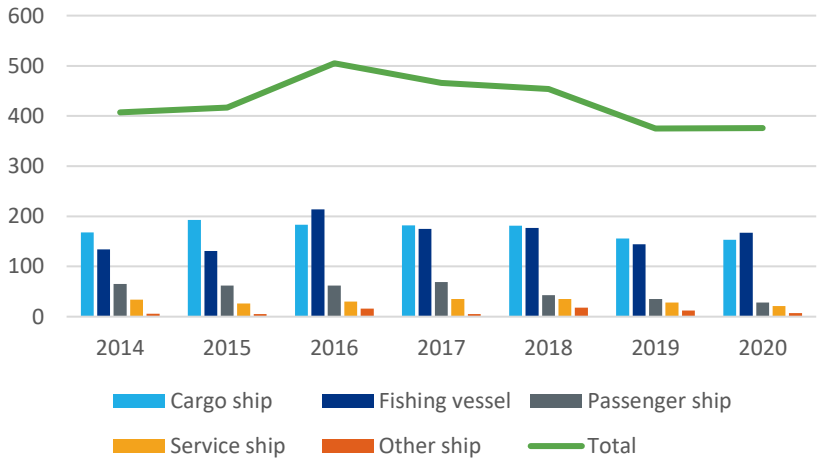


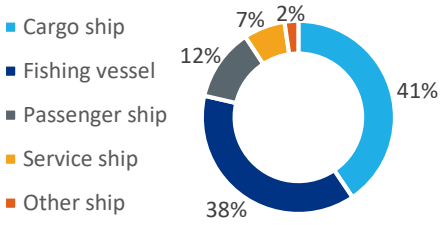


Shore assistance was provided/ considered necessary or required by 4123 ships over the 2014-2020 period. Cargo ships and fishing vessels were the two main categories involved.

	2014	2015	2016	2017	2018	2019	2020	Total
Cargo ship	172	195	187	193	232	347	310	1636
Fishing vessel	160	138	226	181	224	291	293	1513
Passenger ship	68	64	68	74	66	123	95	558
Service ship	35	30	32	38	56	73	61	325
Other ship	7	5	16	5	21	27	10	91
Total	442	432	529	491	599	861	769	4123

Figure 2.31: Number of ships requiring towage





Towage was provided/ considered necessary or required for 3000 ships over the 2014-2020 period. The number of required towage remained equal in 2020 in comparison with 2019.

	2014	2015	2016	2017	2018	2019	2020	Total
Cargo ship	168	193	183	182	181	156	153	1216
Fishing vessel	134	131	214	175	177	144	167	1142
Passenger ship	65	62	62	69	43	35	28	364
Service ship	34	26	30	35	35	28	21	209
Other ship	6	5	16	5	18	12	7	69
Total	407	417	505	466	454	375	376	3000

Figure 2.32: Number of abandoned ships

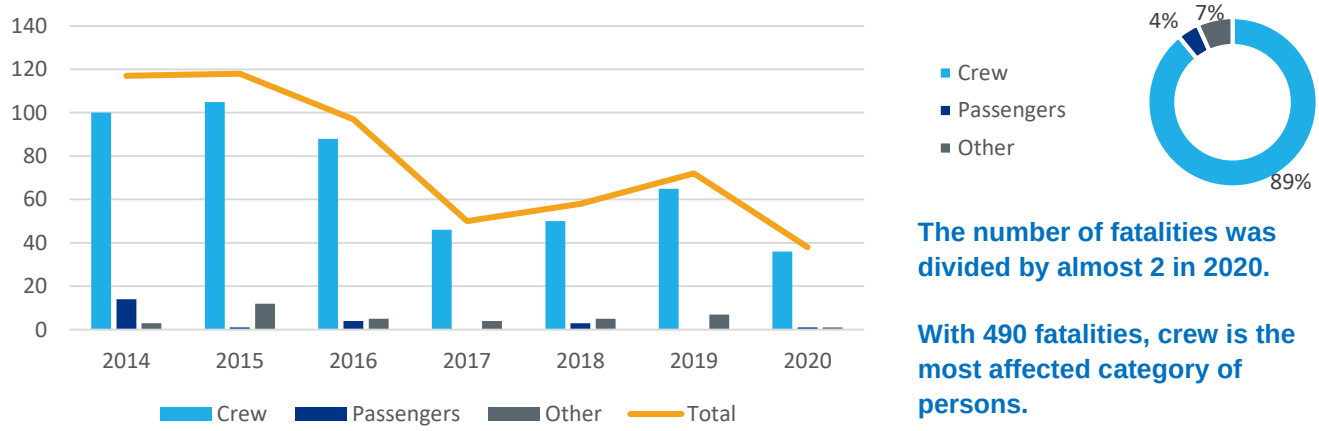
After a significant increase of abandoned ships (whatever the type) in 2018, the reduction noticed in 2019 continued in 2020.

	2014	2015	2016	2017	2018	2019	2020	Total
Cargo ship	6	5	0	2	11	4	3	31
Fishing vessel	16	21	13	8	18	16	7	99
Passenger ship	6	5	2	0	4	3	4	24
Service ship	5	6	3	3	3	2	0	22
Other ship	4	0	2	4	5	6	1	22
Total	37	37	20	17	41	31	15	198

2.6.2 Consequences to persons

2.6.2.1 Fatalities

Figure 2.33: Distribution of fatalities by categories of person



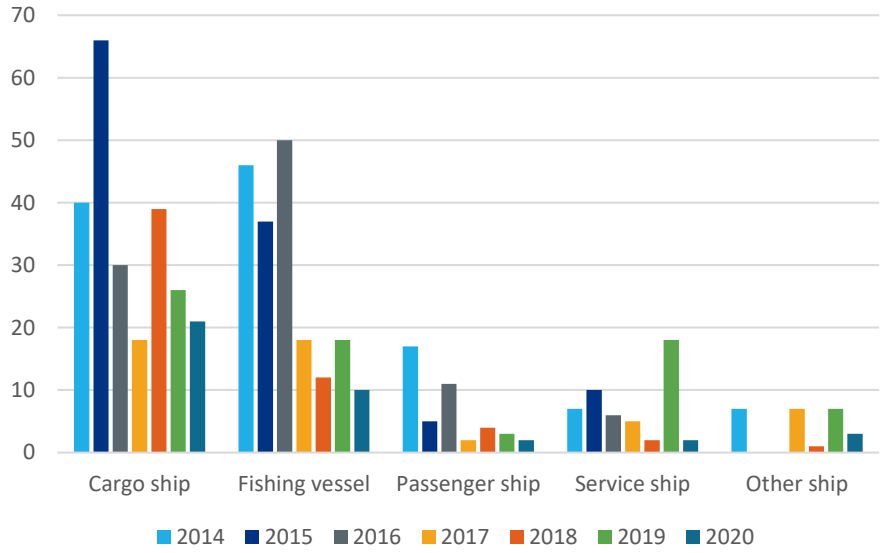
The number of fatalities was divided by almost 2 in 2020.

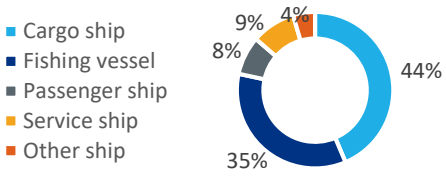
With 490 fatalities, crew is the most affected category of persons.

	2014	2015	2016	2017	2018	2019	2020	Total
Crew	100	105	88	46	50	65	36	490
Passengers	14	1	4	0	3	0	1	23
Other	3	12	5	4	5	7	1	37

Total	117	118	97	50	58	72	38	550

Figure 2.34: Distribution of fatalities by ship category

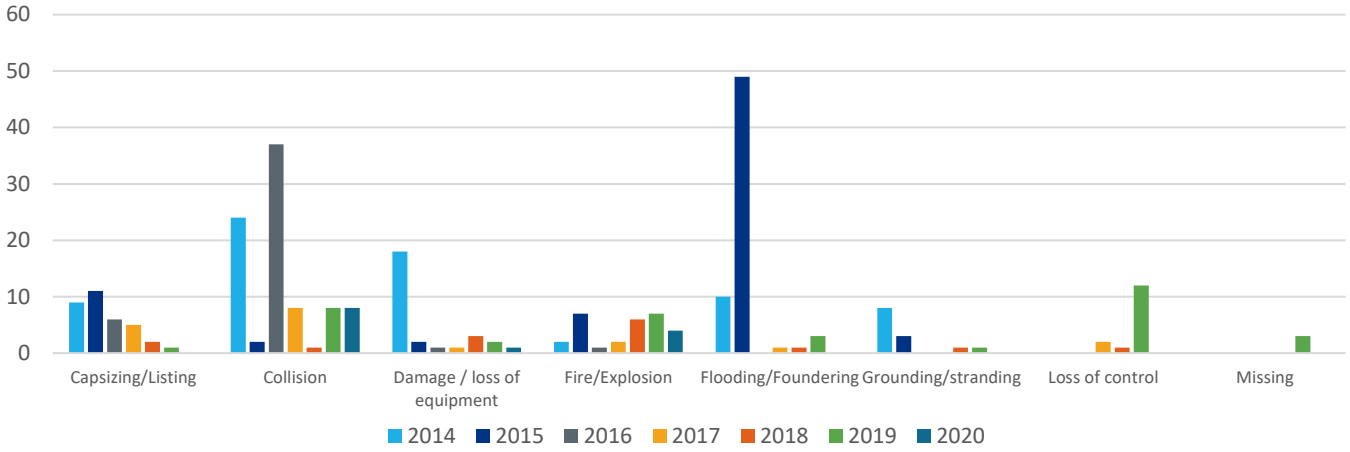


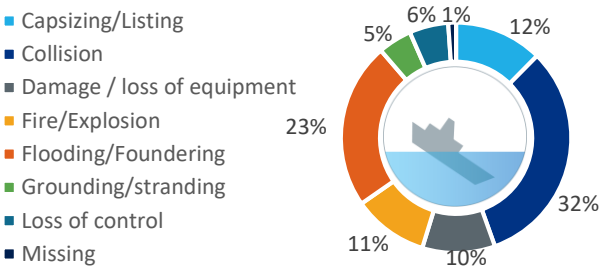


Evolution of fatalities per ship type has been irregular over 2014-2019 period. While it was stable for service ships until 2018, the year 2014 was the worst for fishing vessels and passenger ships. 2015 was the worst one for cargo ships. Cargo ships remained the main ship type related to fatalities.

	2014	2015	2016	2017	2018	2019	2020	Total
Cargo	40	66	30	18	39	26	21	240
Fishing vessel	46	37	50	18	12	18	10	191
Passenger ship	17	5	11	2	4	3	2	44
Service ship	7	10	6	5	2	18	2	50
Other ship	7	0	0	7	1	7	3	22
Total	117	118	97	50	58	72	38	550

Figure 2.35: Distribution of fatalities by casualty events

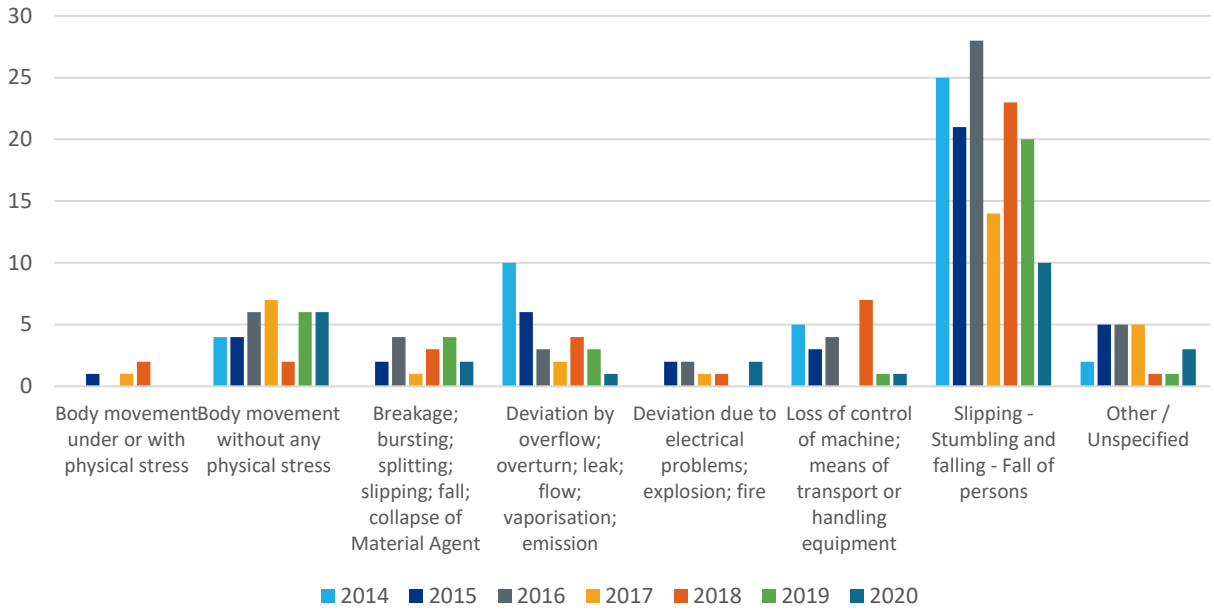


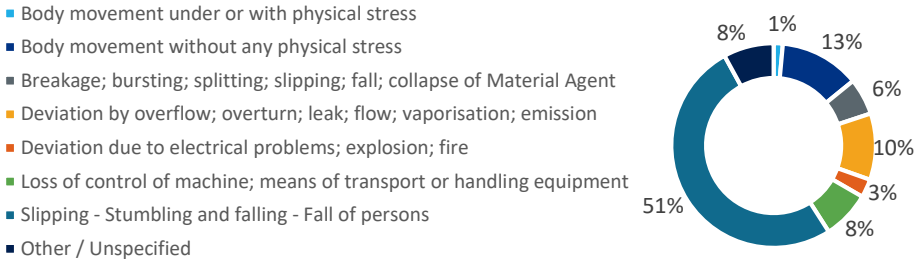


Fatalities mainly occurred during collisions and flooding/foundering, representing more than half of the casualty events (55%).

	2014	2015	2016	2017	2018	2019	2020	Total
Capsizing/Listing	9	11	6	5	2	1	0	34
Collision	24	2	37	8	1	8	8	88
Contact	0	0	0	0	0	0	0	0
Damage / loss of equipment	18	2	1	1	3	2	1	28
Fire/Explosion	2	7	1	2	6	7	4	29
Flooding/Foundering	10	49	0	1	1	3	0	64
Grounding/stranding	8	3	0	0	1	1	0	13
Hull failure	0	0	0	0	0	0	0	0
Loss of control	0	0	0	2	1	12	0	15
Missing	0	0	0	0	0	3	0	3
Total	71	74	45	19	15	37	13	274

Figure 2.36: Distribution of fatalities by deviation[5]





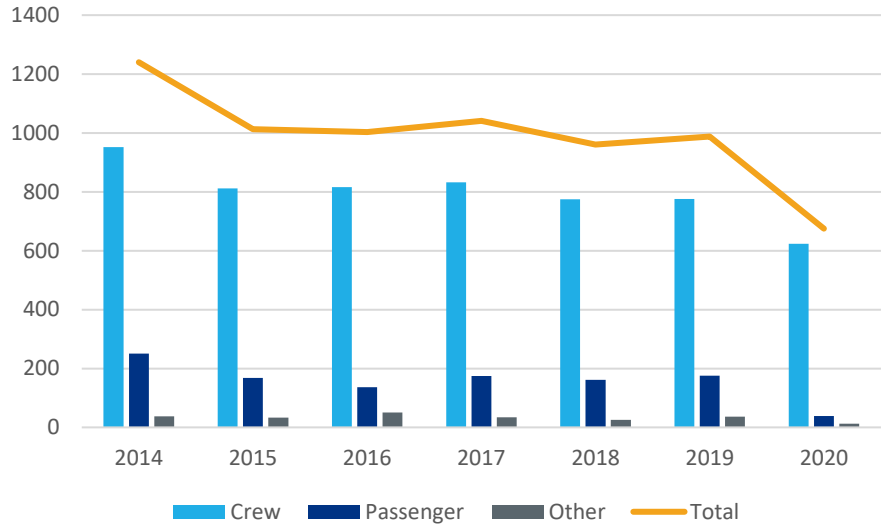
Slipping/falling of persons is by far the main deviation. It caused 141 fatalities over the period 2014-2020. Among the falls, the subcategory "fall overboard" was responsible for 84 fatalities.

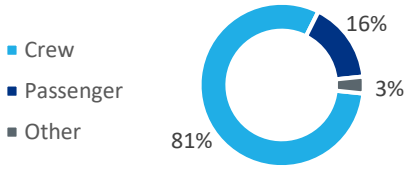
	2014	2015	2016	2017	2018	2019	2020	Total
Body movement under or with physical stress	0	1	0	1	2	0	0	4
Body movement without any physical stress	4	4	6	7	2	6	6	35
Breakage; bursting; splitting; slipping; fall; collapse of Material Agent	0	2	4	1	3	4	2	16
Deviation by overflow; overturn; leak; flow; vaporisation; emission	10	6	3	2	4	3	1	29
Deviation due to electrical problems; explosion; fire	0	2	2	1	1	0	2	8
Loss of control of machine; means of transport or handling equipment	5	3	4	0	7	1	1	21
Slipping - Stumbling and falling - Fall of persons	25	21	28	14	23	20	10	141
Other / Unspecified	2	5	5	5	1	1	3	22
Total	46	44	52	31	43	35	25	276

[5] **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 2.37: Distribution of injuries by category of person

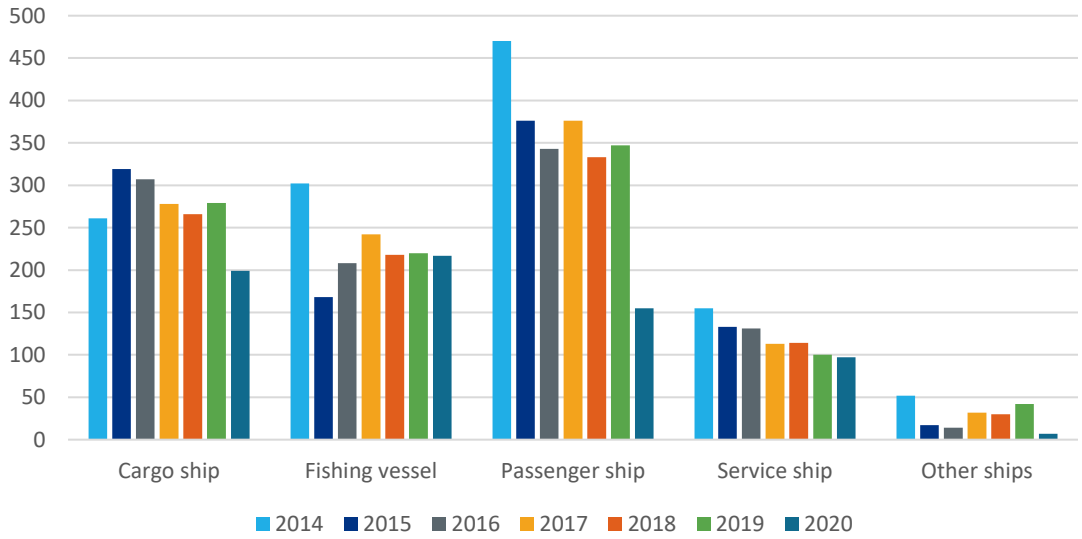


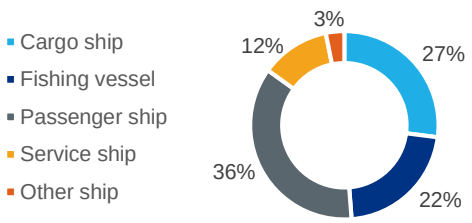


After a 5-year period during which the number of injuries remained stable (around 1000 persons per year), a significant decrease was noted in 2020 (32% of reduction in comparison with the year 2019). Crew represented the main category of persons injured at sea (81% of the total) during the 2014-2020 period.

	2014	2015	2016	2017	2018	2019	2020	Total
Crew	952	812	816	832	775	776	623	5586
Passengers	251	168	136	175	161	176	39	1106
Other	37	33	51	34	25	36	13	229
Total	1240	1013	1003	1041	961	988	675	6921

Figure 2.38: Distribution of injured people by ship type



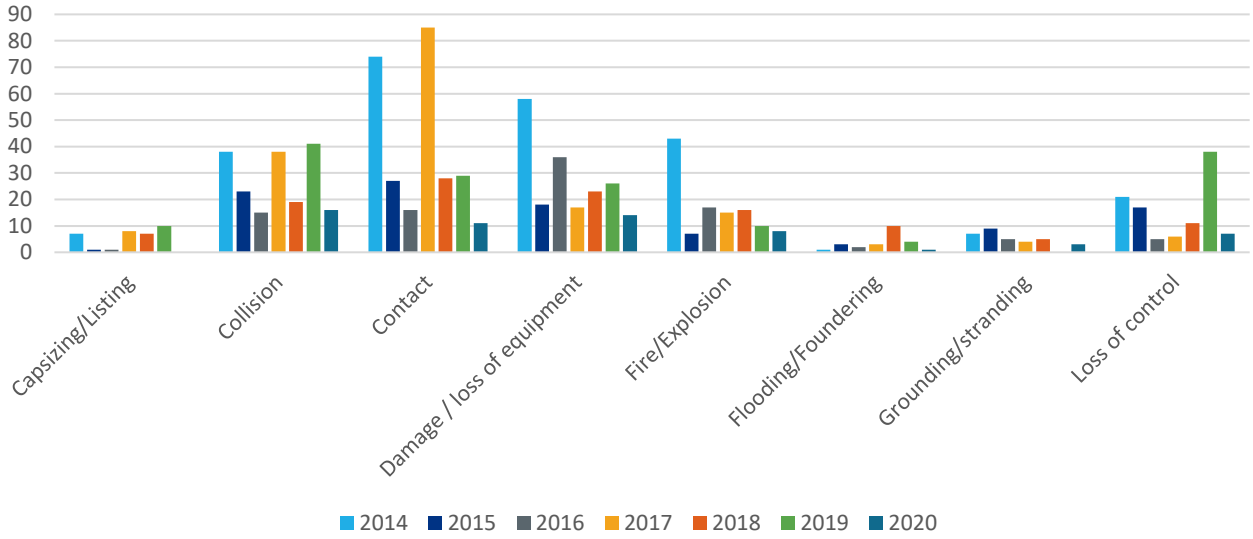


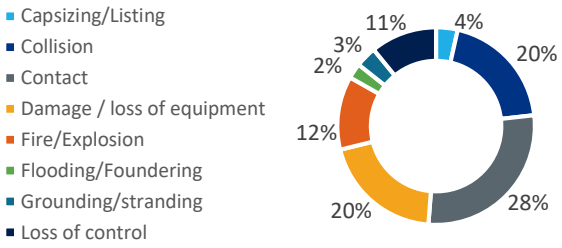
Injuries took foremost place on board passenger ships (35%).

The number of injured persons reduced significantly on-board cargo ships, passenger ships and other ships. However it remained equal on fishing vessels and service ships.

	2014	2015	2016	2017	2018	2019	2020	Total
Cargo ship	261	319	307	278	266	279	199	1909
Fishing vessel	302	168	208	242	218	220	217	1575
Passenger ship	470	376	343	376	333	347	155	2400
Service ship	155	133	131	113	114	100	97	843
Other ship	52	17	14	32	30	42	7	194
Total	1240	1013	1003	1041	961	988	675	6921

Figure 2.39: Distribution of injuries by casualty event



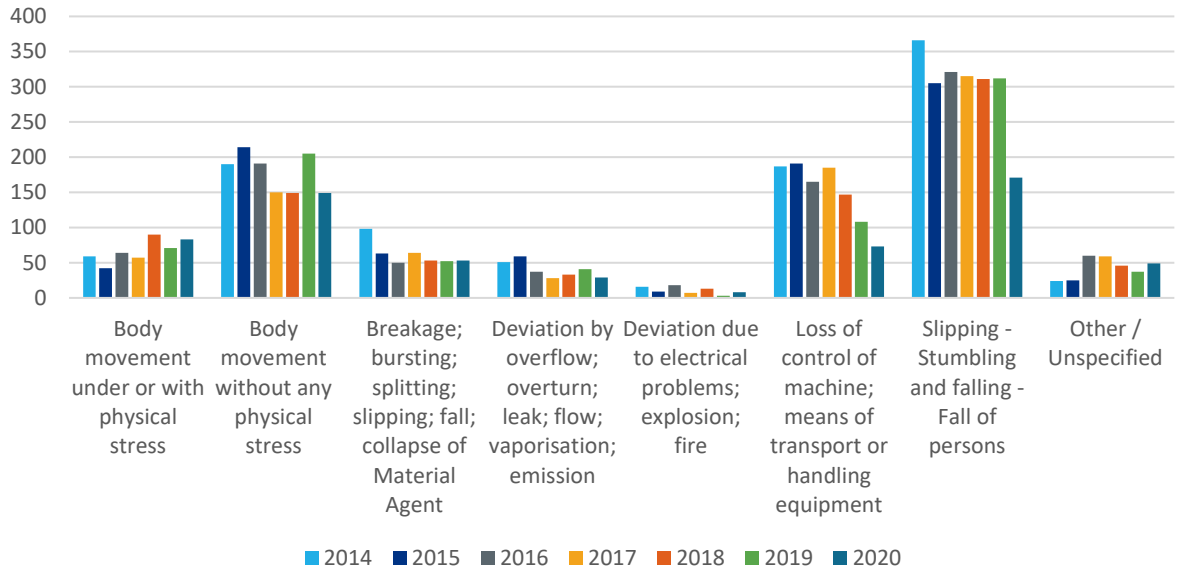


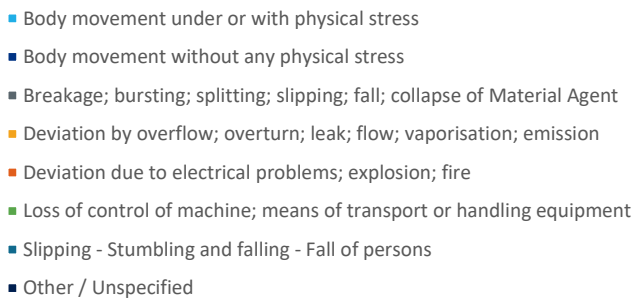
In the period 2014 - 2020, 49% of the injuries took place during navigational events (contact, collision and grounding/standing). Damage of equipment also recorded significant value (20% each).

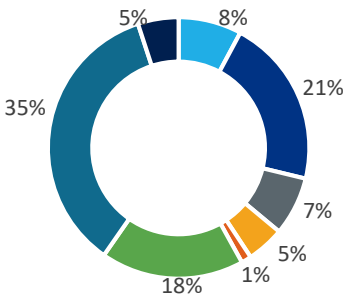
	2014	2015	2016	2017	2018	2019	2020	Total
Capsizing/Listing	7	1	1	8	7	10	0	34
Collision	38	23	15	38	19	41	16	190

Contact	74	24	16	85	28	29	11	270
Damage / loss of equipment	58	18	36	17	23	26	14	192
Fire/Explosion	43	7	17	15	16	10	8	116
Flooding/Foundering	1	3	2	3	10	4	1	24
Grounding/stranding	7	9	5	4	5	0	3	33
Hull failure	0	0	0	0	0	0	0	0
Loss of control	21	17	5	6	11	38	7	105
Missing	0	0	0	0	0	1	0	1
Total	249	105	97	176	119	159	60	965

Figure 2.40: Distribution of injuries by deviation







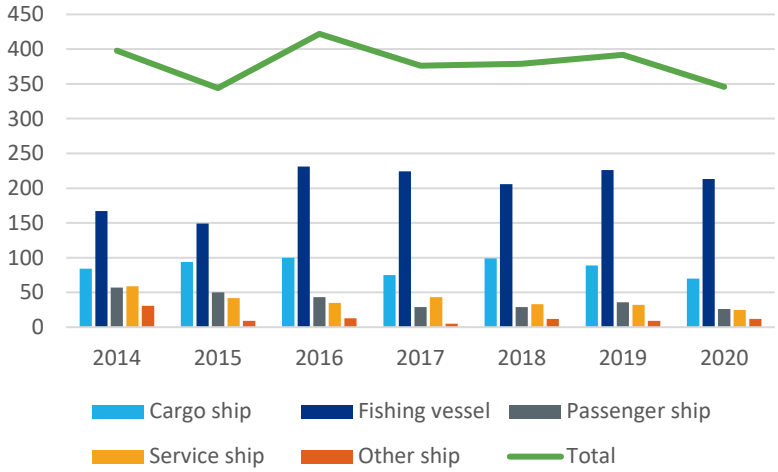
Most of the injuries 2468 (35%) occurred during slipping/falls of persons. Subcategories of fall at the same and to a lower level represent respectively 52.2% and 41.6% of that category.

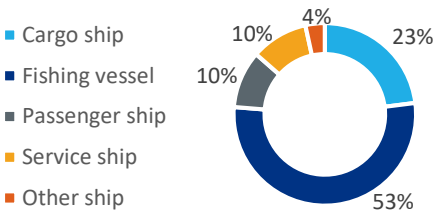
	2014	2015	2016	2017	2018	2019	2020	Total
Body movement under or with physical stress	59	42	64	57	90	71	83	466
Body movement without any physical stress	190	214	191	150	149	205	149	1248
Breakage; bursting; splitting; slipping; fall; collapse of Material Agent	98	63	50	64	53	52	53	433
Deviation by overflow; overturn; leak; flow; vaporisation; emission	51	59	37	28	33	41	29	278
Deviation due to electrical problems; explosion; fire	16	9	18	7	13	3	8	74
Loss of control of machine; means of transport or handling equipment	187	191	165	185	147	108	73	1056

Slipping - Stumbling and falling - Fall of persons	366	305	321	315	311	312	171	2101
Other / Unspecified	24	25	60	59	46	37	49	300
Total	991	908	906	865	842	829	615	5956

2.6.3 Other consequences

Figure 2.41: Distribution of Search and Rescue (SAR) operations by ship type

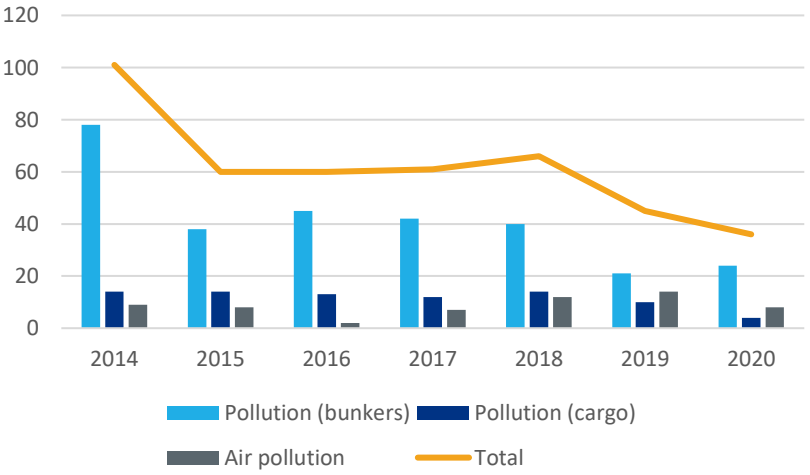


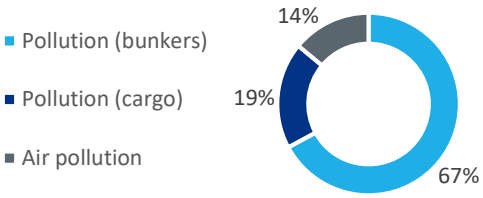


With an average of 385 operations between 2014 and 2019, a reduction of 10% was noted in 2020.
Half of the SAR operations concerned fishing vessels.

	2014	2015	2016	2017	2018	2019	2020	Total
Cargo ship	84	94	100	75	99	89	70	611
Fishing vessel	167	149	231	224	206	226	213	1416
Passenger ship	57	50	43	29	29	36	26	270
Service ship	59	42	35	43	33	32	25	269
Other ship	31	9	13	5	12	9	12	91
Total	398	344	422	376	379	392	346	2657

Figure 2.42: Types of pollution

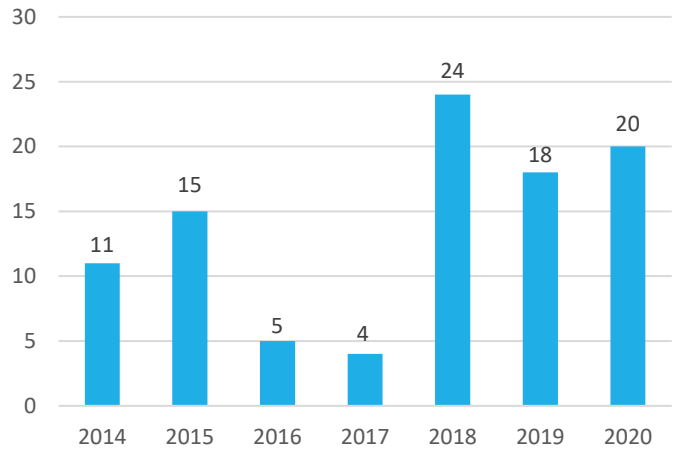




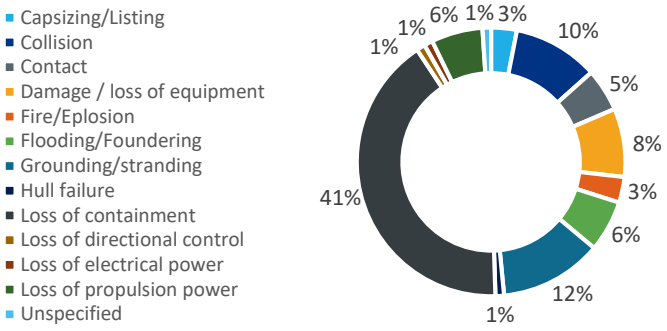
In the period of 2014-2020, 429 cases of pollution were reported. Marine pollution by the release of ship's bunkers (fuel) and other pollutants (e.g. cargo residues, lubricating or hydraulic oils) corresponded to 67% of all pollutions. A significant decrease in the reported number of pollutions was noted in 2020, and the number of pollutions has been divided by 3 since 2014.

	2014	2015	2016	2017	2018	2019	2020	Total
Air pollution	9	8	2	7	12	14	8	60
Pollution (bunkers)	78	38	45	42	40	21	24	288
Pollution (cargo)	14	14	13	12	14	14	8	81
Total	101	60	60	61	66	45	36	429

Figure 2.43: Distribution of oil pollution response



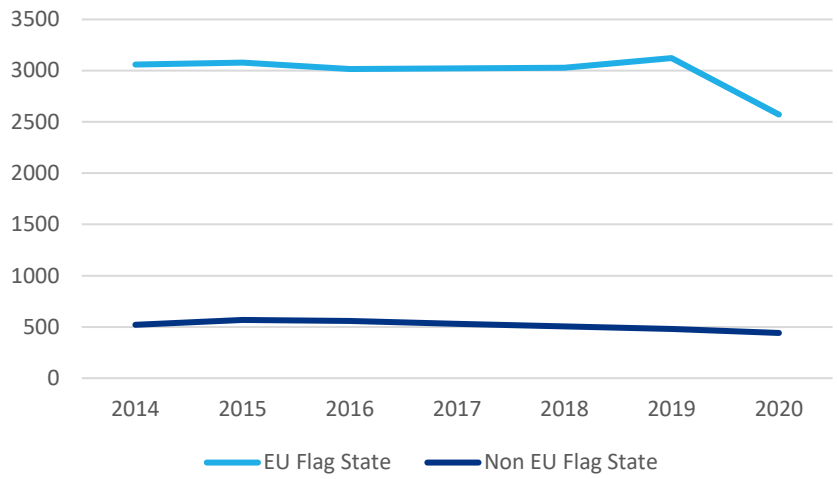
	Total
Capsizing/Listing	3
Collision	10
Contact	5
Damage / loss of equipment	8
Fire/Explosion	3
Flooding/Foundering	6
Grounding/stranding	12
Hull failure	1
Loss of containment	40
Loss of directional control	1
Loss of electrical power	1
Loss of propulsion power	6
Unspecified	1
Total	97



Oil pollution response was mainly deployed after a loss of containment (cargo). It was followed by navigational issues (collision, contact and grounding / stranding) that represented 27%. With 20 pollutions, the year 2020 was worse than the average of 13 cases per year over 2014-2019.

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

Figure 2.44: Distribution of ship flags



In the period 2014 to 2020, 20899 ships flagged under an EU/EEA Member State were involved in a marine casualty or incident.

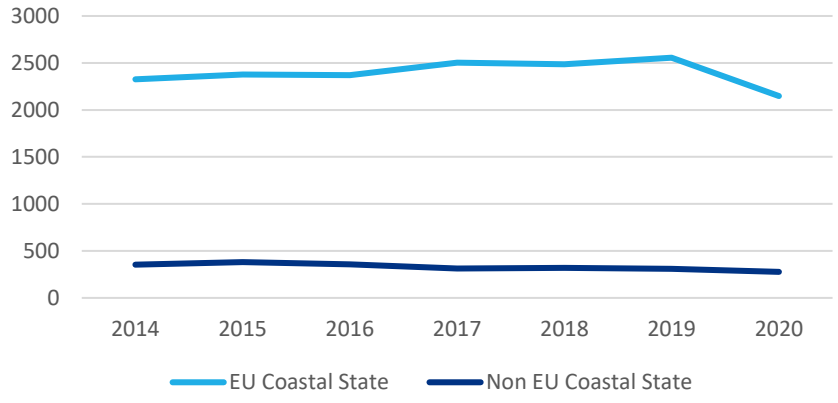
29 EU/EEA Member States were involved as flag of the ship over the 2014–2020 period.

3603 ships flagged under a non-EU/EEA Member State were involved in a marine casualty or incident reported in EMCIP, corresponding to 99 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	2020	Total
EU Flag	3059	3078	3015	3022	3030	3123	2572	20899
Non EU Flag	521	568	558	531	504	480	441	3603
Unknown	34	26	33	26	72	43	36	270
Total	3614	3672	3606	3579	3606	3646	3049	24772

Figure 2.45: Distribution of coastal States



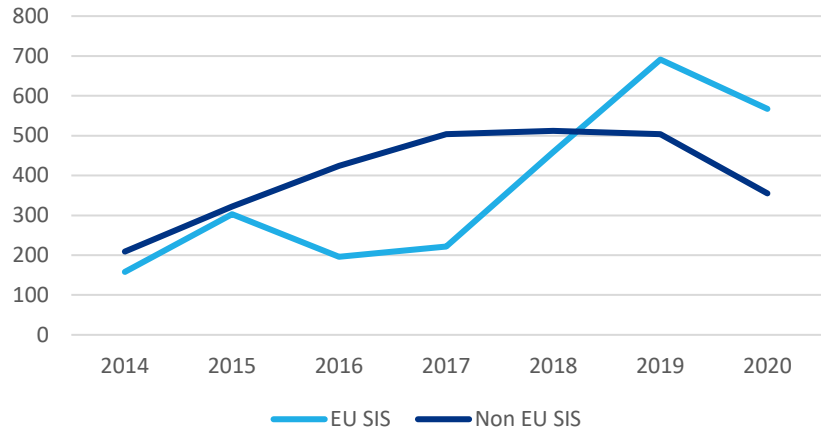
In 19079 occurrences, at least one coastal State was reported to be affected by a marine casualty or incident. Considering the total number of reported marine casualties or incidents, 85.3% of the casualties related to territorial sea or internal waters.

26 EU Member States were involved as a coastal State 16816 times. 140 non-EU countries were reported as coastal State 2320 times.

	2014	2015	2016	2017	2018	2019	2020	Total
EU Coastal State	2330	2383	2375	2503	2489	2557	2179	16816
Non EU Coastal State	356	383	357	313	320	309	282	2320
Total reported Coastal State	2686	2766	2732	2816	2809	2866	2461	19136

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



In 5205 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 23.3% of marine casualties and incidents.

A total of 5426 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 2596 times. 115 non-EU/EEA countries were SIS 2830 times.

	2014	2015	2016	2017	2018	2019	2020	Total
EU SIS	158	303	196	222	459	691	567	2596
Non-EU SIS	209	322	424	504	512	504	355	2830
Total SIS	367	625	620	726	971	1195	922	5426

B- MARINE CASUALTIES AND INCIDENTS

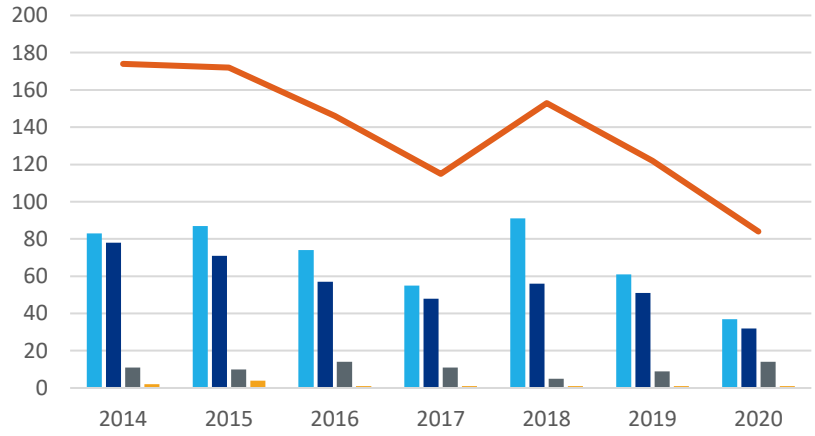
This chapter describes the activities undertaken by the investigative bodies of EU/EEA Member States regarding the investigations performed, reports published, and safety recommendations issued.

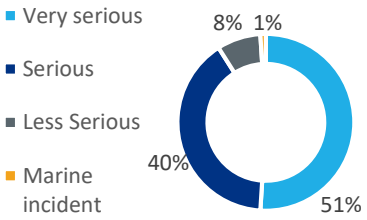
Art. 2.4 of Reg.(EC) 1406/2002 as amended, provides that the Agency shall carry out analysis of safety investigation reports with a view to identifying added value at Union level in terms of any relevant lessons to be drawn.

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



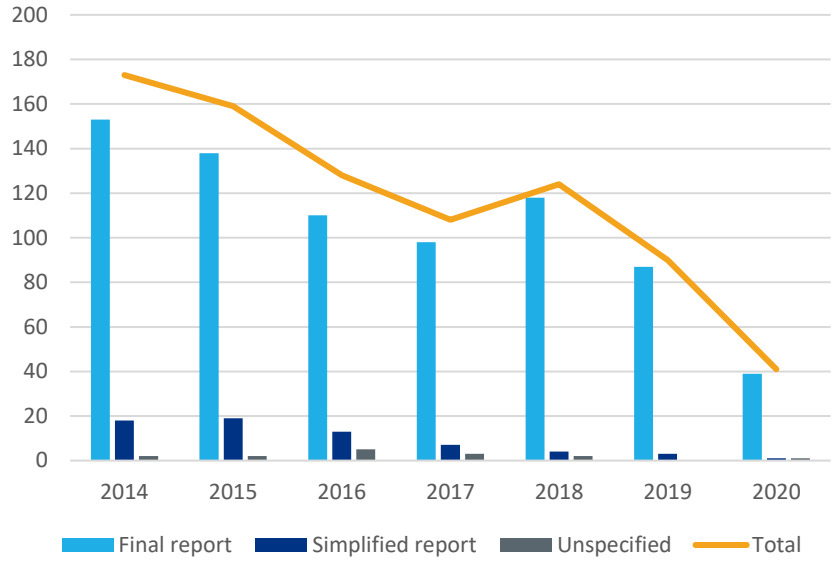


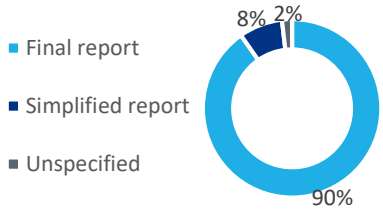
A total of 966 investigations were launched, during 2014 - 2020 period, 51% of these being related to very serious casualties and 40% to serious casualties. Except in 2018, a reduction of the number of investigations launched was noted since 2014.

	2014	2015	2016	2017	2018	2019	2020	Total
Very serious	83	87	74	55	91	61	37	488
Serious	78	71	57	48	56	51	32	393
Less Serious	11	10	14	11	5	9	14	74
Marine incident	2	4	1	1	1	1	1	11
Grand Total	174	172	146	115	153	122	84	966

2.9 Investigation reports

Figure 2.48: Number of investigation reports per type





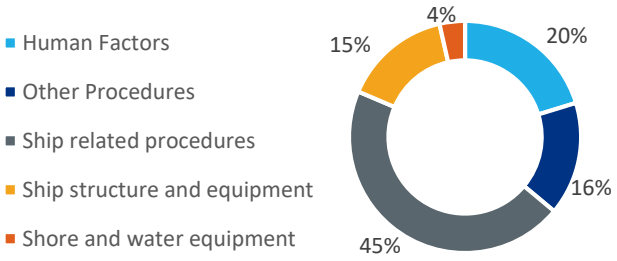
In period 2014 to 2020, 743 reports were classified as final and 65 as simplified, in occurrences with status finished. The type of report, whether final or simplified, is decided by the investigative bodies depending on the severity of the casualty and/or the potential to prevent future casualties.

	2014	2015	2016	2017	2018	2019	2020	Total
Final report	153	138	110	98	118	87	39	743
Simplified report	18	19	13	7	4	3	1	65
Unspecified	2	2	5	3	2	0	1	15
Total	173	159	128	108	124	90	41	823

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**

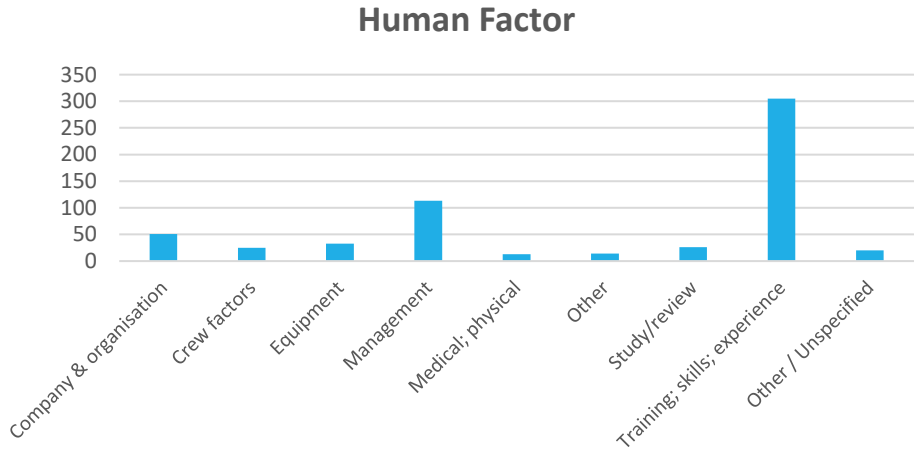
2.10 Safety Recommendations

Figure 2.49: Distribution of safety recommendations / actions taken issued per focus area for 2014-2020



Human Factors	600
Other Procedures	468
Ship Related Procedures	1343
Ship Structure and Equipment	446
Shore and Water Equipment	105
Total	2962

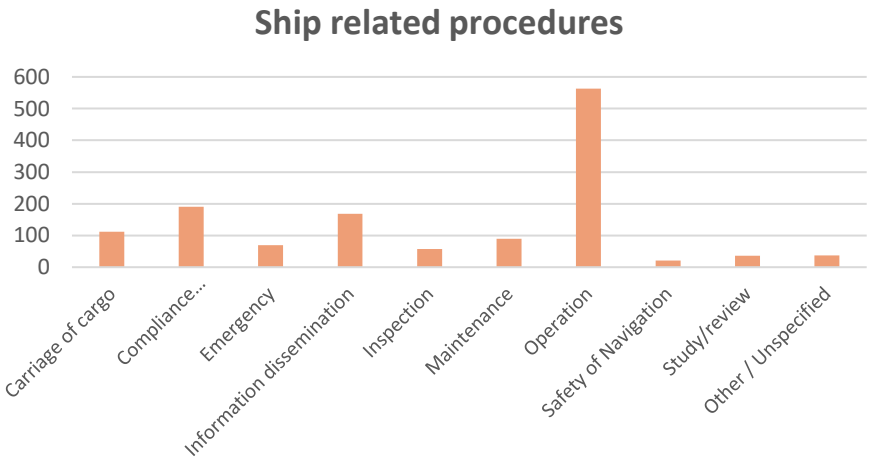
45.3% of the safety recommendations / actions taken (SR/AT) issued related to "ship procedures". Figures below are showing the SR/At by subcategories.



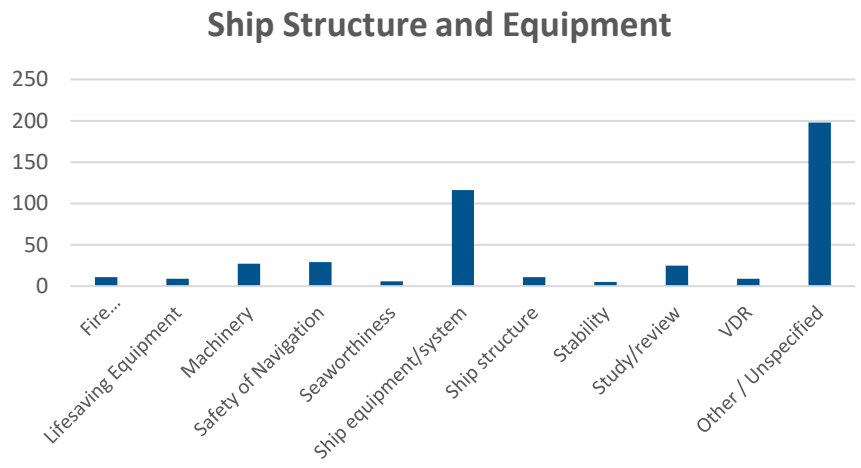
Company & organisation	51
Crew factors	25
Equipment	33
Management	113
Medical; physical	13
Study/review	14
Training; skills; experience	305
Other/Unspecified	20
Total Human Factors SR/AT	600

In the area of human factors, training, skills and experience was by far the first area that was targeted by SR/AT (50.8%).

Carriage of cargo	112
Compliance (regulations/legislation)	190
Emergency	69
Information dissemination	168
Inspection	57
Maintenance	90
Operation	563
Safety of Navigation	21
Study/review	36
Other/Unspecified	37
Total SR/AT	1343

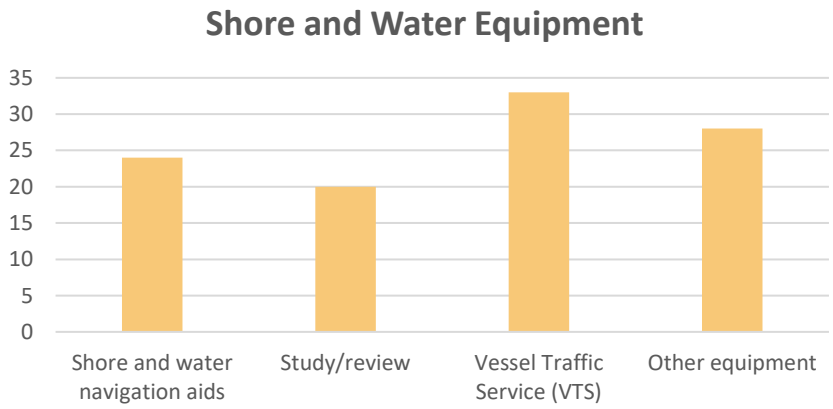


When it related to ship procedures, almost half of the SR/AT were targeting the operations of the ship (41.9%).



Fire Protection / Firefighting Equip.	11
Lifesaving Equipment	9
Machinery	27
Safety of Navigation	29
Seaworthiness	6
Ship equipment/system	116
Ship structure	11
Stability	5
Study/review	25
VDR	9
Other/Unspecified	198
Total SSE SR/AT	446

One quarter 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".

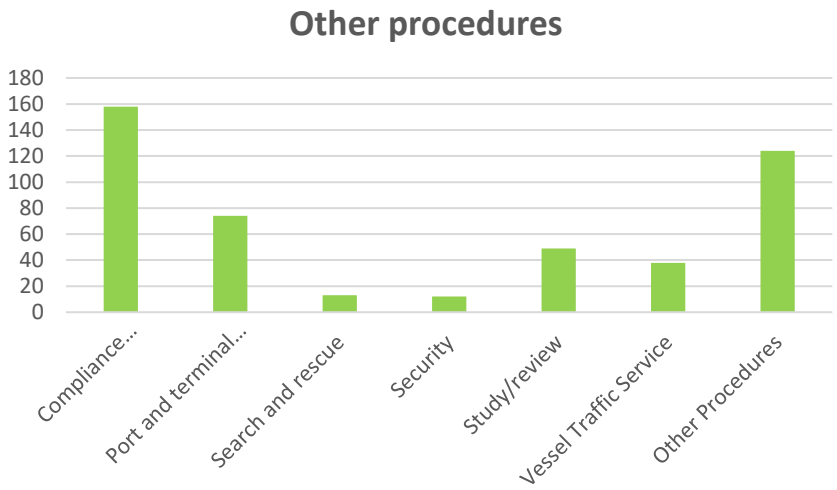


Shore and water navigation aids	24
Study/review	20
Vessel Traffic Service (VTS)	33
Other equipment	28
Total SWE SR/AT	105

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

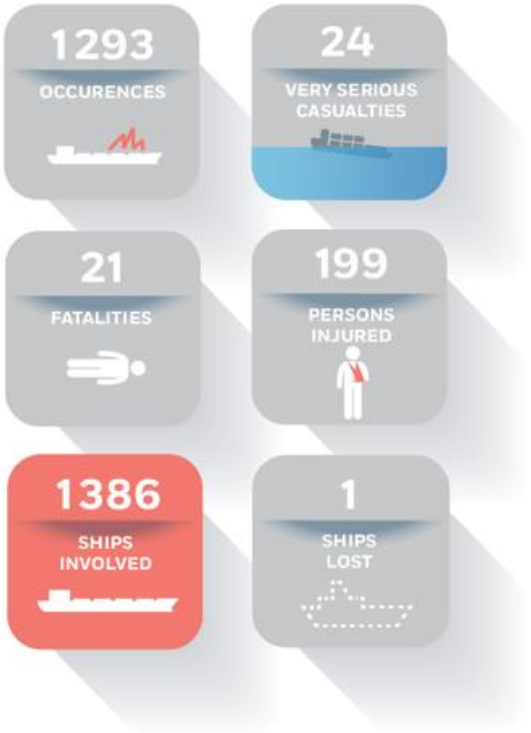
Compliance (regulations/legislation)	158
Port and terminal facilities	74
Search and rescue	13
Security	12
Study/review	49
Vessel Traffic Service	38
Other/Unspecified	124
Total Other Procedures	468

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



Chapter 3: CARGO SHIPS

KEY FIGURES 2020



3.0 Executive summary about Cargo Ships

The year 2020 was a positive one in the category of Cargo Ships.

In particular, the occurrence indicator went down to 158, continuing its decrease since 2015 when it was 294.

A total number of 10981 cargo ships were involved in a marine casualty or incident over the period 2014-2020, which represented 44% of all ships involved in an occurrence. Since 2015, the number of cargo ships involved decreased from 1801 to 1386 in 2020, the average number of the period being 1568.

When comparing occurrence indicators within the cargo ship types, bulk carriers, chemical tankers and liquid gas tankers showed very low values (around or less than 100). On the opposite, the category "other solid cargo" had the worst indicator (615) among not only the cargo ships, but among all ship types. In between, container ships, general cargos, roro cargo and oil tanker were all close to the cargo ship average indicator (214).

Among the cargo ships, general cargo ships represented the main type with 28% of all cargo ships involved.

The rate of Very Serious casualties is 2.6%, and 22.4% when the severity is Serious. In both cases, the severity of occurrences affecting cargo ships is slightly 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 (51.4%) were related to issues of a navigational nature, such as contacts, grounding/stranding and collision. As concerns occurrences to person(s), 33.1% were attributed to slipping, stumbling and falling of persons.

In 2020, for the second consecutive year, only 1 cargo ship was lost. Over the period 2014-2020, out of a total of 21 cargo ships lost, 12 were general cargo.

During the 2014-2020 period, 188 accidents involving cargo ships resulted in a total of 240 lives lost. The decrease observed since 2015 was reversed in 2018, but it decreased since then. Crew have been the most impacted category of victims over this period with 214 fatalities.

In 2020, there were 199 injured persons reported, which is the lowest annual number recorded from 2014 to 2020. With the exception of a limited increase in 2019 (+13), this number has continuously decreased since 2015, when the highest number of injured person (319) was recorded. Again, crew represent the main category of persons injured at sea (1765 out of a total of 1909 during the 2014-2020 period).

When looking at the voyage segments, the departure phase appeared to be the safest phase (10% of the occurrences) while "en route" was the most unsafe (40%).

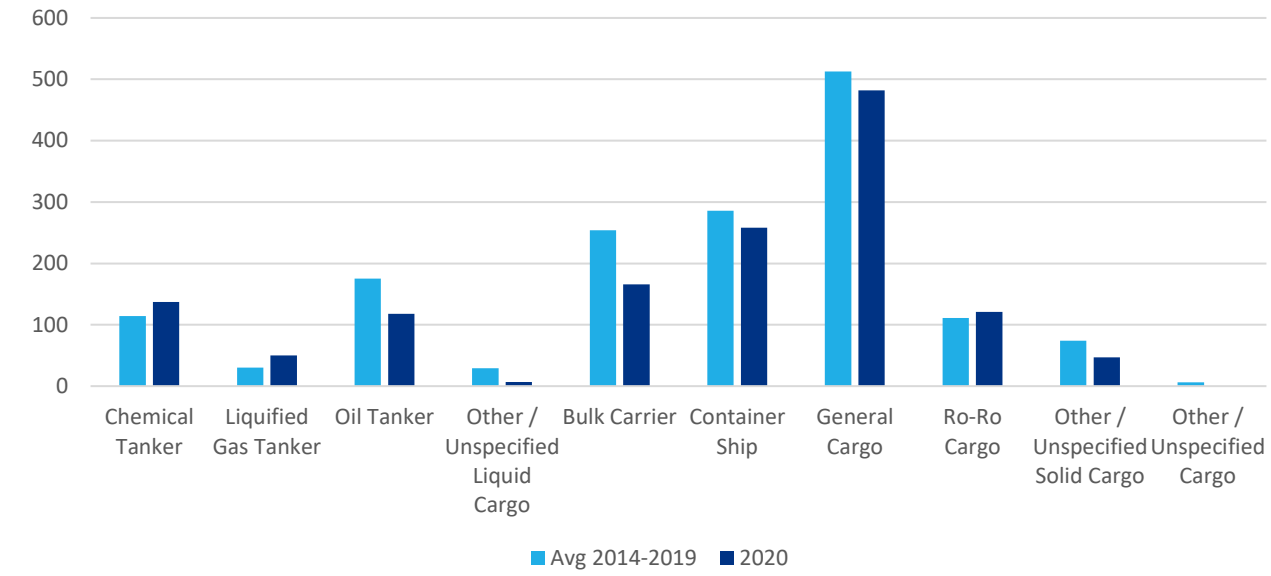
The number of the casualties that occurred in internal waters and coastal waters remained unchanged (77% of all occurrences affecting cargo ships).

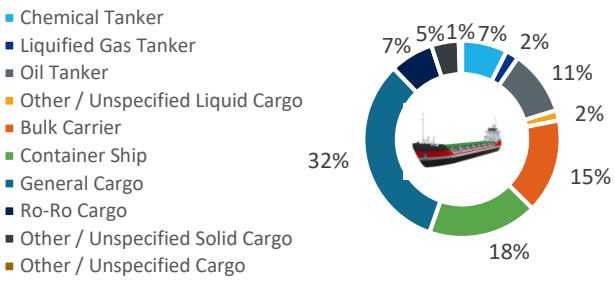
When analysing underlying factors leading to casualties, it was determined during safety investigations that 89.1% of safety investigations were related to "Human Action". It was also reported that 70.9% of the contributing factors were related to shipboard operations. Such figures are similar to all ship types figures.

In conclusion, after a positive year in 2019, safety results related to cargo ships in 2020 continued showing improvements. However, consequences of COVID pandemic can't be excluded as one of the factors that contributed to the reduction of casualties, in line with its overall impact of shipping.

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.

The decrease started in 2015 continued, as a reduction of 10.9% happened in 2020. However, it didn't apply to all ships, as an increase was noted for chemical tankers and liquified gas tankers.

	2014	2015	2016	2017	2018	2019	2020	Total
Chemical tanker	121	115	95	109	118	127	137	822
Liquified gas tanker	25	32	30	30	31	32	50	230
Oil Tanker	152	249	203	152	159	139	118	1172
Other Liquid cargo	41	56	30	21	16	15	7	186
Bulk Carrier	197	343	302	250	230	206	166	1694
Container Ship	250	304	282	309	295	277	258	1975
General cargo	519	491	454	505	544	566	482	3561
Ro-Ro Cargo	108	113	95	112	107	132	121	788
Other Solid cargo	79	86	79	83	63	58	47	495
Other / Unspecified cargo	23	12	11	4	5	3	0	58
Total	1515	1801	1581	1575	1568	1555	1386	10981

Figure 3.2: Occurrence indicators per cargo ship types

In order to draw objective comparisons between the different types of cargo ship and its evolutions, the following ratios between the number of occurrences involving a cargo ship and the fleet of the cargo ships carrying the flag of an EU MS over 2014 – 2020 were calculated.

Occurrences	Bulk carrier	Container	General cargo	Other solid cargo	RoRo cargo	Chemical tanker	Liquid gas tanker	Oil tanker	Other liquid cargo	Total
2014	150	158	340	55	88	94	14	118	37	1054
2015	266	192	319	67	85	96	23	214	43	1305
2016	228	187	287	54	76	75	20	177	24	1128
2017	162	224	347	53	78	81	21	125	17	1108
2018	149	207	367	39	81	95	18	134	14	1104
2019	130	185	402	43	108	103	24	111	10	1116
2020	103	175	339	31	95	107	40	97	4	991

The number of ships involved, with the exception of 2015, is pretty stable with an annual average of 1110.

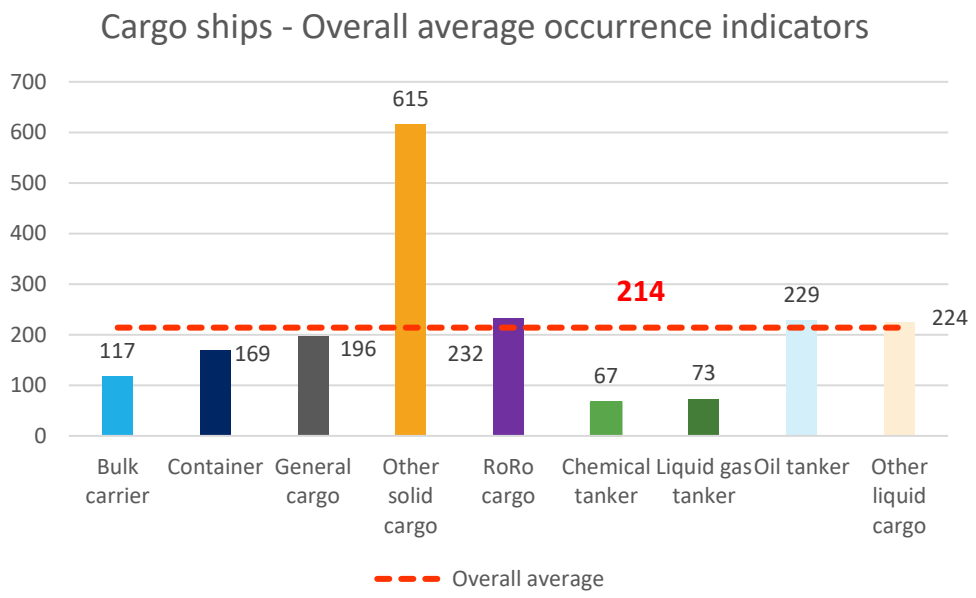
Fleet	Bulk carrier	Container	General cargo	Other solid cargo	RoRo cargo	Chemical tanker	Liquid gas tanker	Oil tanker	Other liquid cargo	Total
2014	1473	1046	1823	80	376	1425	253	560	99	7135
2015	1503	1090	1770	72	378	1428	273	568	101	7183
2016	1492	1109	1747	75	372	1446	299	583	107	7230
2017	1484	1168	1743	86	371	1404	325	631	93	7305
2018	1417	1126	1661	86	365	1313	328	657	75	7028
2019	1352	1159	1742	81	384	1388	343	678	80	7207
2020	1328	1127	1751	85	386	1382	353	660	79	7151

The number of EU-flagged cargo ships was pretty stable between 2014-2020, with a yearly average of 7,177 ships. The most represented sub-type is "general cargo", around 24% of the cargo fleet.

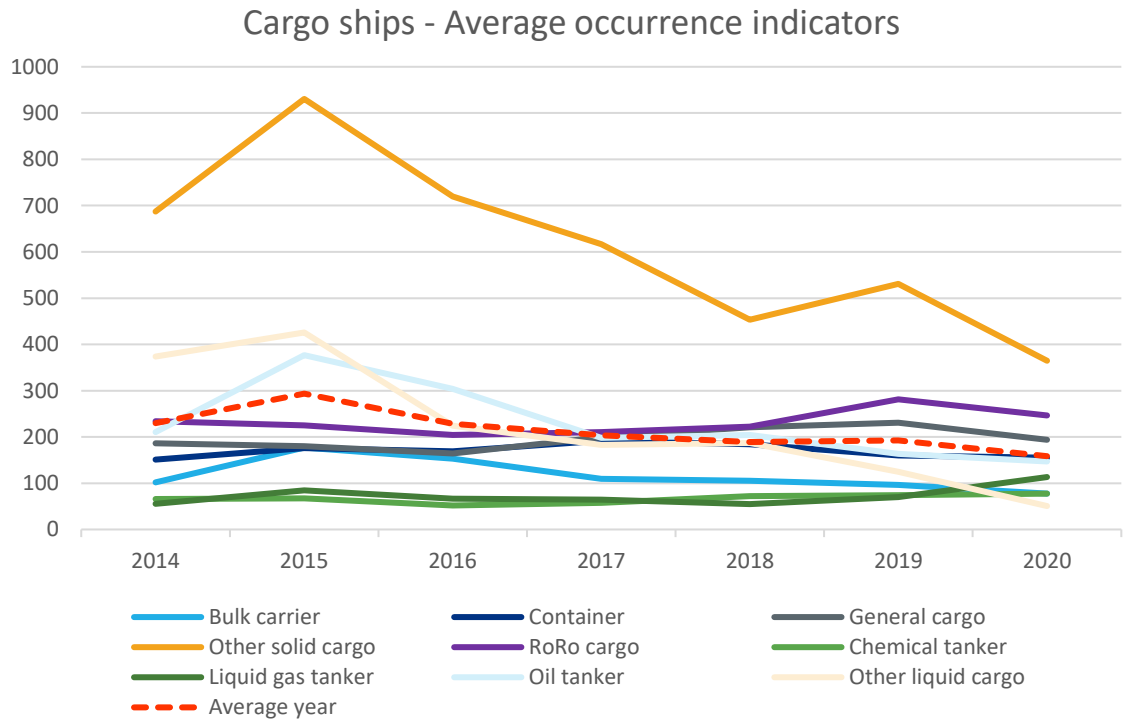
Safety indicator	Bulk carrier	Container	General cargo	Other solid cargo	RoRo cargo	Chemical tanker	Liquid gas tanker	Oil tanker	Other liquid cargo	Average
2014	102	151	187	688	234	66	55	211	374	**230**
2015	177	176	180	931	225	67	84	377	426	**294**
2016	153	169	164	720	204	52	67	304	224	**229**
2017	109	192	199	616	210	58	65	198	183	**203**
2018	105	184	221	453	222	72	55	204	187	**189**
2019	96	160	231	531	281	74	70	164	125	**192**
2020	78	155	194	365	246	77	113	147	51	**158**
Average	**117**	**169**	**196**	**615**	**232**	**67**	**73**	**229**	**224**	**214**

Over the period, one cargo ship flying an EU MS Flag out of a total 6.5 was involved in a casualty.

"Other solid cargo" has by far the highest safety indicator, meaning having the higher risk of casualty. On the other side, "chemical tankers" and "liquid gas tanker" appeared as the safest types of cargo ships.



Only 4 cargo ship types have an indicator above the average, the most significant being the "other solid cargo", where ships such as barges, heavy load carriers, pontoons, refrigerated cargo can be found. On the opposite, chemical tankers are cargo ships with the lowest occurrence indicator.

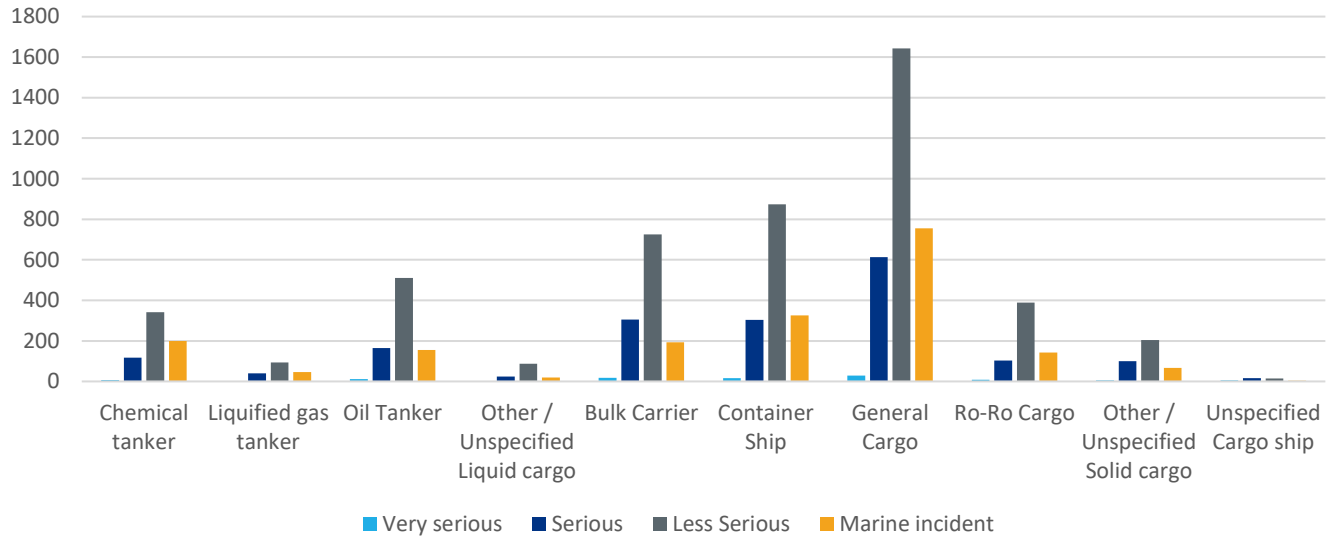


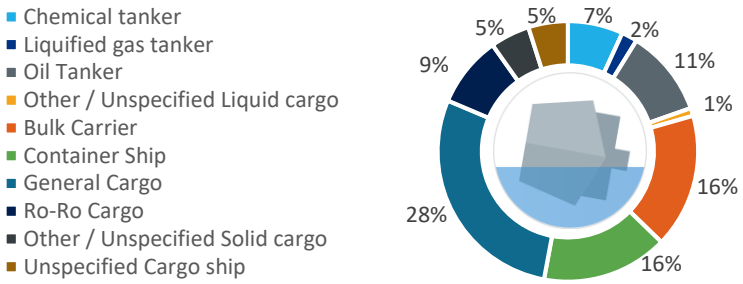
"Bulk carrier", "Other solid cargo", "Oil tankers" and "Other liquid cargo" show the most significant decrease.
An uptrend from 2016 is recognizable for chemical tankers and, from 2018 onwards, for LG tankers. Sideways trends have been found for container ships, general cargo and RoRo cargo, whose indicators remain substantially stable during the period.

3.2 Nature of marine casualties and incidents

3.2.1 Occurrence with ship(s)

Figure 3.3: Distribution of severity per cargo ship type for 2014-2020



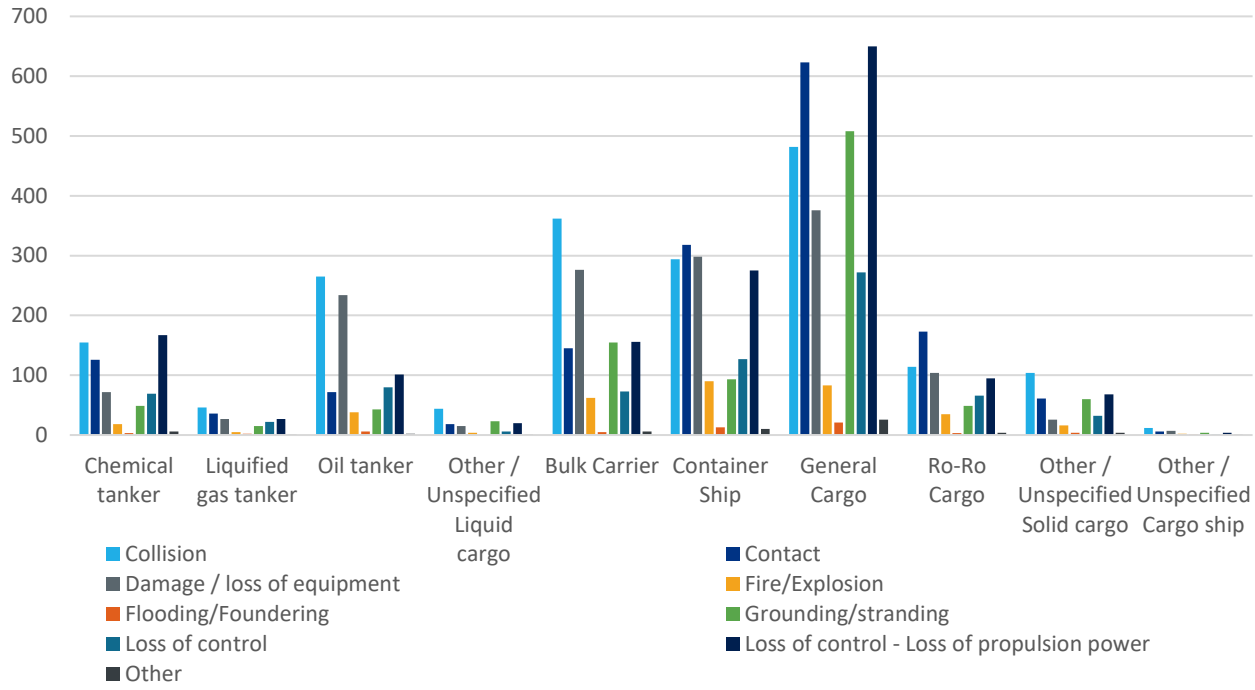


"General cargo", "bulk carriers" and "containers ships" are all together accountable for 60.8% of the very serious casualties related to the ship (and for 68.3% of the serious ones).

35.1% of the casualties and incidents were related to general cargo ships.

	Very serious	Serious	Less Serious	Marine incident	Total
Chemical tanker	7	118	341	199	665
Liquified gas tanker	2	40	93	46	181
Oil tanker	11	164	511	155	841
Other / Unspecified liquid cargo	1	24	87	19	131
Bulk carrier	17	305	725	193	1240
Container ship	16	303	874	325	1518
General cargo	29	613	1643	756	3041
Ro-Ro cargo	9	103	389	142	643
Other / Unspecified solid cargo	5	100	204	66	375
Unspecified cargo ship	5	16	14	3	36
Total	102	1786	4881	1904	8673

Figure 3.4: Distribution of casualty events per cargo ship type for 2014-2020

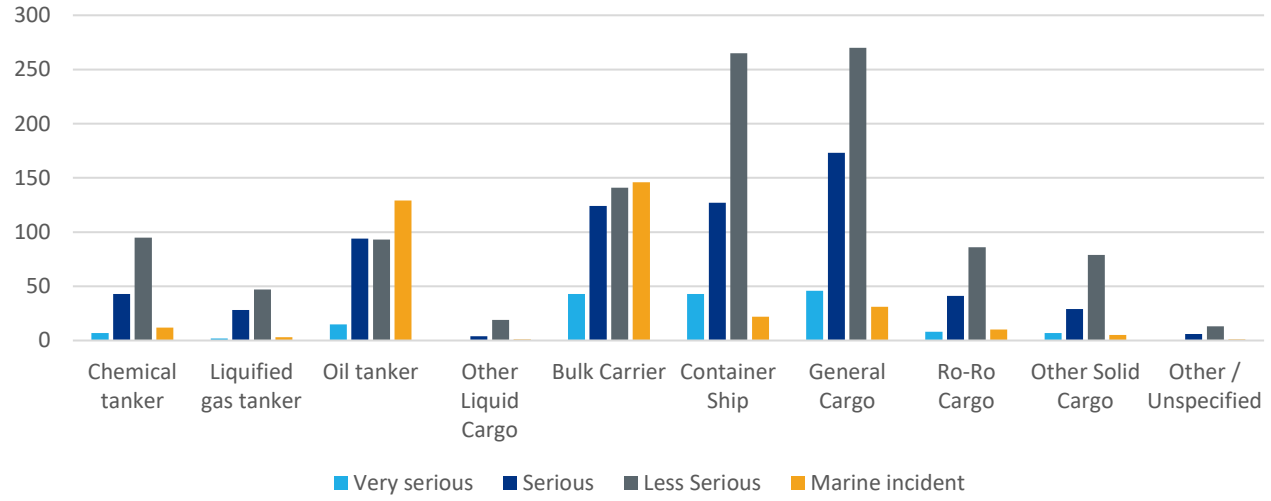


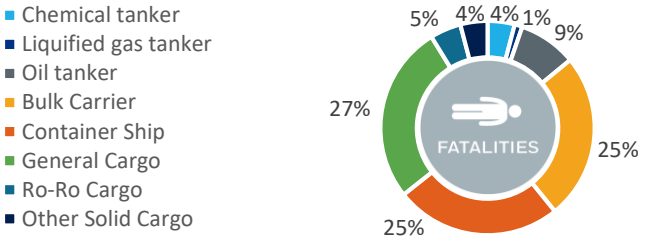
Collisions represent 21.7% of all events, followed by contacts (18.2%) and loss of propulsion power (18%). Grouping of navigation events (collisions, contacts and grounding/stranding) represents more than 51.4% of casualty events to cargo ships.

	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	155	126	72	18	3	49	69	167	6	665
Liquified gas tanker	46	36	27	5	2	15	22	27	1	181
Oil tanker	265	72	234	38	6	43	80	101	2	841
Other/Unspecified liquid cargo	44	18	15	4	0	23	6	20	1	131
Bulk carrier	362	145	276	62	5	155	73	156	6	1240
Container ship	294	318	298	90	13	93	127	275	10	1518
General cargo	482	623	376	83	21	508	272	650	26	3041
Ro-Ro cargo	114	173	104	35	3	49	66	95	4	643
Other/Unspecified solid cargo	104	61	26	16	4	60	32	68	4	375
Other / Unspecified cargo ship	12	6	7	2	1	4	1	4	1	38
Total	1878	1578	1435	353	58	999	748	1563	61	8673

3.2.2 Occurrence with person(s)

Figure 3.5: Distribution of severity of occurrence with person(s)s per cargo ship type for 2014-2020

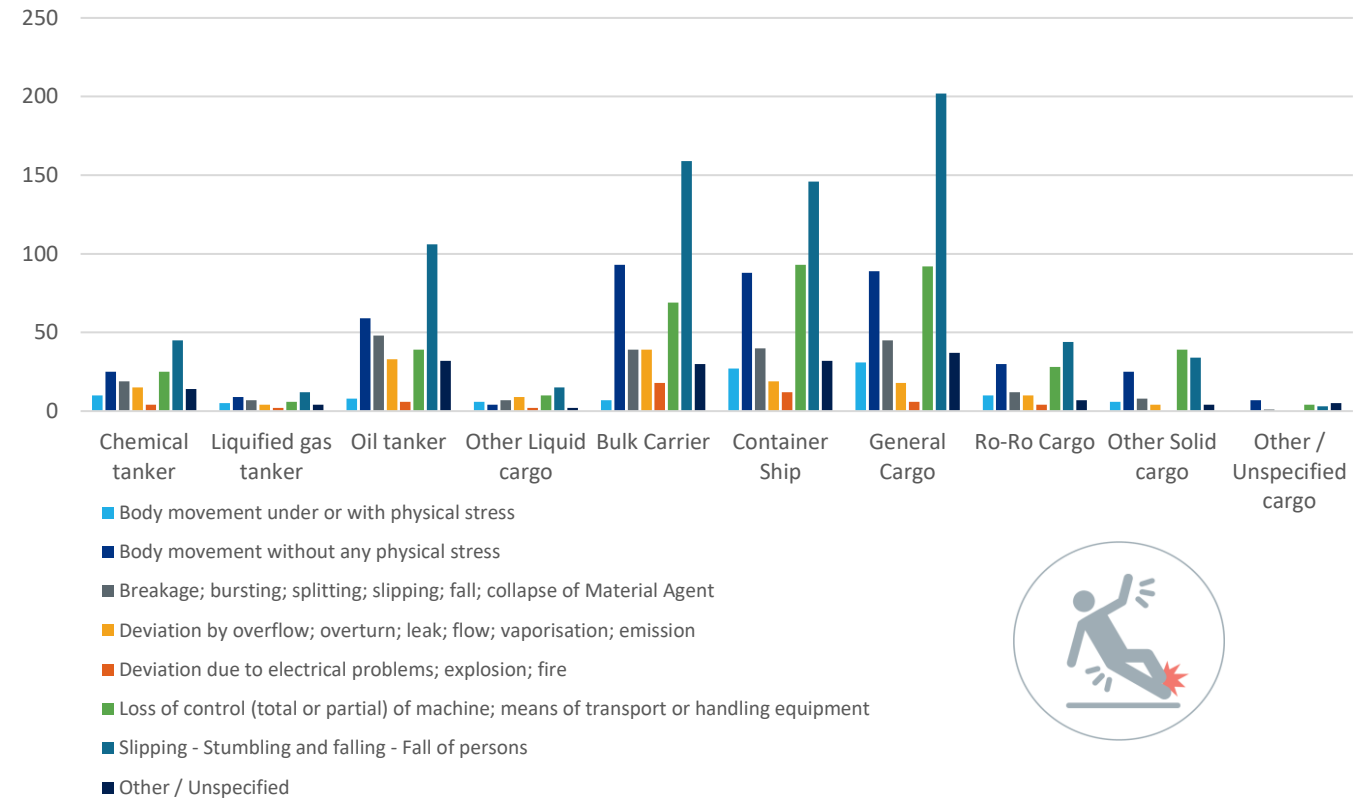




Over the period, 77.2% of very serious accidents with person(s), meaning a fatality, occurred on board a "general cargo", a "container ship" or a "bulk carrier".

	Very serious	Serious	Less Serious	Marine incident	Total
Chemical tanker	7	43	95	12	157
Liquified gas tanker	2	28	47	3	80
Oil tanker	15	94	93	129	331
Other Liquid Cargo	0	4	19	1	24
Bulk Carrier	43	124	141	146	454
Container Ship	43	127	265	22	457
General cargo	46	173	270	31	520
Ro-Ro Cargo	8	41	86	10	145
Other Solid Cargo	7	29	79	5	120
Other / Unspecified cargo	0	6	13	1	20
Total	171	669	1108	360	2308

Figure 3.6: Distribution of deviations per cargo ship type for 2014-2020



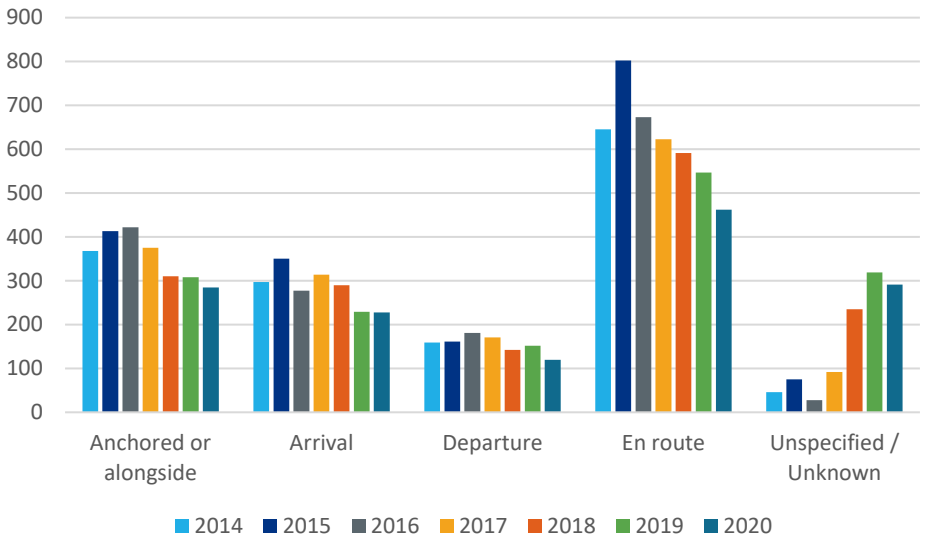
Slipping and falls of persons was the most frequent deviation (33.1%), followed by loss of control of machine or equipment (17.6%).

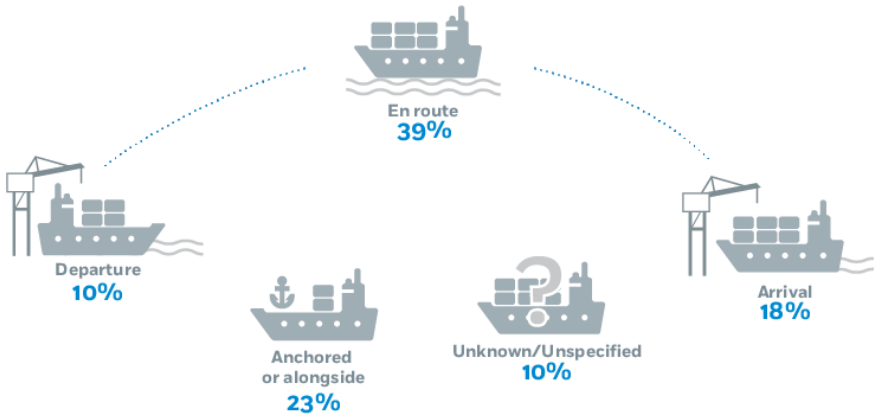
	Body movement under or with physical stress	Body movement without any physical stress	Breakage; bursting; splitting; slipping; fall; collapse of Material Agent	Deviation by overflow; overturn; leak; flow; vaporisation; emission	Deviation due to electrical problems; explosion; fire	Loss of control of machine; means of transport or handling equipment	Slipping - Stumbling and falling - Fall of persons	Other / Unspe.	Total
Chemical tanker	10	25	19	15	4	25	45	14	157
Liquified gas tanker	5	9	7	4	2	6	12	4	49
Oil Tanker	8	59	48	33	6	39	106	32	331
Other Liquid cargo	6	4	7	9	2	10	15	2	55
Bulk Carrier	7	93	39	39	18	69	159	30	454
Container Ship	27	88	40	19	12	93	146	32	457
General cargo	31	89	45	18	6	92	202	37	520
Ro-Ro Cargo	10	30	12	10	4	28	44	7	145
Other Solid Cargo	6	25	8	4	0	39	34	4	120
Other / Unspecified	0	7	1	0	0	4	3	5	20
Total	110	429	226	151	54	405	766	167	2308

3.3 Location of the marine casualties and incidents

3.3.1 Voyage segments

Figure 3.7: Distribution by voyage segment

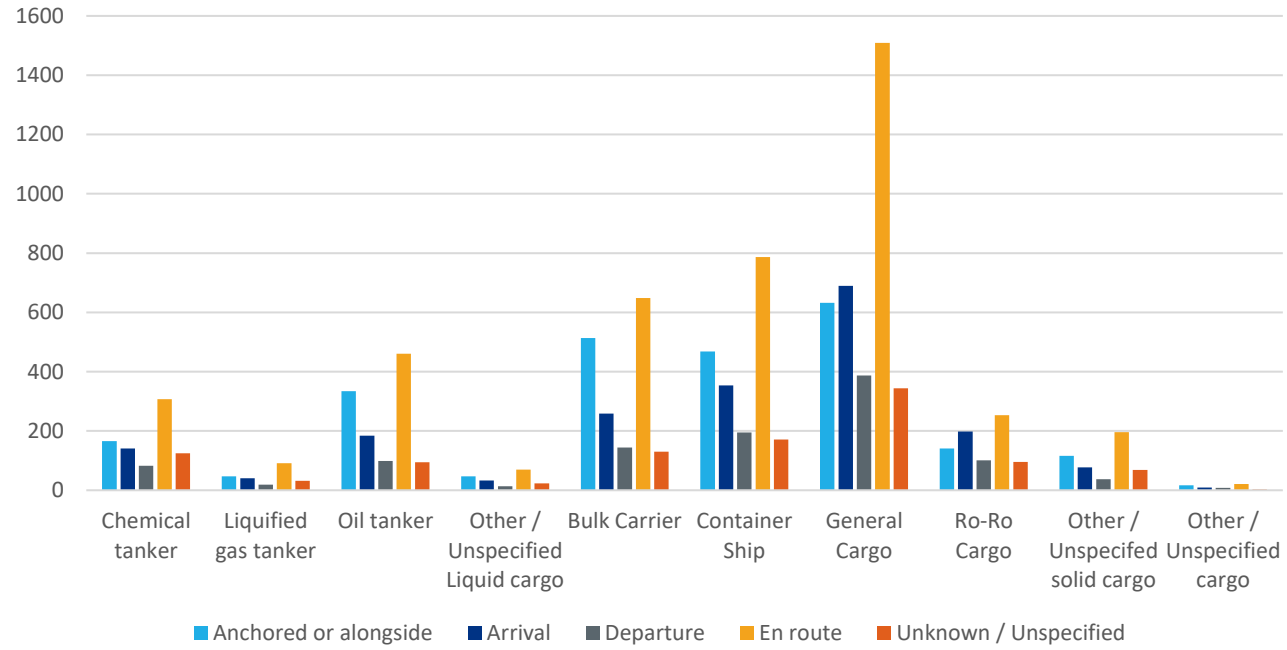




	2014	2015	2016	2017	2018	2019	2020	Total
Anchored or alongside	368	413	422	375	310	308	285	2481
Arrival	297	350	277	314	290	229	228	1985
Departure	159	161	181	171	142	152	120	1086
En route	645	802	673	623	591	547	462	4343
Unspecified / Unknown	46	75	28	92	235	319	291	1086
Total	1515	1801	1581	1575	1568	1555	1386	10981

The departure phase is the safest voyage segment over the period. The “en route” phase represents 39% of the total occurrences. All phases benefited from the reduction of occurrences since 2015.

Figure 3.8: Distribution by voyage segment per cargo ship type for 2014-2020

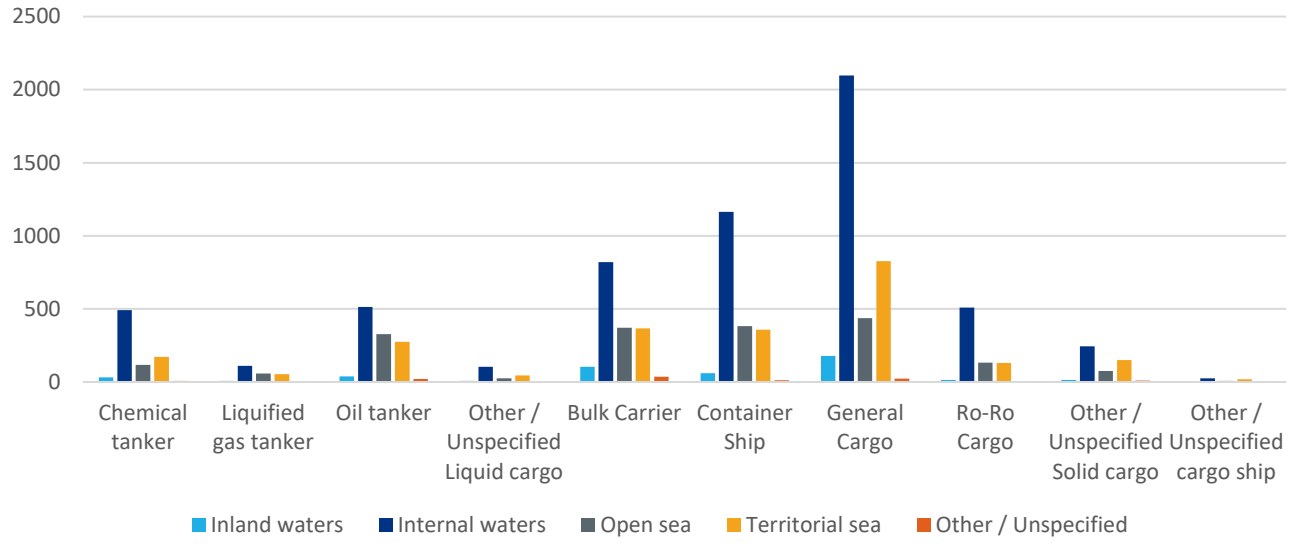


	Anchored or alongside	Arrival	Departure	En route	Unknown / Unspecified	Total
Chemical tanker	166	141	83	307	125	822
Liquified gas tanker	47	41	19	91	32	230
Oil tanker	334	184	9	461	94	1172
Other / unspecified liquid cargo	47	33	13	70	23	186
Bulk Carrier	513	259	144	648	130	1694
Container Ship	468	354	195	787	171	1975
General cargo	632	689	387	1509	344	3561
Ro-Ro Cargo	141	198	101	253	95	788
Other / unspecified solid cargo	116	77	37	196	69	495
Other / Unspecified cargo ship	17	9	8	21	3	58
Total	2481	1985	1086	4343	1086	10981

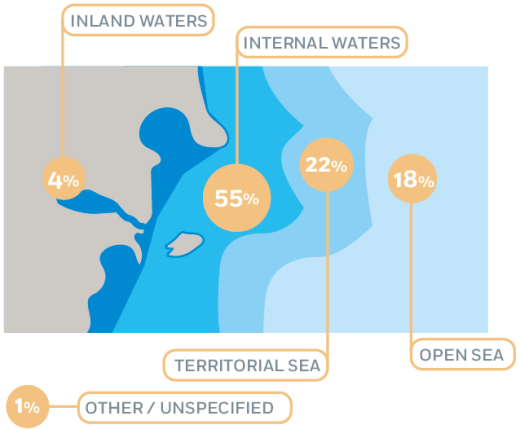
It is noted that for almost all cargo ships the distribution of occurrences is similar among the various voyage segments : from “departure”, the safest segment, to “en route” the less safe one.

3.3.2 Location

Figure 3.9: Distribution by location of marine casualties and incidents per cargo ship type for 2014-2020



	Inland waters	Internal waters	Open sea	Territorial sea	Other / Unspecified	Total
Chemical tanker	32	492	118	172	8	822
Liquified gas tanker	7	110	58	53	2	230
Oil tanker	37	513	328	274	20	1172
Other / Unspecified Liquid cargo	7	103	26	45	5	186
Bulk Carrier	104	819	370	366	35	1694
Container Ship	60	1163	383	358	11	1975
General cargo	179	2097	436	827	22	3561
Ro-Ro Cargo	13	508	132	130	5	788
Other Solid Cargo	15	245	76	149	10	495
Other / Unspecified cargo	3	26	8	18	3	58
Total	457	6076	1935	2392	121	10981



Whatever the type of cargo ship, the highest number of casualties and incidents was found within internal waters (port areas).

3.4 Accidental events and contributing Factors

Investigators look for the factors contributing to marine casualties and incidents in the analysis phase. Such causes are made up of accident events (underlying factors) and contributing factors.

Each marine casualty can have one or more casualty events. More than one accident events can be associated to a casualty event. The five accident events types are: human action, system or equipment failure, other agent or vessel, hazardous material and unknown.

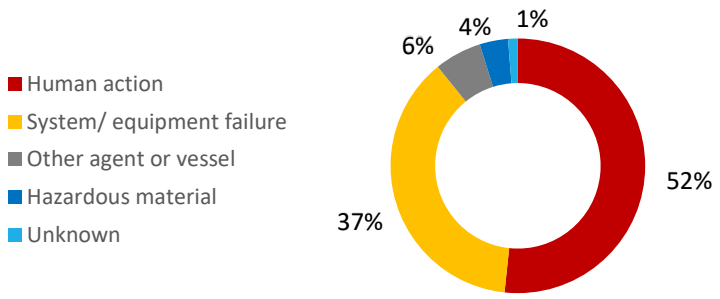
Each casualty event can have one or several contributing factors. Contributing factors have the following three main categories: external environment, shore management and shipboard operation.

3.4.1 Analysis of marine casualties in EMCIP

Each investigated marine casualty with analysis data included in EMCIP can have one or more accident events so, it is possible to obtain two distributions, as explained above:

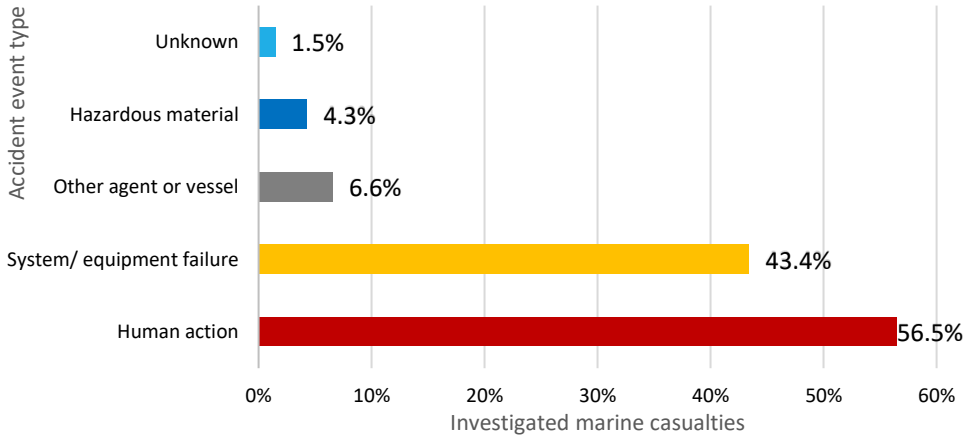
- Distribution of accident event types; and
- Distribution of accident event types related to the investigated marine accidents.

Figure 3.10: Distribution of accident events types for the period 2014-2020



Cargo ships have the same trend for accident event distribution than marine casualties in general. The distribution of the accident events by type has the same trend than from period from 2014 to 2019, with 51.7% of human action accident events and 37.5% of system /equipment failure accident events as the main values of the distribution. In comparison with the period from 2014 to 2019, only system/equipment failure accident events have increased the percentage.

Figure 3.11: Distribution of accident event types related to the investigated marine accidents for the period 2014-2020

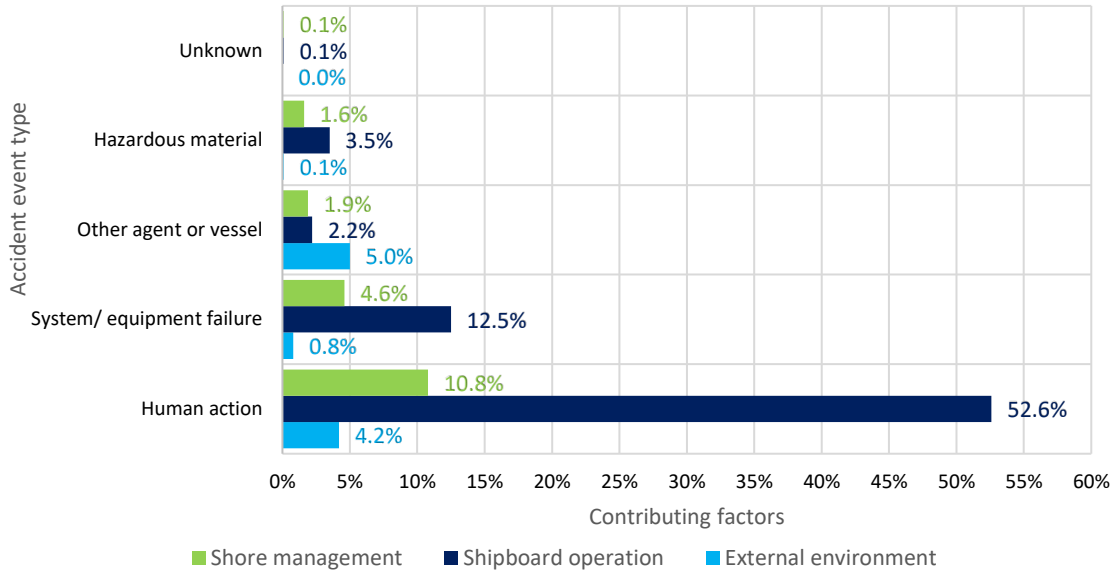


For cargo ships, Human action is related to the 56.5% of the investigated marine casualties.

Human action and system/equipment failure accident events are the most important accident event types.

3.4.2 Analysis of contributing factors

Figure 3.12: Distribution of contributing factors in the accident event types for the period 2014-2020



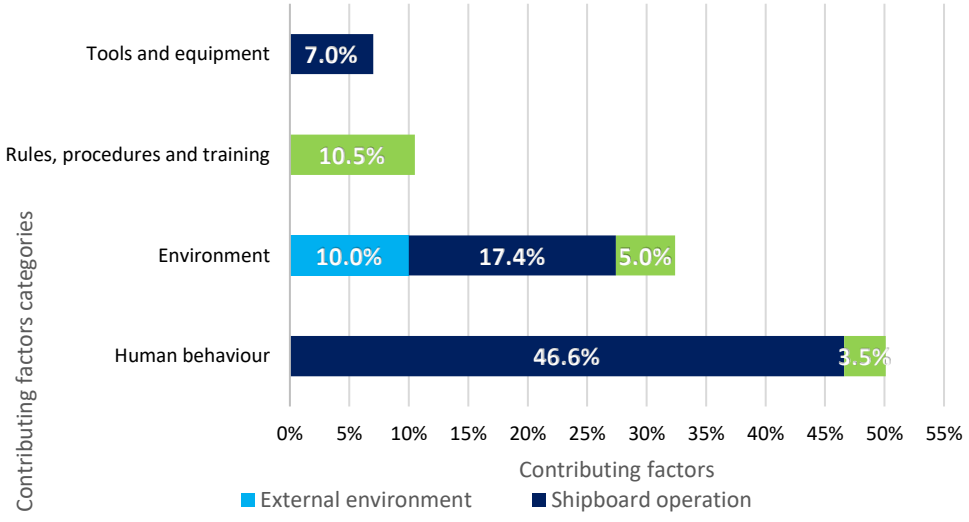
For cargo ships, the trend is the same than in the analysis of the whole fleet. 67.6% of the contributing factors are related to human action accident events and 17.9% to system /equipment failure accident events. Shipboard operation contributing factors are the most frequently associated to accident events with a total of 70.9%. Shore management contributing factors are the second most frequently associated to accident events with a total of 19.0%.

Each main category of contributing factors is divided in second level categories. These categories can be simplified by cataloguing them in only four categories, as explained above:

- Human behaviour.
- Environment (internal or external).
- Rules, procedures and training.
- Tools and equipment.

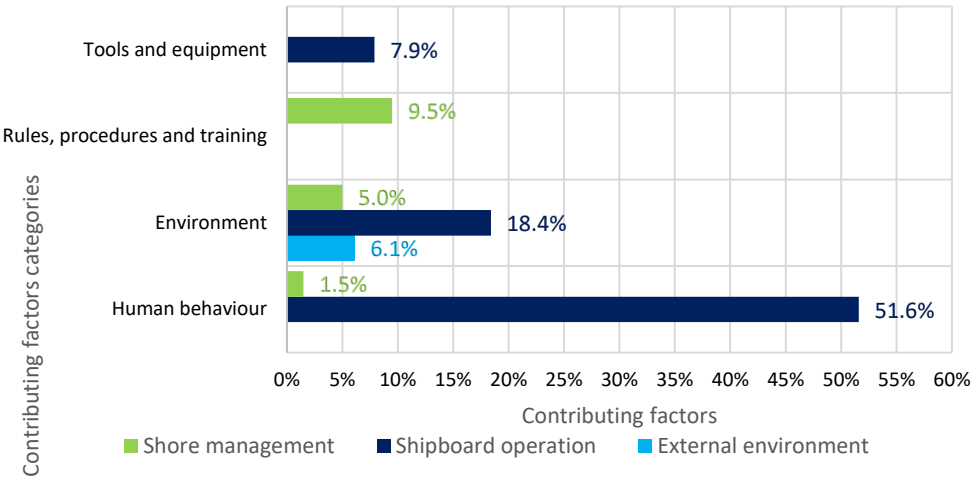
Second level contributing factors for each accident event type are grouped for main contributing factors categories in the following charts.

Figure 3.13: Contributing factors distributed by categories



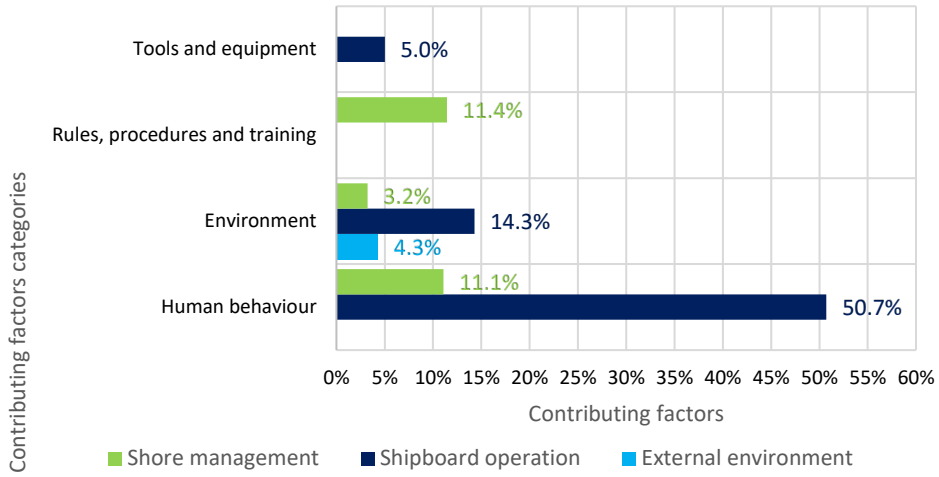
For cargo ships, the trend is the same than in the analysis of the whole fleet. 50.1% of the contributing factors in EMCIP are related to human behaviour, 32.4% to environment and 10.5% to rules, procedures and training.

Figure 3.14: Contributing factors involved in human action accident events, distributed by categories



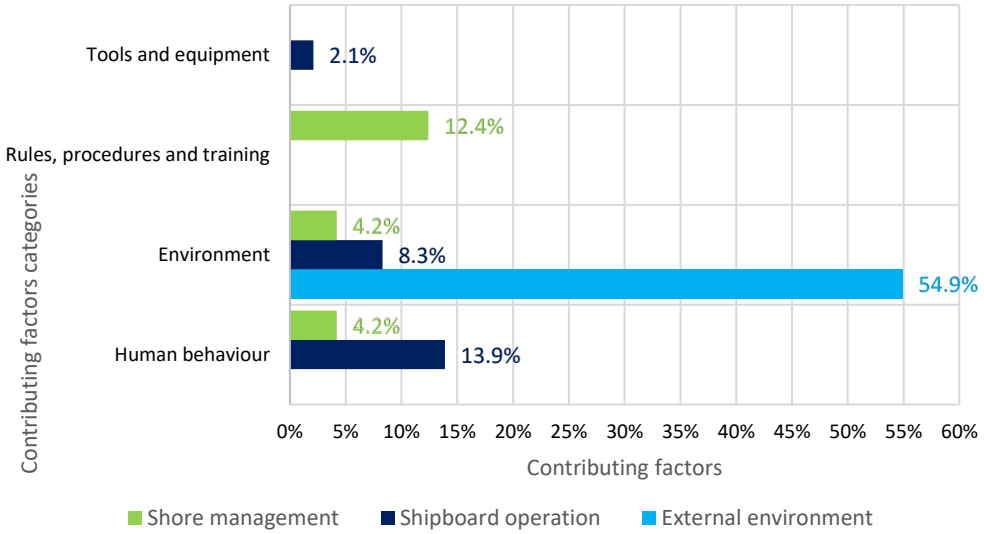
For cargo ships and human action accident events, the trend is the same than in the analysis of all the contributing factors for all the accident events. 53.1% of the contributing factors in EMCIP are related to human behaviour, 29.5% to environment, 9.5% to rules, procedures and training.

Figure 3.15: Contributing factors involved in system/equipment failure accident events, distributed by categories



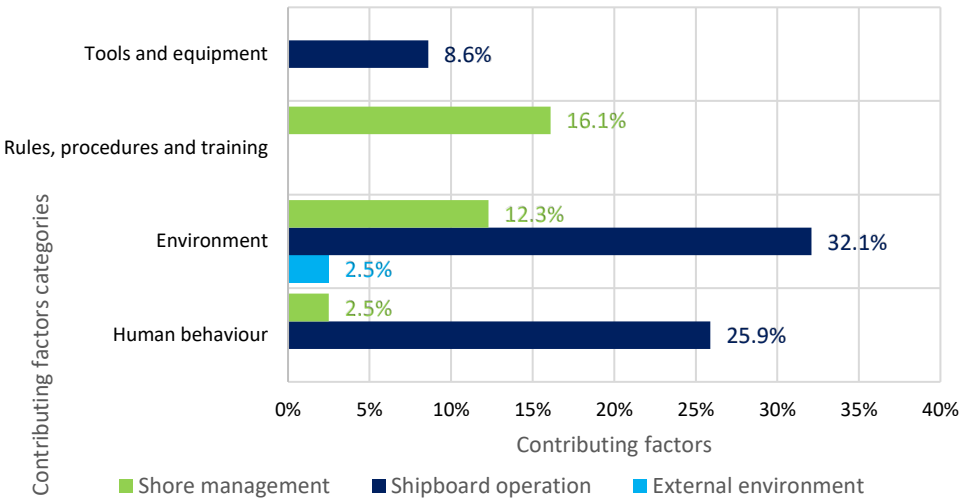
For cargo ships and system/equipment failure accident events, the trend is the same than in the analysis of all the contributing factors for all the accident events. 61.8% of the contributing factors in EMCIP are related to human behaviour, 21.8% to environment, 11.4% to rules, procedures and training.

Figure 3.16: Contributing factors involved in other agent or vessel accident events, distributed by categories



For cargo ships and other agent or vessel accident events, the trend has changed in environment and human behaviour, comparing with the analysis of all the contributing factors for all the accident events, but is the same trend than for other agent or vessel accident events in the whole fleet. 67.4% of the contributing factors in EMCIP are related to environment, 18.1% to human behaviour and 12.4% to rules, procedures and training.

Figure 3.17: Contributing factors involved in hazardous material accident events, distributed by categories



For cargo ships and hazardous material accident events, 46.9% of the contributing factors in EMCIP are related to environment, 28.4% to human behaviour and 16.1% to rules, procedures and training.

3.4.3 Analysis of human element

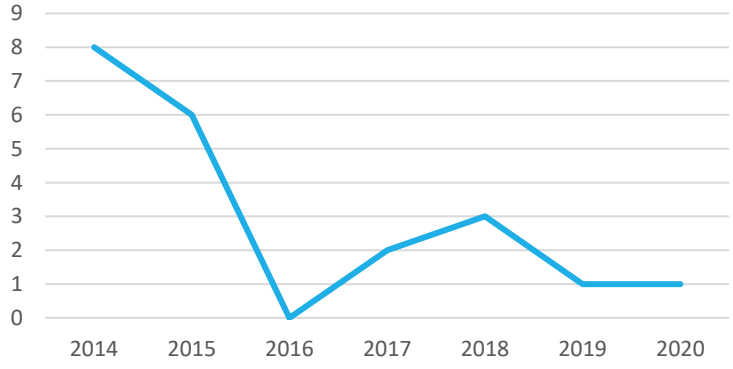
For cargo ships, 89.1% of the reported safety investigations have human action accident events or contributing factors catalogued as human behaviour, so they are affected by human element.

Figure 3.18 Influence of human element

3.5 Consequences

3.5.1 Consequences to ships

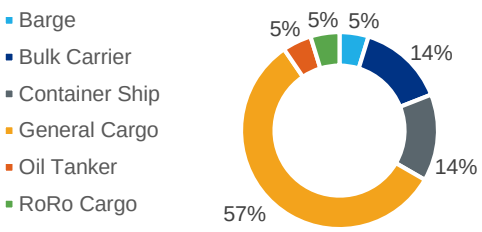
Figure 3.19: Cargo ships lost



	2014	2015	2016	2017	2018	2019	2020
Cargo ships lost	8	6	0	2	3	1	1

It was noted that only 1 cargo ship was lost in 2020, as in 2019.

Over the period, more than half of the cargo ships lost were general cargo ships, followed equally by bulk carriers and container ships.

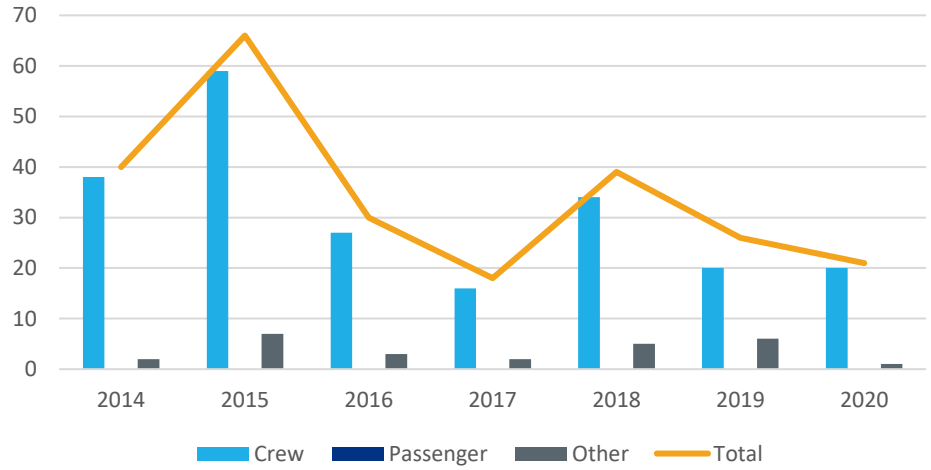


Barge	1
Bulk carrier	3
Container ship	3
General cargo	12
Oil tanker	1
RoRo cargo	1
Cargo ships lost	21

3.5.2 Consequences to persons

3.5.2.1 Fatalities

Figure 3.20: Number of fatalities

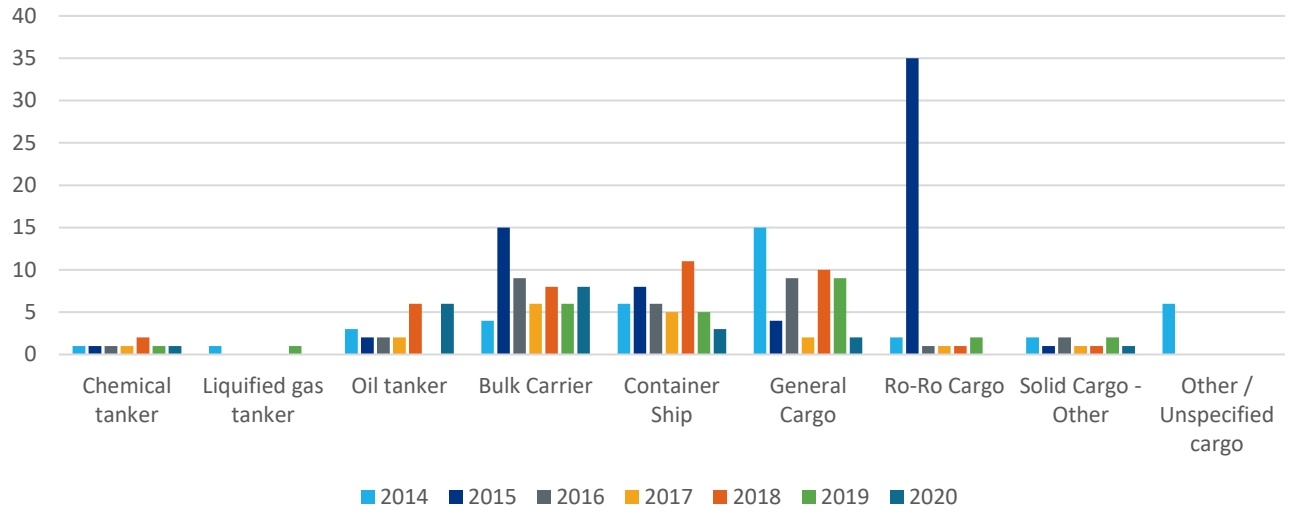


With an average of 37 fatalities per year over 204-2019, including two peaks in 2015 and 2018, the year 2020 saw a low number of lives lost on board cargo ships.

Crew fatalities represented 89.2% of cases, with the same total in 2020 in comparison with 2019.

	2014	2015	2016	2017	2018	2019	2020	Total
Crew	38	59	27	16	34	20	20	214
Passenger	0	0	0	0	0	0	0	0
Other	2	7	3	2	5	6	1	26
Fatalities	40	66	30	18	39	26	21	240

Figure 3.21: Distribution of fatalities per cargo ship type

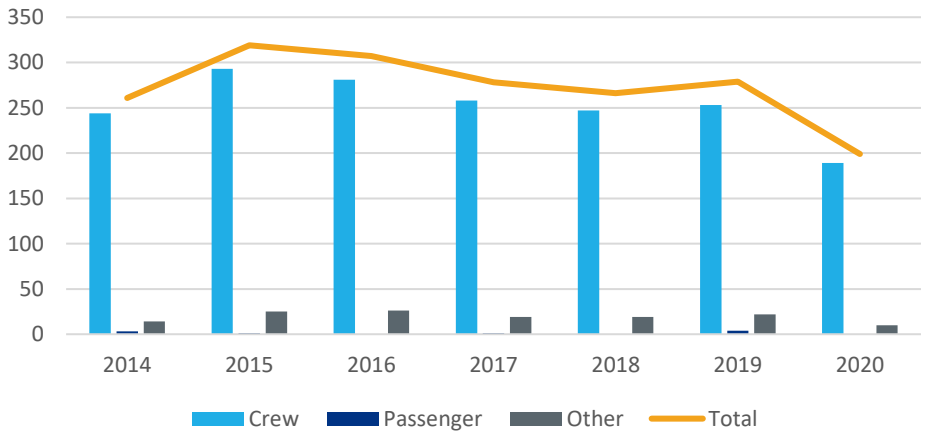


Highest numbers of fatalities related almost equally to occurrences that happened on board bulk carriers, and general cargo ships. Those ships represent a cumulated total of 44.6% of all fatalities. The number of fatalities was very high on board of Ro-Ro cargo ships in 2015, due to the sinking of El Faro on 02/10/2015 with 33 victims.

	2014	2015	2016	2017	2018	2019	2020	Total
Chemical tanker	1	1	1	1	2	1	1	8
Liquified gas tanker	1	0	0	0	0	1	1	2
Oil tanker	3	2	2	2	6	0	6	21
Bulk Carrier	4	15	9	6	8	6	8	56
Container Ship	6	8	6	5	11	5	3	44
General cargo	15	4	9	2	10	9	2	51
Ro-Ro Cargo	2	35	1	1	1	2	0	42
Solid cargo - Other	2	1	2	1	1	2	1	10
Other / Unspecified cargo	6	0	0	0	0	0	0	6
Total	40	66	30	18	39	26	21	240

3.5.2.2 Injuries

Figure 3.22: Number of injuries

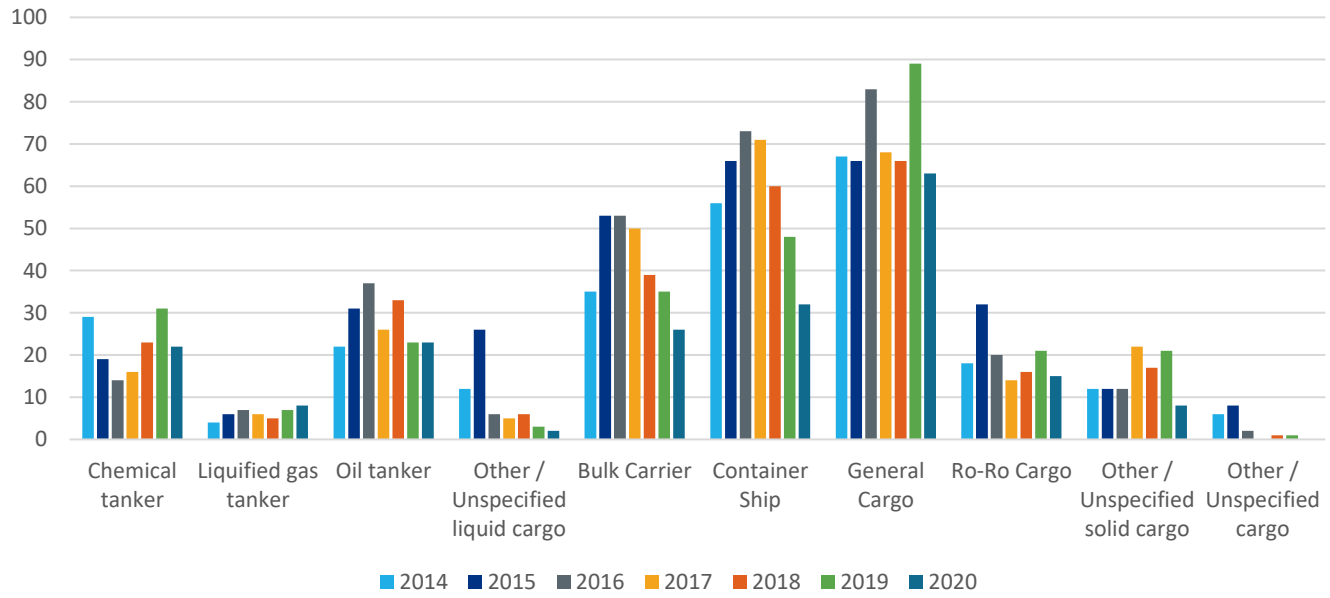


Since 2015, the total number of injuries has progressively reduced. A more significant decrease was noted in 2020 (29% in comparison with 2019).

Crew members represent 92.4% of the injured population.

	2014	2015	2016	2017	2018	2019	2020	Total
Crew	244	293	281	258	247	253	189	1765
Passenger	3	1	0	1	0	4	0	9
Other	14	25	26	19	19	22	10	135
Total	261	319	307	278	266	279	199	1909

Figure 3.23: Distribution of injuries by cargo ship type

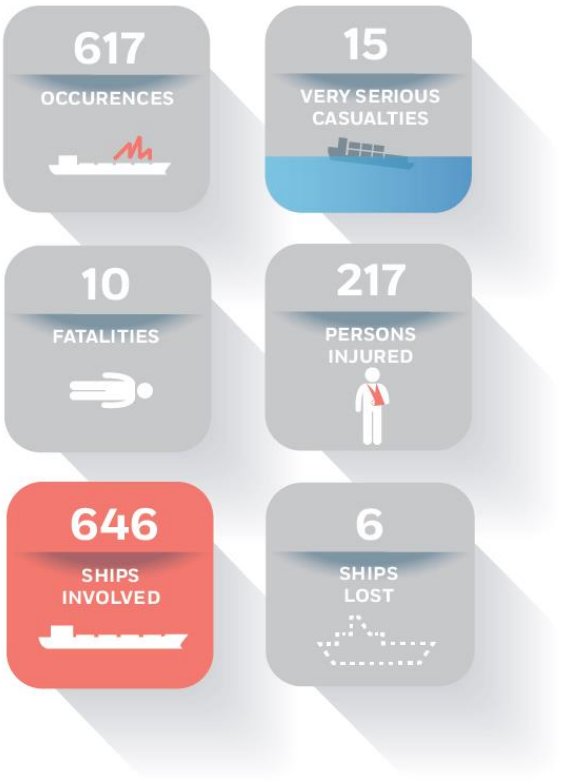


While 26.3% of injuries happened on board general cargo ships, container ships also accounted for 21.3%.

	2014	2015	2016	2017	2018	2019	2020	Total
Chemical tanker	29	19	14	16	23	31	22	154
Liquified gas tanker	4	6	7	6	5	7	8	43
Oil tanker	22	31	37	26	33	23	23	195
Other / Unspecified liquid cargo	12	26	6	5	6	3	2	60
Bulk carrier	35	53	53	50	39	35	26	291
Container ship	56	66	73	71	60	48	32	406
General cargo	67	66	83	68	66	89	63	502
Ro-Ro Cargo	18	32	20	14	16	21	15	136
Other solid cargo	12	12	12	22	17	21	8	104
Other / Unspecified cargo	6	8	2	0	1	1	0	18
Total	261	319	307	278	266	279	199	1909

Chapter 4: FISHING VESSELS

KEY FIGURES 2020



Listing and flooding of fishing vessel WLA 184 Helot near port of Hvide Sande, Denmark, on 05/07/2019

4.0 Executive summary about Fishing Vessels

Even if some figures showed improvements when it relates to fishing vessels, such as the number of fatalities or vessels lost, the deterioration started in 2019 continued in 2020.

The fishing vessel occurrence indicator continued increasing, and for the first time over 2014-2020, it went above 100. Even if it remained in average one of the best values in comparison with other ship types, it was the only indicator that continued increasing in 2020 (+38%).

A total of 4132 fishing vessels were involved in a marine casualty or incident over the period 2014-2020, which represented 17% of all occurrences.

The number of fishing vessels involved continued increasing in 2020. Since 2015, it increased from 466 to 646 in 2020. This was also noted while analysing the fishing vessel occurrence indicator, that continuously went up from 58 in 2014 to 137 in 2020. If the main categories of fishing vessels (trawlers, seiners, liners, gillnetters and dredgers) showed occurrences indicators around 50 in average, the other fishing vessels have their indicators increasing from 156 to 568 over the period.

Among the fishing vessels, trawlers represented, from 2014 to 2020, the main type having incidents with 52% of all fishing vessels involved.

The rate of Very Serious casualties is 5.3%, and 44.7% 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%.

Over the period 2014-2020, the number of events related to issues of a navigational nature, such as contacts, grounding/stranding and collision, represented 36.8%, at equal level with the loss of propulsion power. As concerns occurrences to person(s), slipping, stumbling and falling of persons on one hand (25.6%) and loss of control of machines on the other hand (23.4%) were the main deviations that occurred onboard fishing vessels.

In 2020, six fishing vessels were lost, which corresponds to the lowest number of fishing vessels lost over 2014-2020. Still, when comparing with all ships, fishing vessels remained the category where the number of lost vessels is much higher than for any category (106 fishing vessels lost out of a total of 180). Among the fishing vessel losses, almost half of them were trawlers.

During the 2014-2020 period, 101 accidents involving fishing vessels resulted in a total of 191 lives lost. The decrease observed since 2016, despite a reverse in 2019, continued and resulted in the lowest number of lives lost in 2020 (10). Crew have been the most impacted category of victims over this period with 186 fatalities.

In 2020 there were 217 injured persons reported. This number constant since 2017.

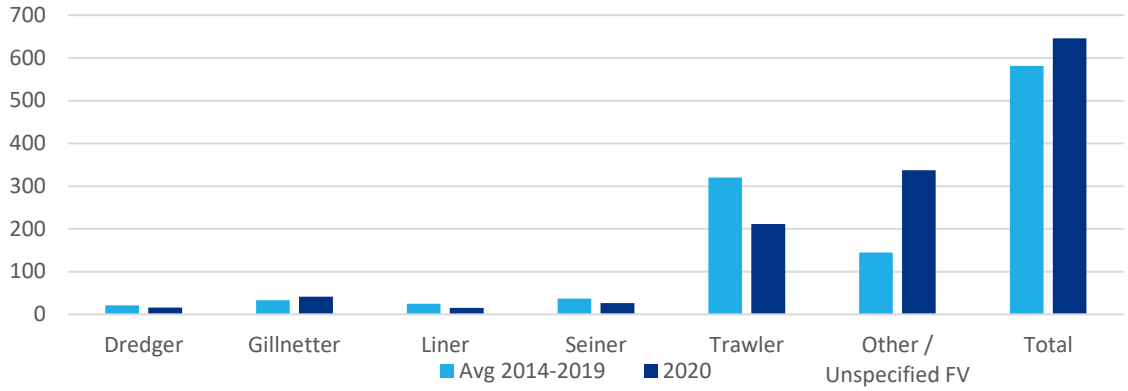
While the departure and arrival phases appeared to be the safest segments of a fishing vessel voyage, the en route segment, when fishing operations take place, is by far the most unsafe. It was noted that 77% of the casualties occurred in coastal waters and open sea, where fishing vessels operate.

When analysing underlying factors leading to casualties, safety investigations determined that 89% of safety investigations were related to "Human Action". Shipboard operations represented 67.2% of the reported contributing factors. Such figures are similar to all ship types figures.

In conclusion, while the number of fatalities of fishing vessels lost have decreased, other figures remained equivalent or deteriorated. In particular, the number of fishing vessels involved in a marine casualty has continuously increased since 2015, despite a limited decrease in 2018 while the continued increase of the fishing vessel occurrence indicator provided a negative view on fishing vessel safety.

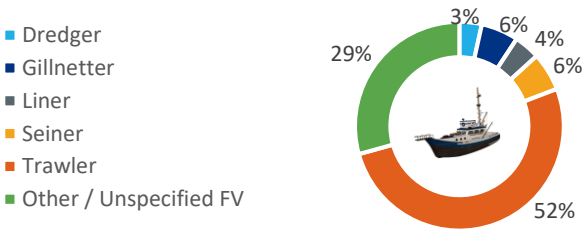
4.1 Detailed distribution

Figure 4.1: Distribution of fishing vessel types involved



	2014	2015	2016	2017	2018	2019	2020	Total
Dredger	30	32	27	18	10	10	16	143
Gillnetter	27	24	44	36	28	39	41	239
Liner	13	17	42	27	35	17	15	166
Seiner	29	27	32	60	50	21	26	245
Trawler	377	278	351	342	278	291	211	2128
Other / Unspecified FV	98	88	90	145	202	251	337	1211
Total	574	466	586	628	603	629	646	4132

The number of fishing vessels involved in a marine casualty has continuously increased since 2015, despite a limited decrease in 2018. For dredgers, gillnetters, liners and seiners, the situation remained stable. A reduction of trawlers since 2016 was even noted. However, the number of "others/unspecified" has multiplied by almost 4 over the period.



Among fishing vessels involved, the subcategory trawlers represented 52% of the marine casualties and incidents.

Fire on board Fishing Vessel Ana Alexandra in Povoa de Varzim, Portugal, on 26/07/2020.

Figure 4.2: Occurrence indicators per fishing vessel types

In order to draw objective comparisons between the different types of fishing vessels and its evolutions, the following ratios between the number of occurrences involving a fishing vessel and the corresponding fleet size over 2014 – 2020 were calculated. It covers only occurrences that involved fishing vessels with an EU Flag.

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

Occurrences	Trawler	Seiner	Liner	Gillnetter	Dredger	Other	Total
2014	331	27	9	24	19	25	435
2015	194	23	13	21	33	25	309
2016	265	31	33	38	28	28	423
2017	289	58	23	32	17	39	458
2018	253	51	24	26	9	58	421
2019	305	23	15	38	10	75	466
2020	255	31	15	42	20	113	476

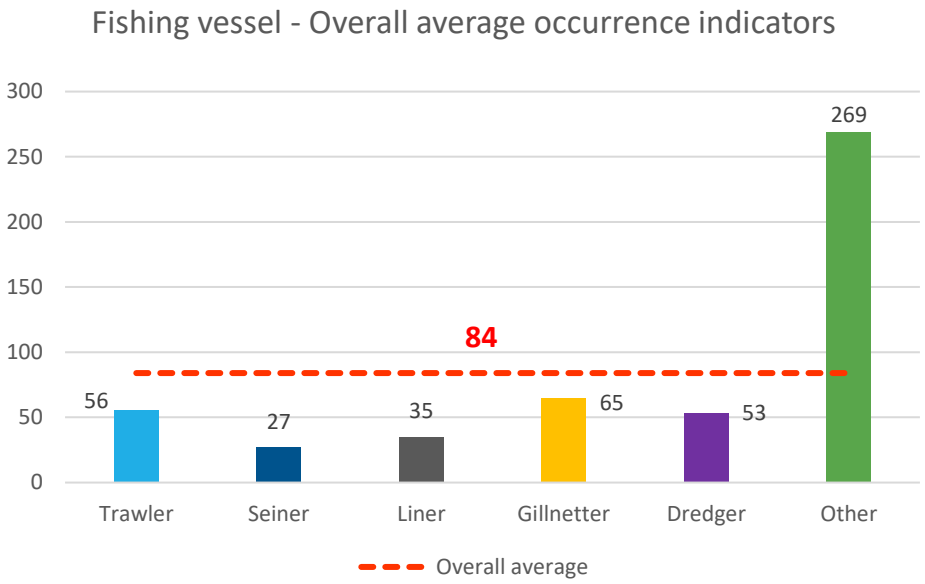
Over the period, the number of reported accidents to FV was soaring from 2015 onwards, with an increase since 2018.

Fleet	Trawler	Seiner	Liner	Gillnetter	Dredger	Other	Total
2014	5197	1330	600	538	376	160	8201
2015	5021	1301	570	510	372	162	7936
2016	4971	1288	541	482	369	196	7847
2017	4903	1269	536	474	363	197	7742
2018	4712	1254	537	462	354	201	7520
2019	4611	1247	541	472	364	201	7436
2020	4599	1241	540	470	362	199	7410

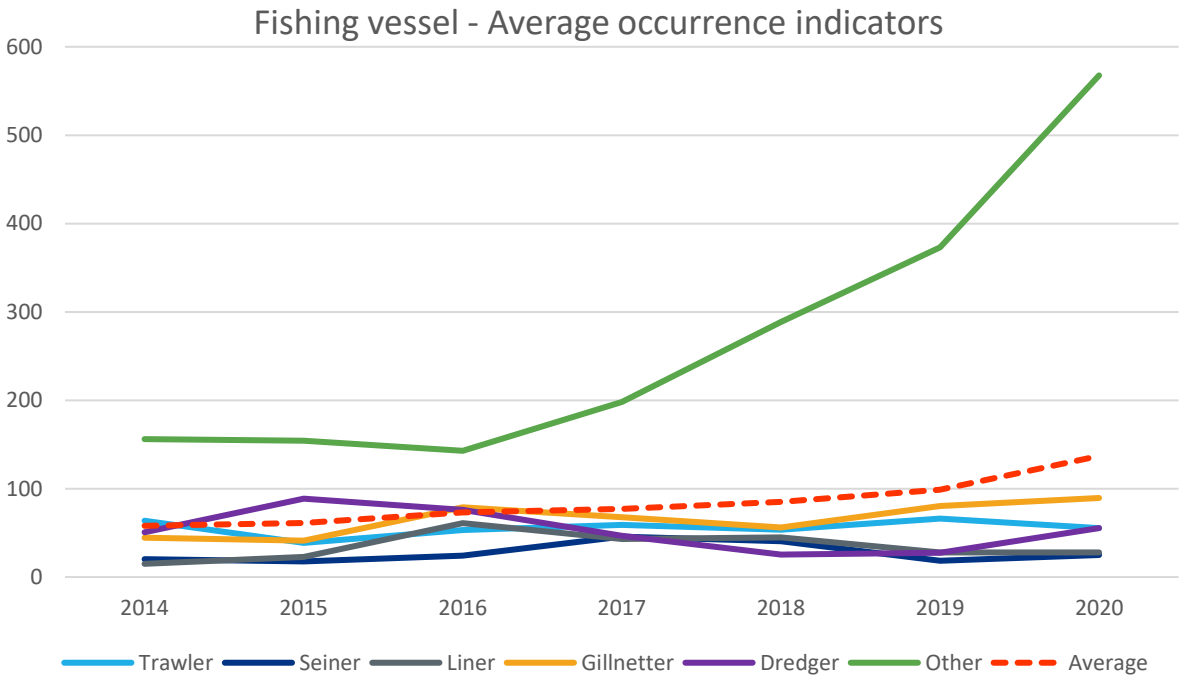
The evolution of the EU28 fleet during the period at stake shows a decreasing trend, diminishing around 10% from 2014 to 2020. Trawlers represent by far the largest segment (63%), followed by seiners (around 17%).

Occurrence Indicator	Trawler	Seiner	Liner	Gillnetter	Dredger	Other	Average
2014	64	20	15	45	51	156	**58**
2015	39	18	23	41	89	154	**61**
2016	53	24	61	79	76	143	**73**
2017	59	46	43	68	47	198	**77**
2018	54	41	45	56	25	289	**85**
2019	66	18	28	81	27	373	**99**
2020	55	25	28	89	55	568	**137**
Average	**56**	**27**	**35**	**65**	**53**	**269**	**84**

The occurrence indicator presents a sharp rise from 2014, indicating that potential safety issues may affect fishing vessels.



Despite a high number of accidents involving trawlers, it was noted that trawlers' indicator is 33% lower than the overall average and in the same range of values than other categories such as dredgers or gillnetters. Seiners are characterised by a very low indicator. On the opposite the very high indicator related to "others", composed mainly by potters and multipurpose vessels, is a concern in the area of fishing vessels.

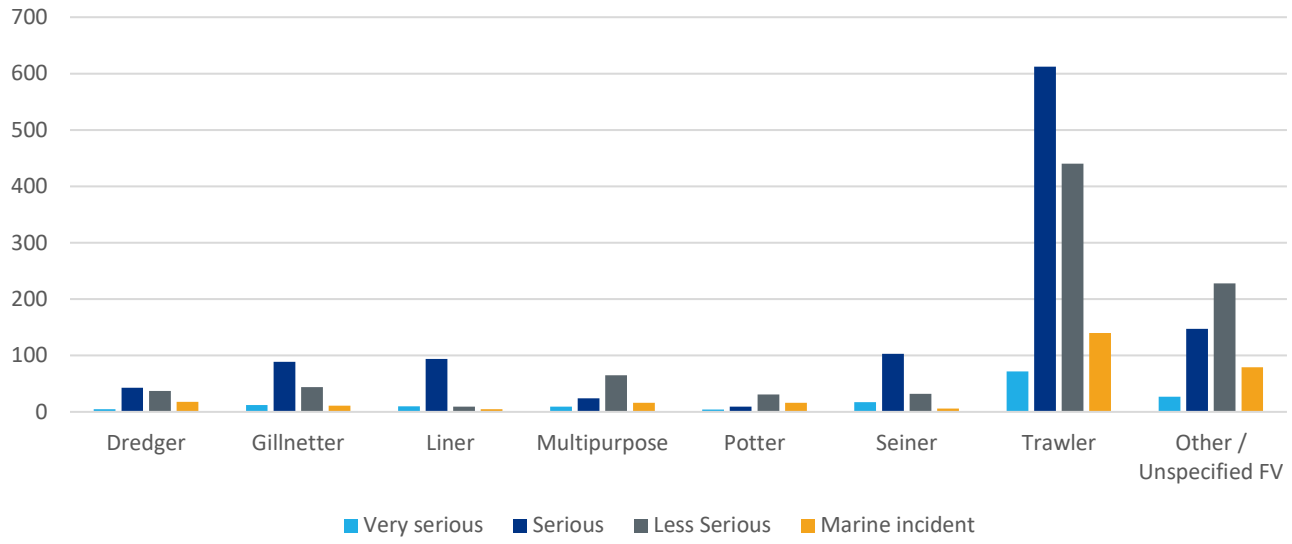


Overall, the accident rate to FV increased significantly between 2014-2020.
The chart shows a clear increase in the accident rate for category "other" on the overall period at stake.
The peak was reached in 2020.
For trawlers and gillnetters, the indicators suggest a decrease in the accidentality rate in 2020 compared with the situation in 2019.
The indicator for liners and seiners in 2020 is going worst after a substantial decrease between 2018-2019.

4.2 Nature of marine casualties and incidents

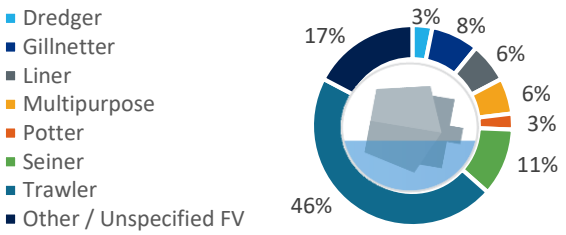
4.2.1 Occurrence with ship(s)

Figure 4.3: Distribution of severity per fishing vessel type for 2014-2020



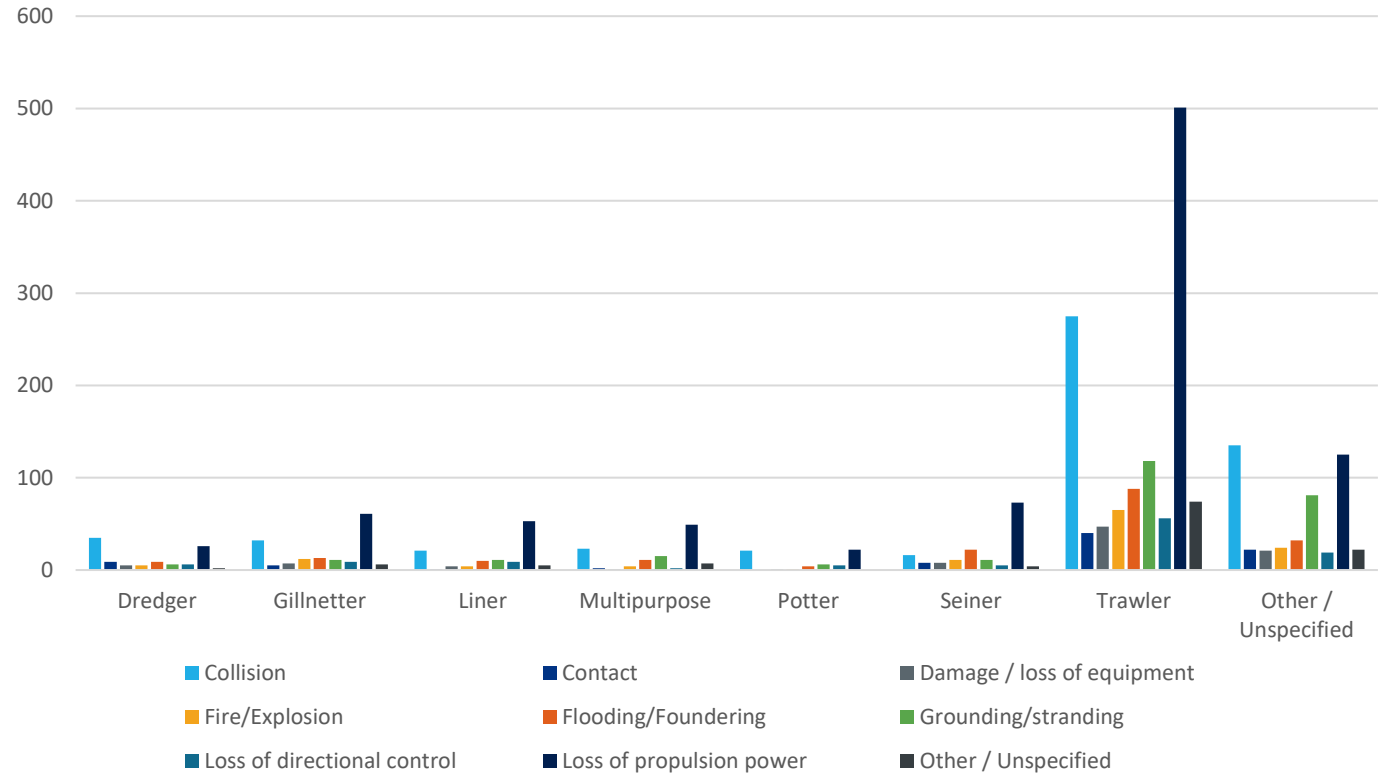
	Very serious	Serious	Less Serious	Marine incident	Total
Dredger	5	43	37	18	103
Gillnetter	12	89	44	11	156
Liner	10	94	9	5	118
Multipurpose	9	24	65	16	114
Potter	4	9	31	16	60
Seiner	17	103	32	6	158
Trawler	72	612	440	140	1264
Other / Unspecified FV	27	147	228	79	481
Total	156	1121	886	291	2454

Trawlers represent 51.5% of all fishing vessels involved in a casualty with a ship. The sub-category "trawler stern" is by far the most unsafe type of fishing vessels, as it represents 61.5% of all trawlers and 31.7% of all fishing vessels involved.



Among all fishing vessels, 46% of the very serious casualties involved trawlers.

Figure 4.4: Distribution of casualty events per fishing vessel type for 2014-2020

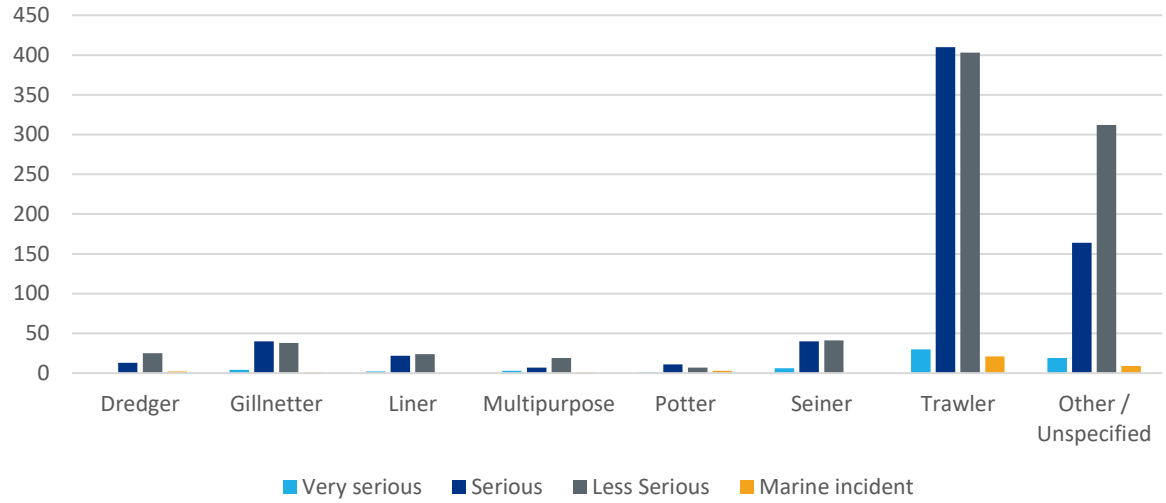


	Collision	Contact	Damage / loss of equipment	Fire / Explosion	Flooding / Foundering	Grounding / stranding	Loss of directional control	Loss of propulsion power	Other / Unspecified	Total
Dredger	35	9	5	5	9	6	6	26	2	103
Gillnetter	32	5	7	12	13	11	9	61	6	156
Liner	21	1	4	4	10	11	9	53	4	118
Multipurpose	23	2	1	4	11	15	2	49	7	114
Potter	21	0	1	1	4	6	5	22	0	60
Seiner	16	8	8	11	22	11	5	73	4	158
Trawler	275	40	47	65	88	118	56	501	74	1264
Other/Unspecified	135	22	21	24	32	81	19	125	22	481
Total	558	87	94	126	189	259	111	910	120	2454

Loss of propulsion power, with 37% of all casualty events, was the main quoted category, together with navigation issues (collision, contact and grounding).

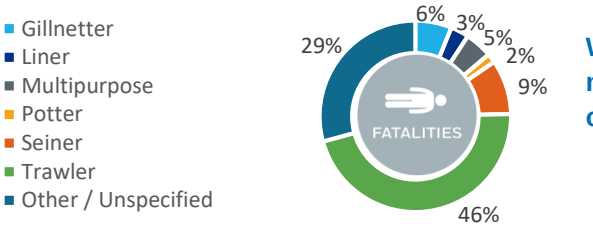
4.2.2 Occurrence with person(s)

Figure 4.5: Severity of occurrence with person(s)s per fishing vessel type for 2014-2020



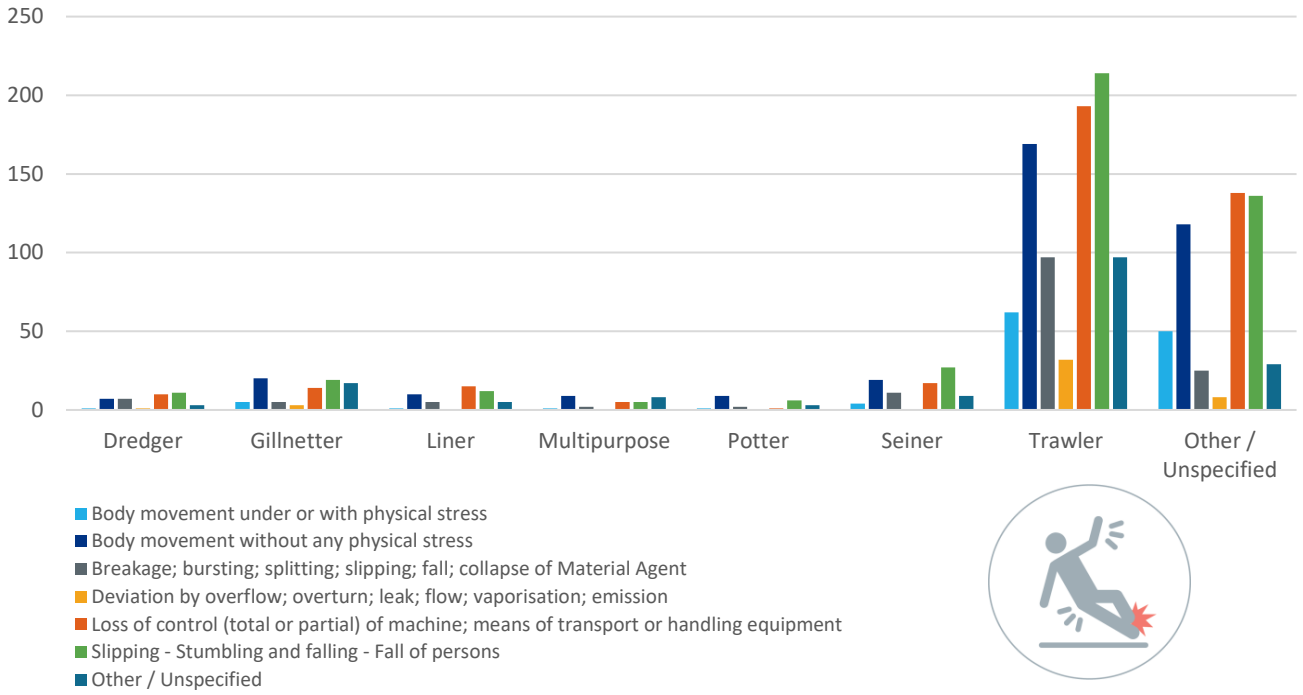
	Very serious	Serious	Less Serious	Marine incident	Total
Dredger	0	13	25	2	40
Gillnetter	4	40	38	1	83
Liner	2	22	24	0	48
Multipurpose	3	7	19	1	30
Potter	1	11	7	3	22
Seiner	6	40	41	0	87
Trawler	30	410	403	21	864
Other / Unspecified	19	164	312	9	504
Total	65	707	869	37	1678

Similarly to casualty events, accidents to persons, one deviation out of two happened on trawlers.



With 46%, the quantity of very serious deviations, meaning the fatality rate, is unsurprisingly the highest on-board trawlers.

Figure 4.6: Distribution of deviations per fishing vessel type for 2014-2020



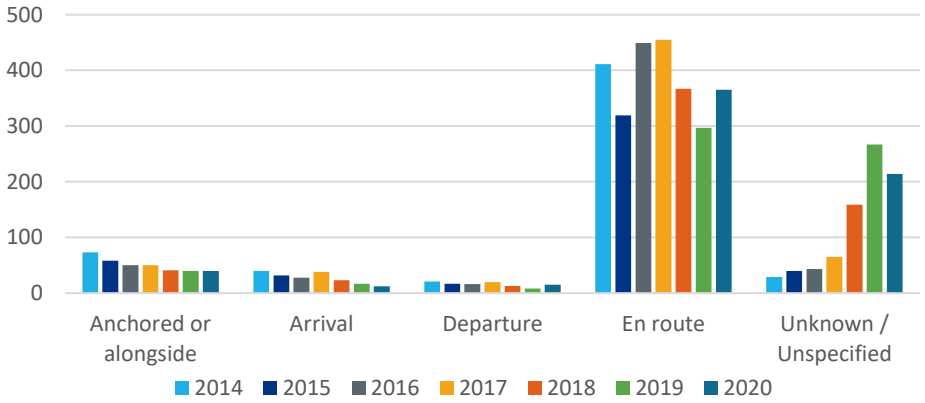
	Body movement under or with physical stress	Body movement without any physical stress	Breakage; bursting; splitting; slipping; fall; collapse of Material Agent	Deviation by overflow; overturn; leak; flow; vaporisation; emission	Loss of control of machine; means of transport or handling equipment	Slipping - Stumbling and falling - Fall of persons	Other / Unspecified	Total
Dredger	1	7	7	1	10	11	3	40
Gillnetter	5	20	5	3	14	19	17	83
Liner	1	10	5	0	15	12	5	48
Multipurpose	1	9	2	0	5	5	8	30
Potter	1	9	2	0	1	6	3	22
Seiner	4	19	11	0	17	27	9	87
Trawler	62	169	97	32	193	214	97	864
Other / Unspecified	50	118	25	8	138	136	29	504
Total	125	361	154	44	393	430	171	1678

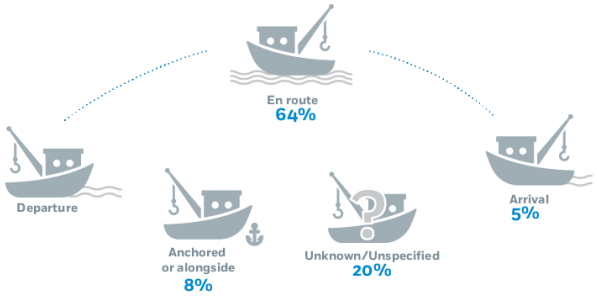
Fall of persons and loss of control of machines or equipment's are the two main deviation categories with respectively 25.6% and 23.4%. Deviations on board trawlers represents 51.5% of all deviations on board fishing vessels.

4.3 Location of the marine casualties and incidents

4.3.1 Voyage segments

Figure 4.7: Distribution by voyage segment

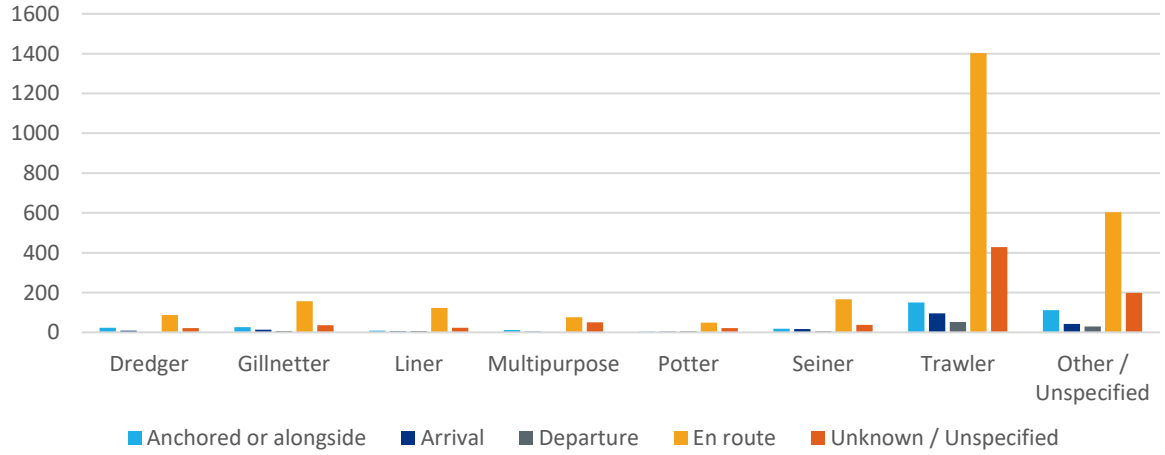




"En route", when fishing operations take place, is the segment where 64% of the occurrences took place. The number of occurrences in that segment increased of 23% in 2020.

	2014	2015	2016	2017	2018	2019	2020	Total
Anchored or alongside	73	58	50	50	41	40	40	352
Arrival	40	32	28	38	23	17	12	190
Departure	21	17	16	20	13	8	15	110
En route	411	319	449	455	367	297	365	2663
Unknown / Unspecified	29	40	43	65	159	267	214	817
Total	574	466	586	628	603	629	646	4132

Figure 4.8: Distribution by voyage segment per fishing vessel type for 2014-2020

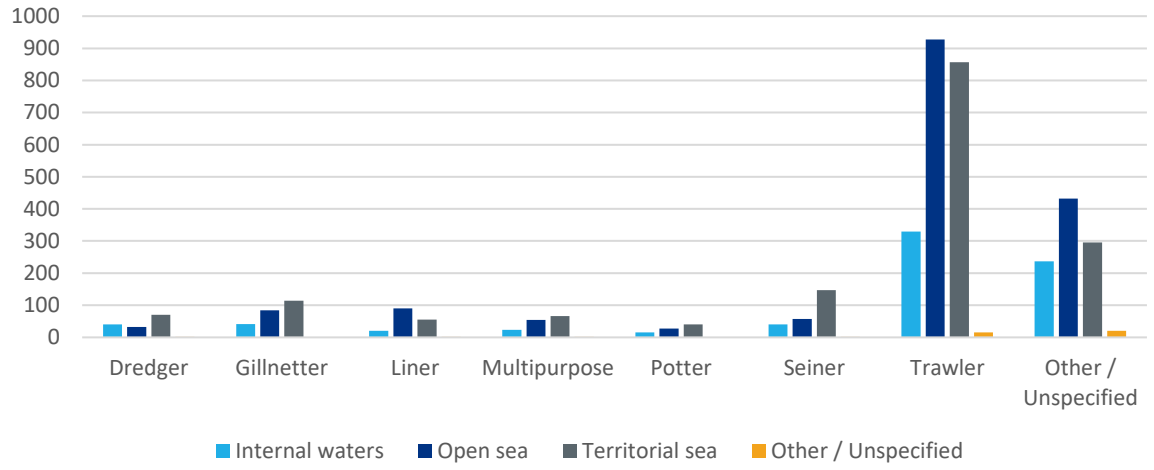


	Anchored or alongside	Arrival	Departure	En route	Unknown / Unspecified	Total
Dredger	23	9	2	87	22	143
Gillnetter	26	13	7	157	36	239
Liner	8	6	7	122	23	166
Multipurpose	12	4	2	76	50	144
Potter	3	3	5	49	22	82
Seiner	19	17	6	166	37	245
Trawler	150	96	52	1402	428	2128
Other / Unspecified FV	111	42	52	604	199	985
Total	352	190	110	2663	817	4132

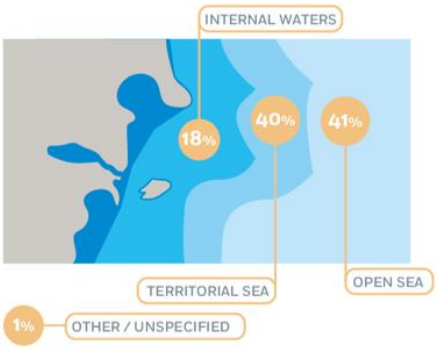
For all fishing vessels, the "en route" segment is by far the most unsafe part of the ship voyage. A significant number of accidents also take place in the segment Anchored or alongside, where ship operations such as unloading fish take place.

4.3.2 Location

Figure 4.9: Distribution by location of marine casualties and incidents per fishing vessel type for 2014-2020



	Internal waters	Open sea	Territorial sea	Other / Unspecified	Total
Dredger	40	32	70	1	143
Gillnetter	41	84	114	0	239
Liner	20	90	55	1	166
Multipurpose	23	54	66	1	144
Potter	15	27	40	0	82
Seiner	40	57	147	1	245
Trawler	329	927	857	15	2128
Other / Unspecified	237	432	296	20	985
Total	745	1703	1645	39	4132



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 areas where fishing operations take place.

4.4 Accidental events and contributing Factors

Investigators look for the factors contributing to marine casualties and incidents in the analysis phase. Such causes are made up of accident events (underlying factors) and contributing factors.

Each marine casualty can have one or more casualty events. More than one accident events can be associated to a casualty event. The five accident events types are: human action, system or equipment failure, other agent or vessel, hazardous material and unknown.

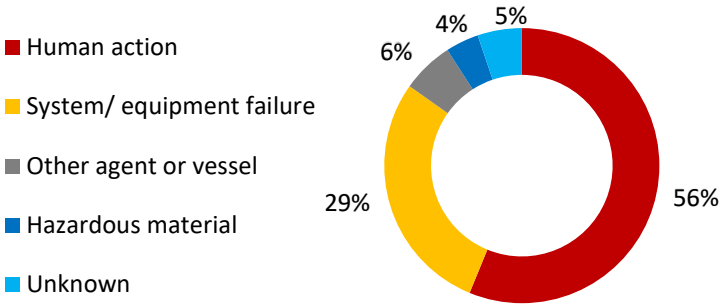
Each casualty event can have one or several contributing factors. Contributing factors have the following three main categories: external environment, shore management and shipboard operation.

4.4.1 Analysis of Accident events

Each investigated marine casualty with analysis data included in EMCIP can have one or more accident events so, it is possible to obtain two distributions, as explained above:

- Distribution of accident event types; and
- Distribution of accident event types related to the investigated marine accidents.

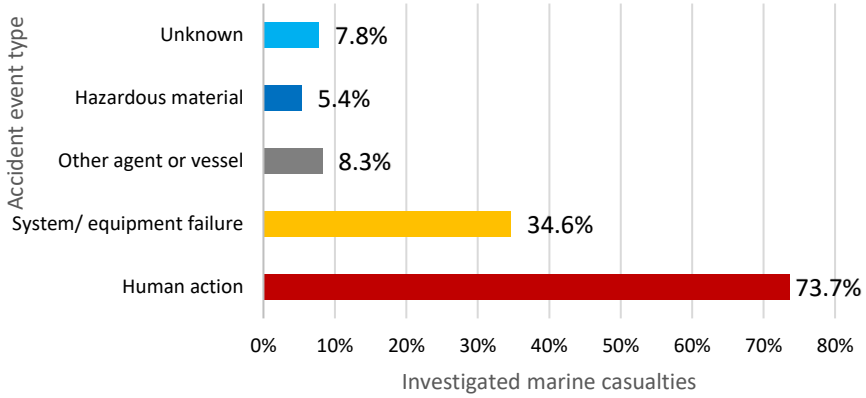
Figure 4.10: Distribution of accident events types for the period 2014-2020



Fishing vessels have the same trend for accident event distribution than marine casualties in general except for the unknown accident events. The distribution of the accident events by type has the same trend than from period from 2014 to 2019, with 56.2% of human action accident events and 28.6% of system/equipment failure accident events as the main values of the distribution.

In comparison with the period from 2014 to 2019, human action, system/equipment failure and unknown accident events have increased slightly the percentage.

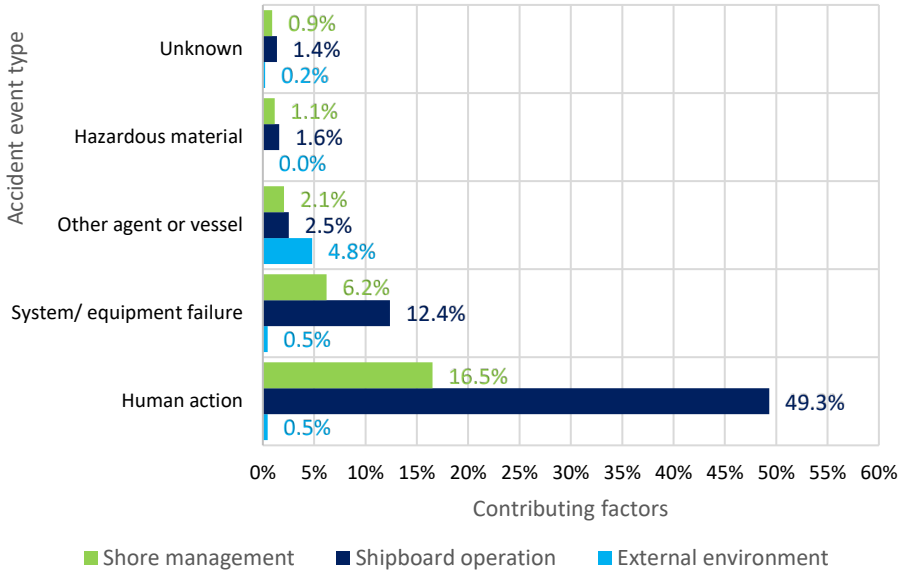
Figure 4.11: Distribution of accident event types related to the investigated marine accidents for the period 2014-2020



For fishing vessels, Human action is related to the 73.7% of the investigated marine casualties. Human action and system/equipment failure accident events are the most important accident event types.

4.4.2 Analysis of contributing factors in EMCIP

Figure 4.12: Distribution of contributing factors in the accident event types for the period 2014-2020



For fishing vessels, the trend is the same than in the analysis of the whole fleet. 66.3% of the contributing factors in EMCIP are related to human action accident events and 19.0% to system /equipment failure accident events.

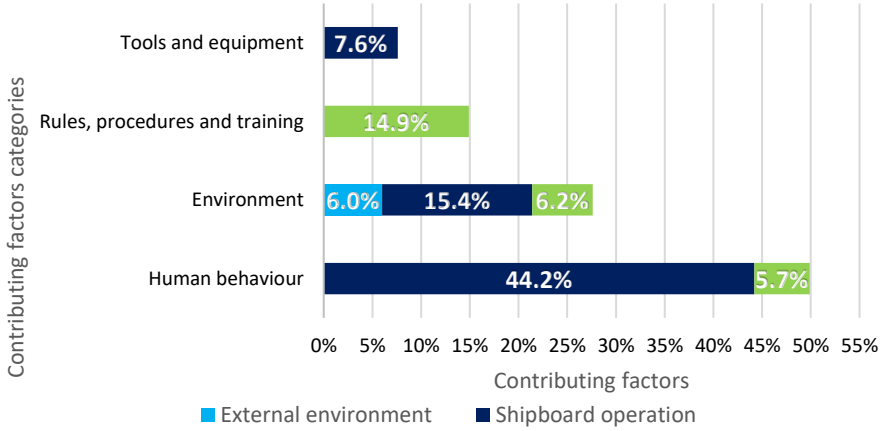
Shipboard operation contributing factors are the most frequently associated to accident events with a 67.2% of the contributing factors. Shore management contributing factors are the second most frequently associated to accident events with a 26.8% of the contributing factors.

Each main category of contributing factors is divided in second level categories. These categories can be simplified by cataloguing them in only four categories, as explained above:

- Human behaviour.
- Environment (internal or external).
- Rules, procedures and training.
- Tools and equipment.

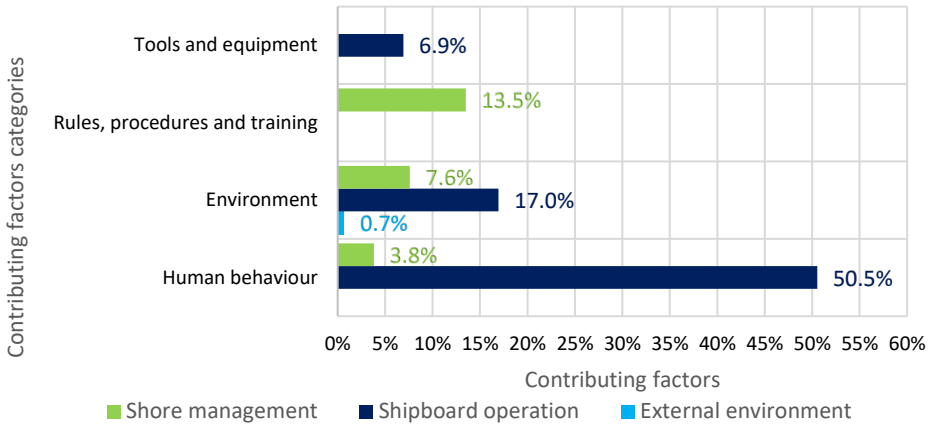
Second level contributing factors for each accident event type are grouped for main contributing factors categories in the following charts.

Figure 4.13: Contributing factors distributed by categories



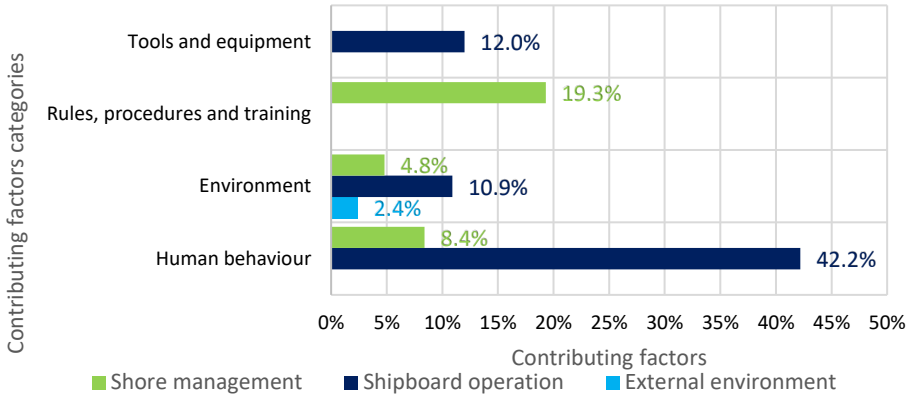
For fishing vessels, the trend is the same than in the analysis of all the whole fleet. 49.9% of the contributing factors in EMCIP are related to human behaviour, 27.6% to environment and 14.9% to rules, procedures and training.

Figure 4.14: Contributing factors involved in human action accident events, distributed by categories



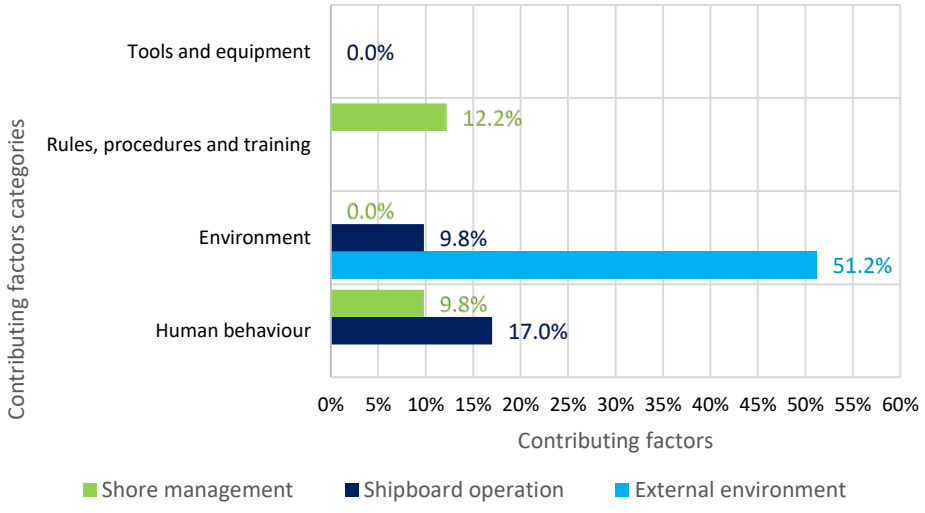
For fishing vessels and human action accident events, the trend is the same than in the analysis of all the contributing factors for all the accident events. 53.4% of the contributing factors in EMCIP are related to rules, procedures and training, 25.3% to environment and 13.5% to human behaviour.

Figure 4.15: Contributing factors involved in system/equipment failure accident events, distributed by categories



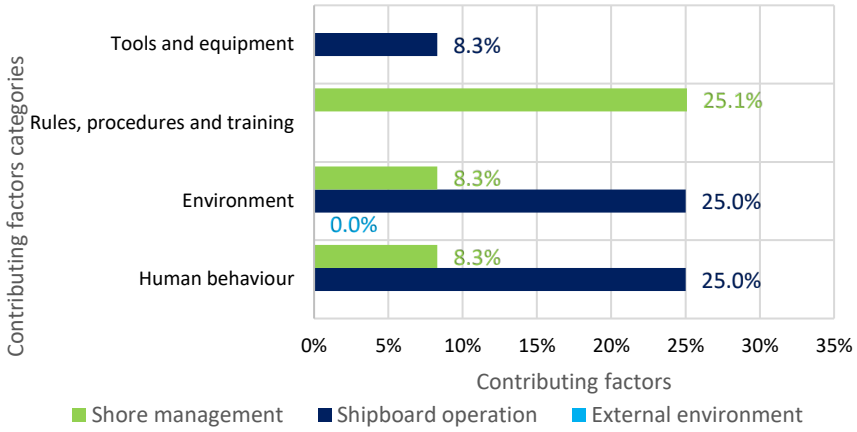
For fishing vessels and system/equipment failure accident events, the trend has changed in environment and rules, procedures and training, comparing with the analysis of all the contributing factors for all the accident events. 50.6% of the contributing factors in EMCIP are related to human behaviour, 19.3% to rules, procedures and training and 18.1% to environment.

Figure 4.16: Contributing factors involved in other agent or vessel accident events, distributed by categories



For fishing vessels and other agent or vessel accident events, the trend has changed in environment and human behaviour, comparing with the analysis of all the contributing factors for all the accident events, but is the same trend than for other agent or vessel accident events in the whole fleet. 61.0% of the contributing factors in EMCIP are related to environment, 26.8% to human behaviour and 12.2% to rules, procedures and training.

Figure 4.17: Contributing factors involved in hazardous material accident events, distributed by categories



For fishing vessels and hazardous material accident events, 33.3% of the contributing factors in EMCIP are related to human behaviour, 33.3% to environment and 25.1% to rules, procedures and training.

4.4.3 Analysis of human element

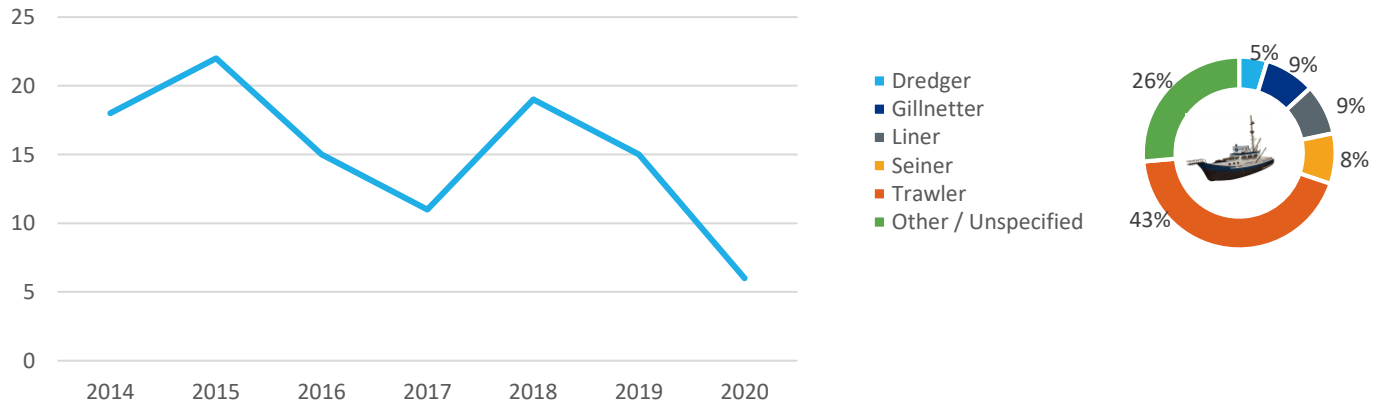
For fishing vessels, 89.0% of the reported safety investigations have human action accident events or contributing factors catalogued as human behaviour, so they are affected by human element.

Figure 4.18: influence of human element

4.5 Consequences

4.5.1 Consequences to ships

Figure 4.19: Fishing vessels lost



	2014	2015	2016	2017	2018	2019	2020	Total
Fishing vessels lost	18	22	15	11	19	15	6	106

Dredger	5
Gillnetter	9
Liner	9
Seiner	9
Trawler	46
Other / Unspecified	28
Fishing vessels lost	106

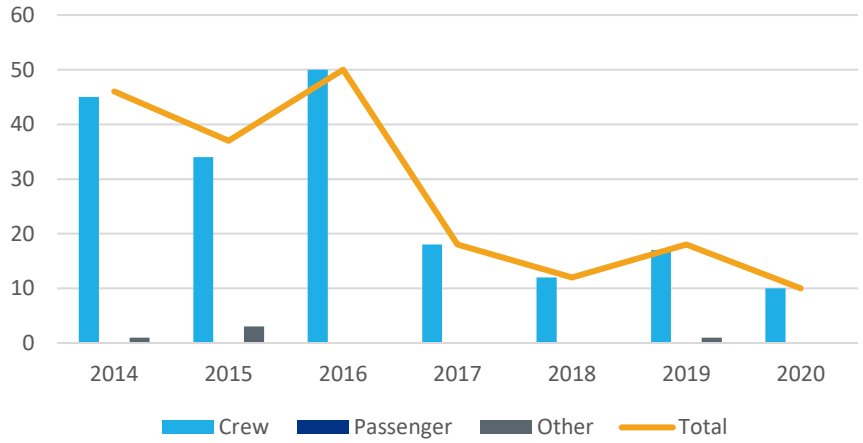
In 2020, a significant drop of fishing vessels lost was noted (3 times less than in 2019.

43% of the fishing vessels lost were trawlers.

4.5.2 Consequences to persons

4.5.2.1 Fatalities

Figure 4.20: Number of fatalities

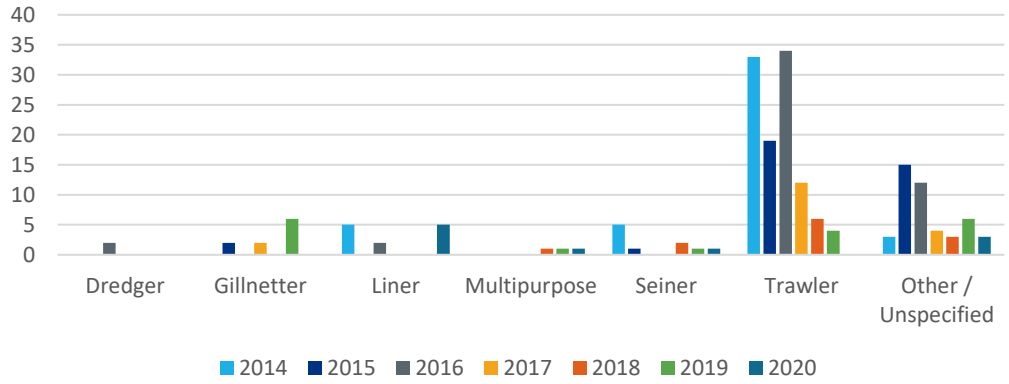


Despite a 50% increase of fatalities in 2019 when comparing with 2018, the overall reduction of lives lost since 2016 has continued.

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

	2014	2015	2016	2017	2018	2019	2020	Total	
Crew	45	34	50	18	12	17	10	186	
Passengers	0	0	0	0	0	0	0	0	
Other	1	3	0	0	0	1	0	5	
Fatalities	46	37	50	18	12	18	10	191	

Figure 4.21: Distribution of fatalities per fishing vessel type

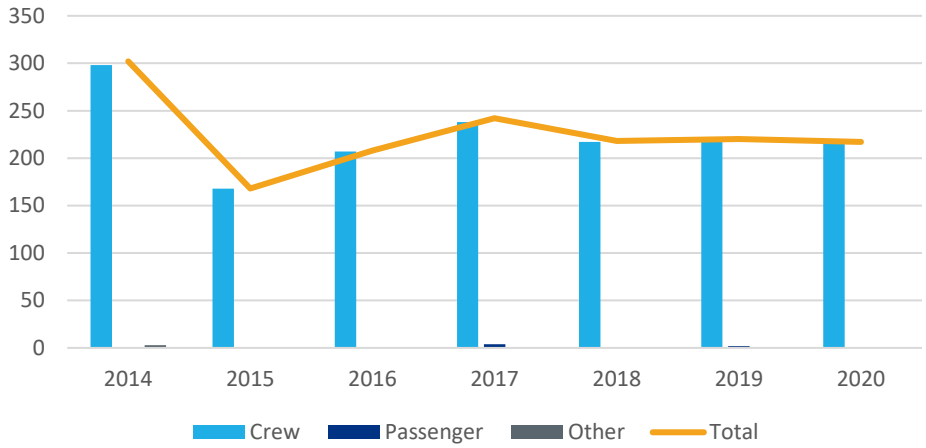


57% of the fatalities took place on board trawlers.
At the subcategory level, 28% of all lives lost occurred on board stern trawlers.

	2014	2015	2016	2017	2018	2019	2020	Total
Dredger	0	0	2	0	0	0	0	2
Gillnetter	0	2	0	2	0	6	0	10
Liner	5	0	2	0	0	0	5	12
Multipurpose	0	0	0	0	1	1	1	3
Seiner	5	1	0	0	2	1	1	10
Trawler	33	19	34	12	6	4	0	108
Other / Unspecified	3	15	12	4	3	6	3	46
Total	46	37	50	18	12	18	10	191

4.5.2.2 Injuries

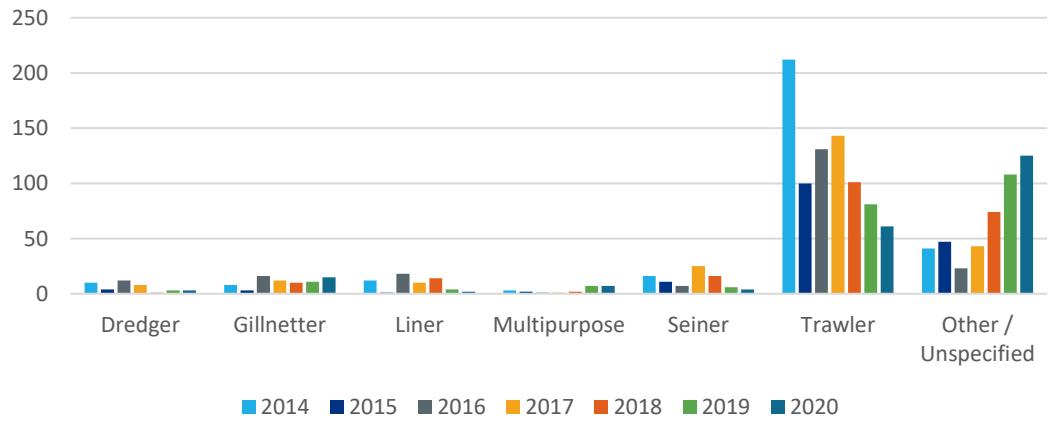
Figure 4.22: Number of injuries



The average of injured fishermen over the last 6 years is around 225. The number of injured persons remain the same over the past 3 years.

	2014	2015	2016	2017	2018	2019	2020	Total
Crew	298	168	207	238	217	218	217	1563
Passengers	1	0	0	4	0	2	0	7
Other	3	0	1	0	1	0	0	5
Total	302	168	208	242	218	220	217	1575

Figure 4.23: Distribution of injuries by fishing vessel type

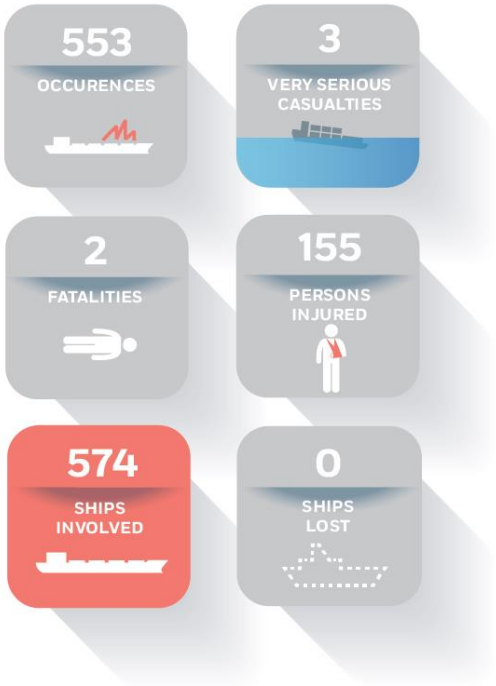


As for the fatalities, most of injuries on-board trawlers (53%).

	2014	2015	2016	2017	2018	2019	2020	Total
Dredger	10	4	12	8	1	3	3	41
Fishing vessel - Gillnetter	8	3	16	12	10	11	15	75
Liner	12	1	18	10	14	4	2	61
Multipurpose	3	2	1	1	2	7	7	23
Seiner	16	11	7	25	16	6	4	85
Trawler	212	100	131	143	101	81	61	829
Other / Unspecified	41	47	23	43	74	108	125	461
Total	302	168	208	242	218	220	217	1575

Chapter 5: PASSENGER SHIPS

KEY FIGURES 2020



5.0 Executive summary about Passenger Ships

Casualty records in 2020 indicated a significant improvement of the safety level related to accidents involving passenger ships.

Despite showing the higher average occurrence number among all ships (350, while the overall average is 181 over 2014-2020), passenger ships was the ship category that revealed the most significant decrease in 2020 (from 337 in 2019 to 167 in 2020). This reduction led passenger vessel occurrence indicator in the range of other categories of ships.

A total number of 5926 passenger ships were involved in a marine casualty or incident over the period 2014-2020, which represented 24% of all ships in an occurrence. 574 ships were involved in 2020, much less than the average of 846 ships per year.

Among all passenger ships, 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 0.93%, and 16.5% 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 (43.8%) were related to issues of a navigational nature, such as contacts, grounding/stranding and collision.

As concerns occurrences to person(s), 48% were attributed to slipping, stumbling and falling of persons.

As in 2017, and after only one loss in 2019, no loss of passenger ship was recorded in 2020.

Over the overall period, the total remained of 12 passenger ships lost, seven were carrying only passengers while four were ferries, carrying passengers and ro-ro cargo.

During the 2014-2012 period, 30 accidents involving passenger ships resulted in a total of 44 lives lost. The decrease observed since 2014 continued and two fatalities were recorded in 2020. The number of lives lost since 2017 seems steady, around three per year. Crew and passengers were almost equally affected.

The number of injuries also dropped in 2020, with a total of 155, in comparison with 347 in 2019 and an annual average of 342 over 2014-2020. The crew represented the main category of persons injured at sea (56.4%).

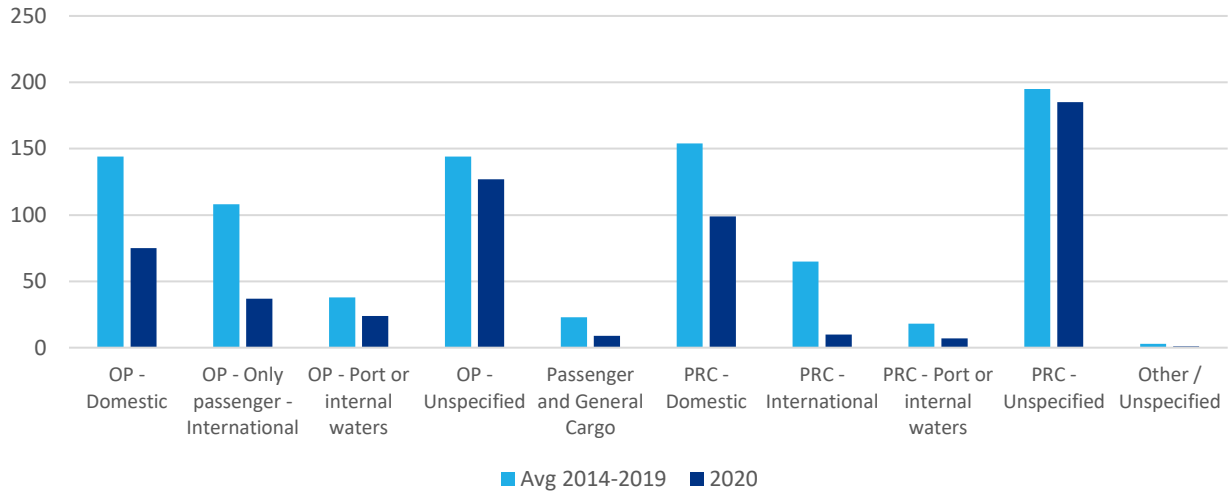
The departure phase appeared to be the safest phase of a voyage (12%), while “en route” represented the most unsafe segment (35%). It was noted that the repartition of occurrences among the various voyage segments is more balanced for passenger ships in comparison with other ship types. A total of 60%% of the casualties occurred in internal waters.

Analysis of underlying factors leading to casualties showed that 89.1% were related to “Human Action”, which is equal to the ones for the other categories of ships. Shipboard operations represented 56.8% of the reported contributing factors, which is significantly less than for other types of ships.

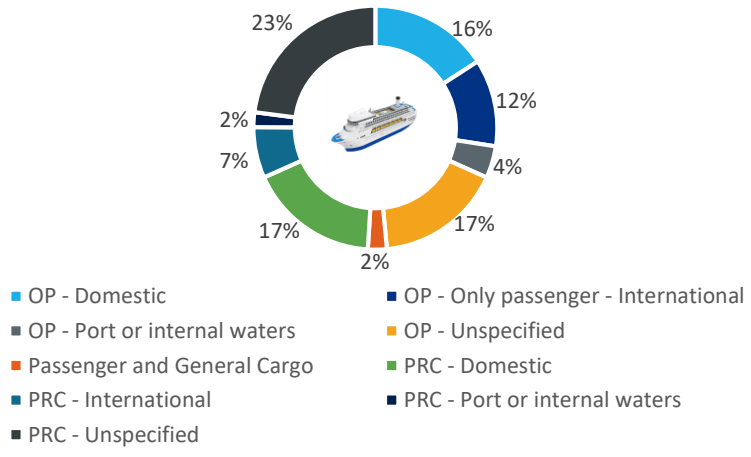
In conclusion, the year 2020 clearly showed improvements of all indicators, for example the number of passenger ships lost, the number of fatalities or the clear decrease of the occurrence indicator. However, it should be kept in mind the very strong impact of COVID pandemic on passenger ships, in particular the ships carrying only passengers (cruise ships). Therefore, it is very likely that such very positive results have been influenced by the covid impact in 2020 in this shipping area before concluding to a definitively improved safety situation.

5.1 Detailed distribution

Figure 5.1: Distribution of passenger ship types involved



	2014	2015	2016	2017	2018	2019	2020	Total
OP - Domestic	77	104	185	161	157	177	75	936
OP- International	119	148	123	99	100	59	37	685
OP- Port or internal waters	45	33	25	36	50	38	24	251
OP - Unspecified	108	103	136	145	148	224	127	991
Passenger and general cargo	22	27	21	21	24	24	9	148
PRC - Domestic	121	148	179	169	152	155	99	1023
PRC - International	74	97	84	82	41	11	10	399
PRC - Port or internal waters	32	25	16	20	13	3	7	116
PRC - Unspecified	263	169	147	144	177	271	185	1356
Other / Unspecified	7	4	3	3	3	0	1	21
Total	868	858	919	880	865	962	574	5926



A reduction of 40.4% of passenger ships involved in occurrences was noted in 2020, in comparison with 2019. 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: Occurrences indicators per passenger ship types

In order to draw objective comparisons between the different types of service ships and its evolutions, the following ratios between the number of occurrences involving a passenger ship and the corresponding fleet size over 2014 – 2020 were calculated. It covers only occurrences that involved passenger ships with an EU Flag and an IMO number.

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

Occurrences	Passenger - Only pax	Passenger - Other	Passenger - RoRo	Total
2014	235	26	460	721
2015	248	31	421	700
2016	274	23	390	687
2017	276	22	390	688
2018	312	23	360	695
2019	340	17	418	775
2020	175	6	277	458

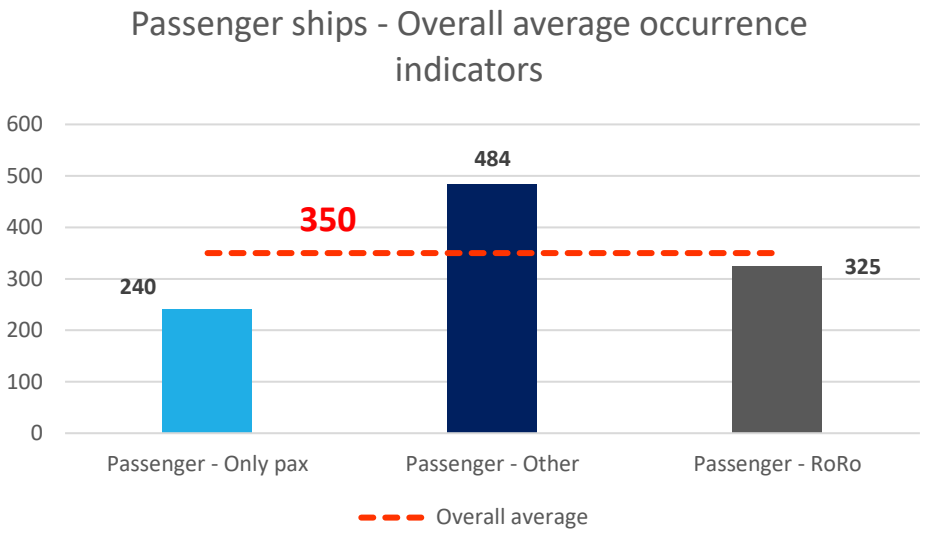
The number of reported accidents was stable between 2014 and 2018. It slightly increased in 2019 and dropped down in 2020, very likely due to the impact of COVID19 on the operation of passenger ships.

Fleet	Passenger - Only pax	Passenger - Other	Passenger - RoRo	Total
2014	992	44	1168	2204
2015	1021	45	1159	2225
2016	1087	44	1170	2301
2017	1097	44	1175	2316
2018	1137	42	1206	2385
2019	1212	43	1242	2497
2020	1260	42	1271	2573

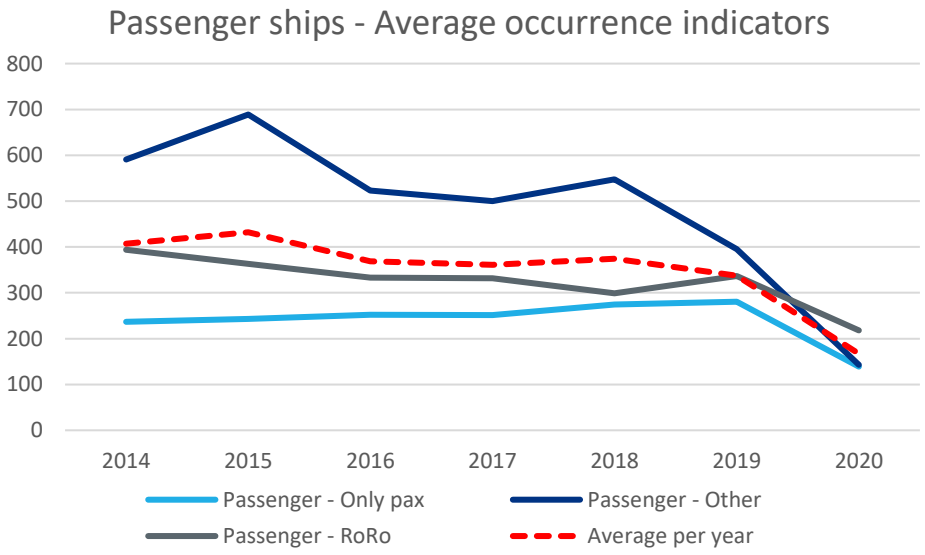
The EU-flagged passenger ships fleet increased almost 17% between 2014-2020, with an annual average of 2,357 ships. "RoRo pax" and "Only passenger" are the two main sub-types, each of them covering almost 50% of the fleet share.

Occurrence Indicator	Passenger - Only pax	Passenger - Other	Passenger - RoRo	Average per year
2014	237	591	394	**407**
2015	243	689	363	**432**
2016	252	523	333	**369**
2017	252	500	332	**361**
2018	274	548	299	**374**
2019	281	395	337	**337**
2020	139	143	218	**167**
Average per ship type	**240**	**484**	**325**	**350**

The average indicator significantly and continuously decreased since 2014. It was two times smaller in 2020 than the average of 350 over the period.



The overall average indicator related to "Passenger ships – Other" is significantly above the average, while passenger ships carrying only passengers below and the ones carrying also RoRo cargo just under the average.

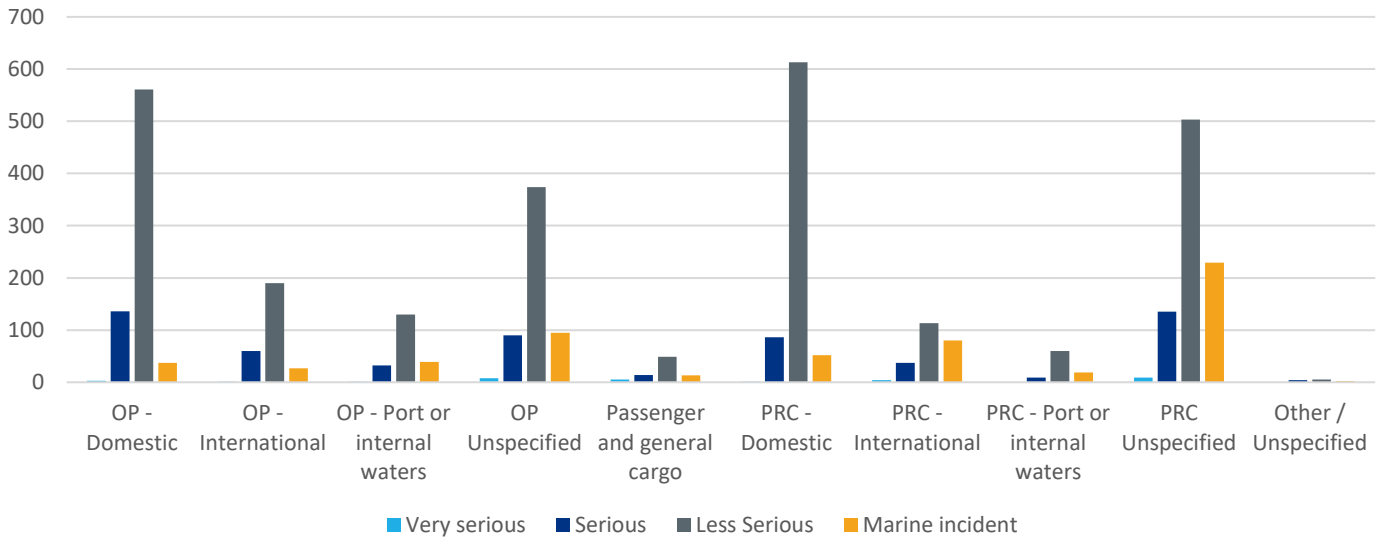


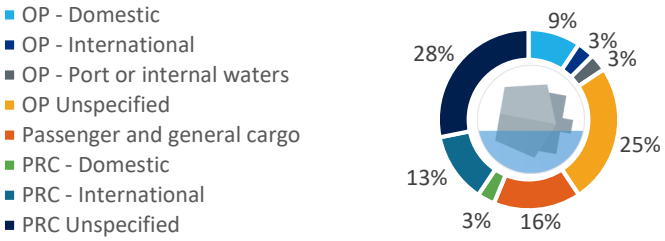
The "Only passenger" indicator appears stable between 2014 and 2019, with a minor increase in 2019, dropping down in 2020. This pattern can be explained by the COVID19 impact on the cruise sector.
The "RoRo" indicator presents a significant downtrend between 2014 and 2018, followed by a moderate increase in 2019 and a sharp decline in 2020.
Similarly, the "Other passenger ships" pattern shows a moderate decrease from 2015 to 2018, then a rapid decrease in 2019-2020.

5.2 Nature of marine casualties and incidents

5.2.1 Occurrence with ship(s)

Figure 5.3: Distribution of severity per passenger ship type for 2014-2020

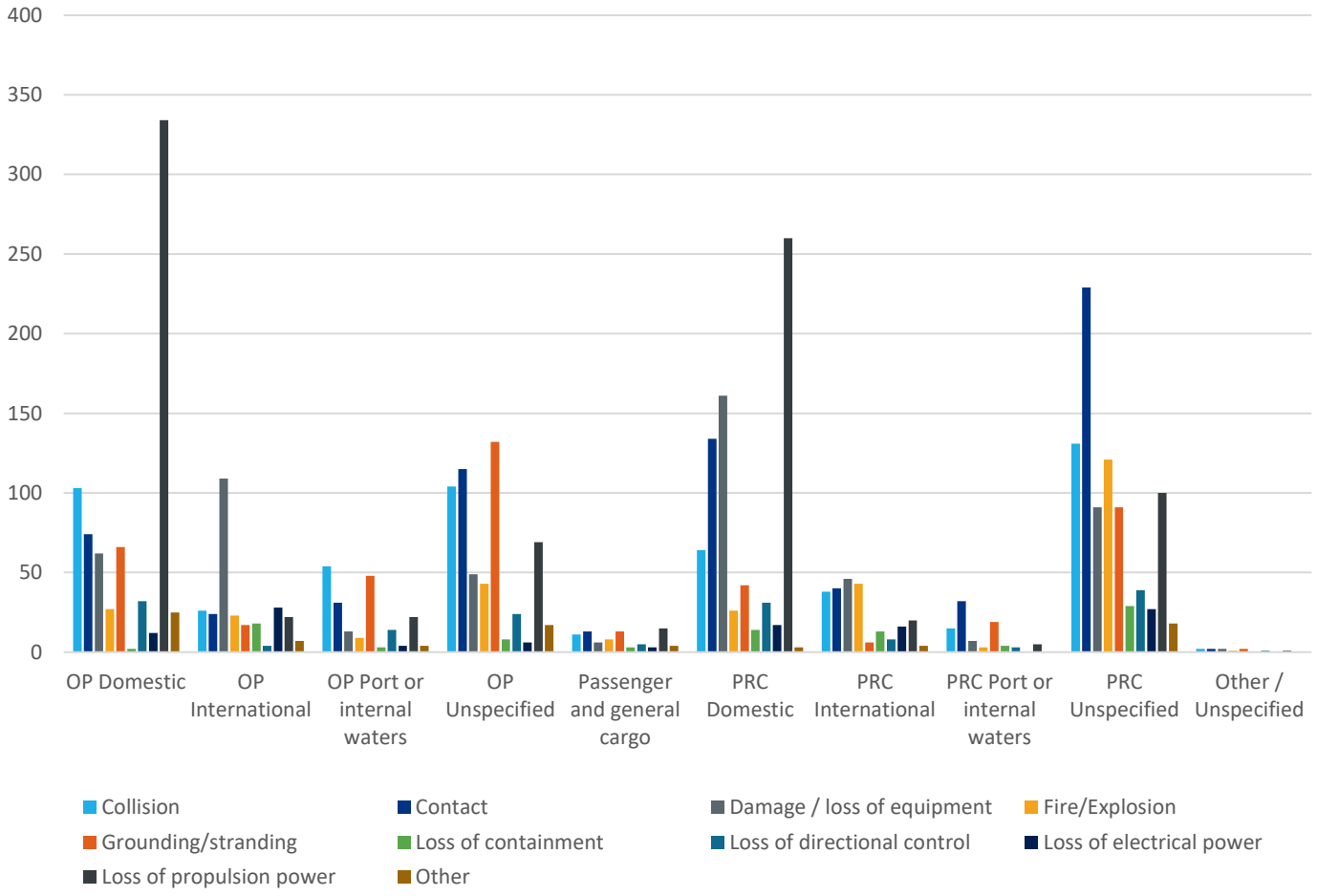




The rate of passenger ships involved in a very serious occurrence with ship(s) is very low (0.84%), when compared with the overall fleet for which the very serious casualty events represent 1.9%. Similarly, the rate of serious casualties (15.8%) is also low (23.3% for all ships).

	Very serious	Serious	Less Serious	Marine incident	Total
OP Domestic	3	136	561	37	737
OP International	1	60	190	27	278
OP Port or internal waters	1	32	130	39	202
OP Unspecified	8	90	374	95	567
Passenger and general cargo	5	14	49	13	81
PRC Domestic	1	86	613	52	752
PRC International	4	37	113	80	234
PRC Port or internal waters	0	9	60	19	88
PRC Unspecified	9	135	503	229	876
Other / Unspecified	0	4	5	2	11
Total	32	603	2598	593	3826

Figure 5.4: Distribution of casualty events per passenger ship type for 2014-2020

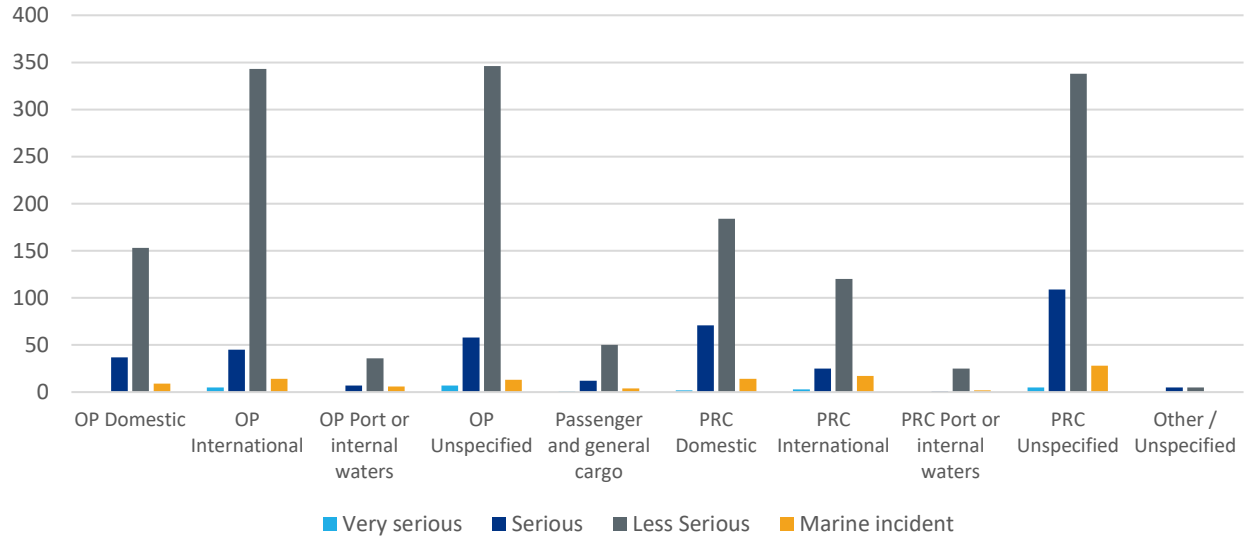


	Collision	Contact	Damage / loss of equipment	Fire / Explosion	Grounding / stranding	Loss of containment	Loss of directional control	Loss of electrical power	Loss of propulsion power	Other	Total
OP Domestic	103	74	62	27	66	2	32	12	334	25	737
OP International	26	24	109	23	17	18	4	28	22	7	278
OP Port or internal waters	54	31	13	9	48	3	14	4	22	4	202
OP Unspecified	104	115	49	43	132	8	24	6	69	17	567
Passenger and general cargo	11	13	6	8	13	3	5	3	15	4	81
PRC Domestic	64	134	161	26	42	14	31	17	260	3	752
PRC International	38	40	46	43	6	13	8	16	20	4	234
PRC Port or internal waters	15	32	7	3	19	4	3	0	5	0	88
PRC Unspecified	131	229	91	121	91	29	39	27	100	18	876
Other / Unspecified	2	2	2	1	2	0	1	0	1	0	11
Total	548	694	546	304	436	94	161	113	848	82	3826

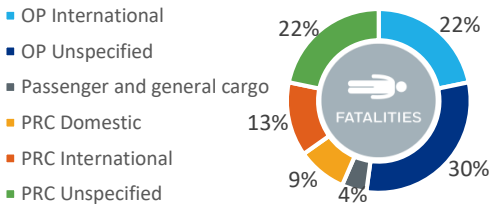
Navigational accidents (collision, contact and grounding) represented 43.9% of events that affected passenger ships. Loss of propulsion power still represents a significant casualty event with 22.2% of all events.

5.2.2 Occurrence with person(s)

Figure 5.5: Severity of occurrence with person(s)s per passenger ship type for 2014-2020



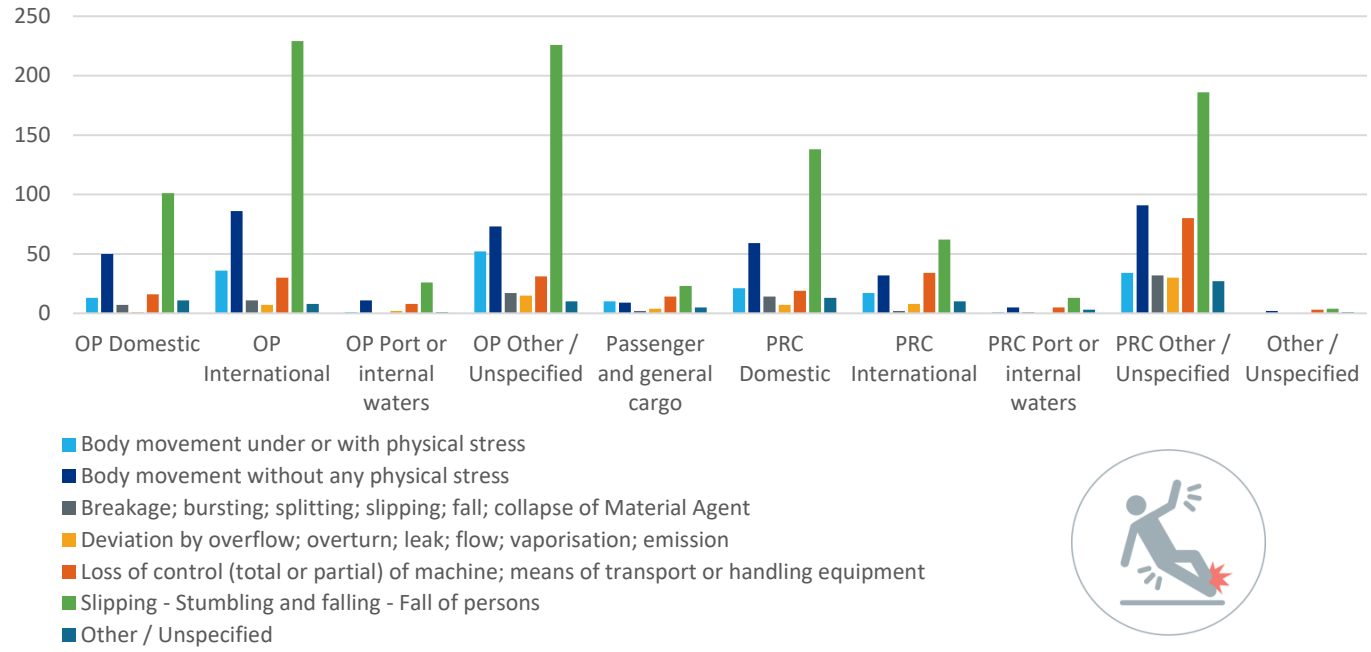
	Very serious	Serious	Less Serious	Marine incident	Total
OP - Domestic	0	37	153	9	199
OP - International	5	45	343	14	407
OP - Port or internal waters	0	7	36	6	49
OP - Unspecified	7	58	346	13	424
Passenger and general cargo	1	12	50	4	67
PRC - Domestic	2	71	184	14	271
PRC - International	3	25	120	17	165
PRC - Port or internal waters	0	1	25	2	28
PRC - Unspecified	5	109	338	28	480
Other / Unspecified	0	5	5	0	10
Total	23	370	1600	107	2100



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

A high number of serious occurrences on "Unspecified PRC (eg ferries) was noted.

Figure 5.6: Distribution of deviations per passenger ship type for 2014-2020



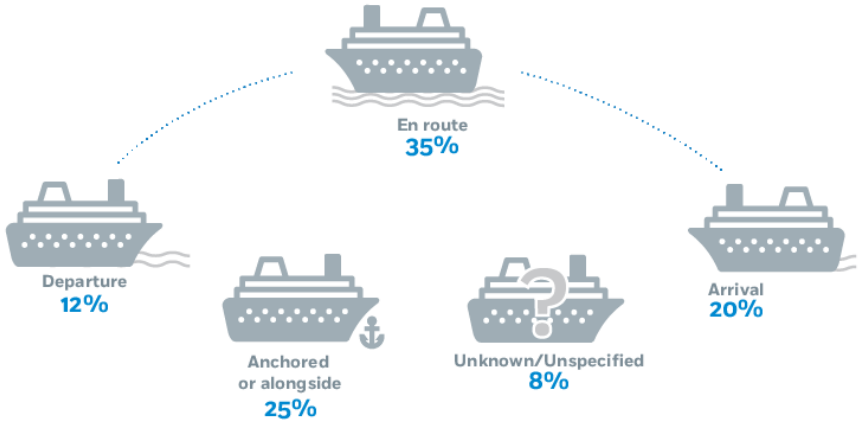
	Body movement under or with physical stress	Body movement without any physical stress	Breakage; bursting; splitting; slipping; fall; collapse of Material Agent	Deviation by overflow; overturn; leak; flow; vaporisation; emission	Loss of control (total or partial) of machine; means of transport or handling equipment	Slipping - Stumbling and falling - Fall of persons	Other / Unspecified	Total
OP - Domestic	13	50	7	1	16	101	11	199
OP - International	36	86	11	7	30	229	8	407
OP - Port or internal waters	1	11	0	2	8	26	1	49
OP - Other / Unspecified	52	73	17	15	31	226	10	424
Passenger and general cargo	10	9	2	4	14	23	5	67
PRC - Domestic	21	59	14	7	19	138	13	271
PRC - International	17	32	2	8	34	62	10	165
PRC - Port or internal waters	1	5	1	0	5	13	3	28
PRC - Other / Unspecified	34	91	32	30	80	186	27	480
Other / Unspecified	0	2	0	0	3	4	1	10
Total	185	418	86	74	240	1008	89	2100

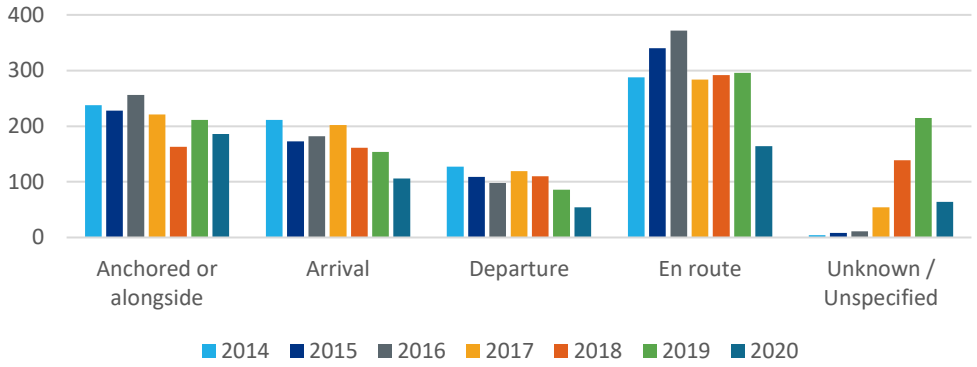
Whatever the type of passenger ship, slipping and falling of person is the most significant deviation (48%).

5.3 Location of the marine casualties and incidents

5.3.1 Voyage segments

Figure 5.7: Distribution by voyage segment

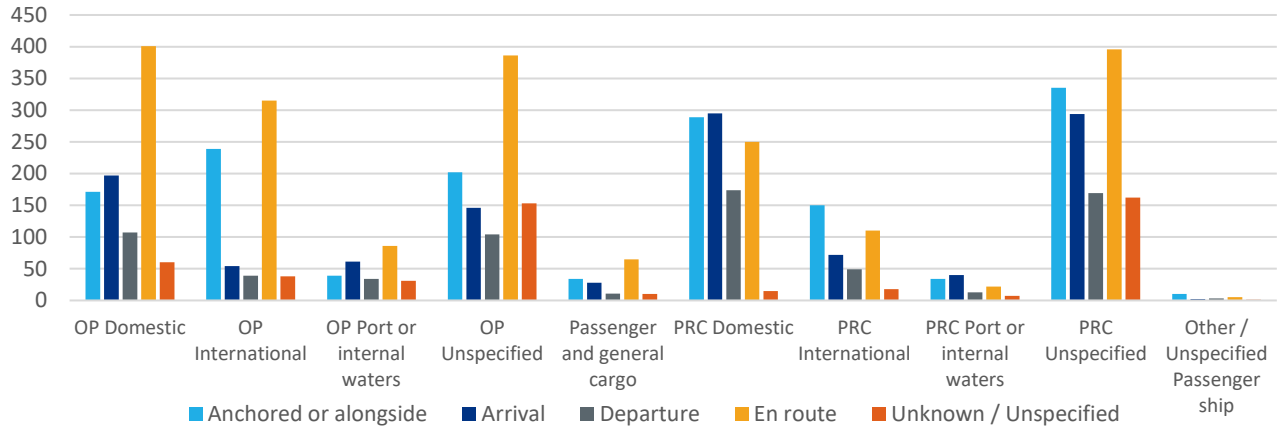




"En route" was, as for the other types of ships, the phase least safe over the period 2014-2020. It represented 34.4% of the reported voyage segments.

	2014	2015	2016	2017	2018	2019	2020	Total
Anchored or alongside	238	228	256	221	163	211	186	1503
Arrival	211	173	182	202	161	154	106	1189
Departure	127	109	98	119	110	86	54	703
En route	288	340	372	284	292	296	164	2036
Unknown / Unspecified	4	8	11	54	139	215	64	495
Total	868	858	919	880	865	962	574	5926

Figure 5.8: Distribution by voyage segment per passenger ship type for 2014-2020

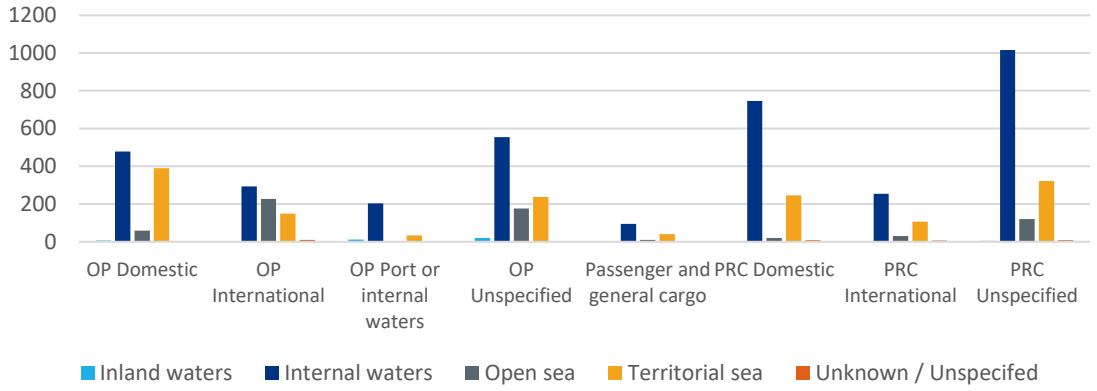


	Anchored or alongside	Arrival	Departure	En route	Unknown / Unspecified	Total
OP Domestic	171	197	107	401	60	936
OP International	239	54	39	315	38	685
OP Port or internal waters	39	61	34	86	31	251
OP Unspecified	202	146	104	386	153	991
Passenger and general cargo	34	28	11	65	10	148
PRC Domestic	289	295	174	250	15	1023
PRC International	150	72	49	110	18	399
PRC Port or internal waters	34	40	13	22	7	116
PRC Unspecified	335	294	169	396	162	1356
Other / Unspecified Passenger Ship	10	2	3	5	1	21
Total	1503	1189	703	2036	495	5926

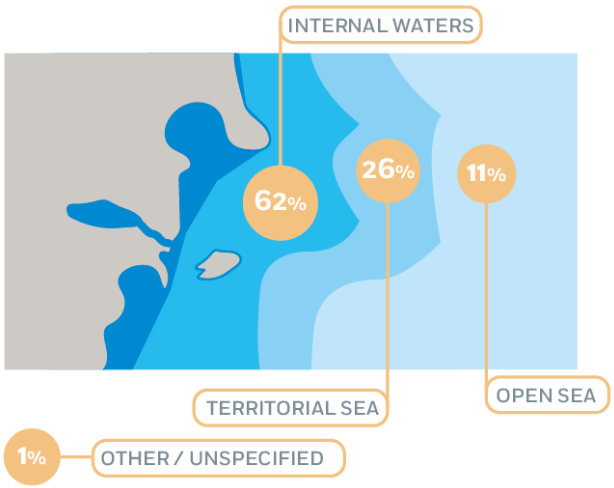
While ships carrying only passengers are mainly involved in casualties during the “en route” phase of the voyage, it was noted that Passenger and Ro-Ro cargo ships (eg ferries) show a more regular distribution among the various segments, as arrival and departures segments are equal or more numerous than the “en route” one.

5.3.2 Location

Figure 5.9: Distribution by location of marine casualties and incidents per passenger ship type for 2014-2020



	Inland waters	Internal waters	Open sea	Territorial sea	Other / Unspecified	Total
OP - Domestic	7	478	59	390	2	936
OP - International	4	294	227	150	10	685
OP - Port or internal waters	12	203	3	33	0	251
OP - Other / Unspecified	20	555	177	237	2	991
Passenger and general cargo	2	95	10	41	0	148
PRC - Domestic	1	747	21	246	8	1023
PRC - International	1	254	31	107	6	399
PRC - Other / Unspecified	5	1016	120	323	8	1472
Other / Unspecified Passenger ship	0	15	2	3	1	21
Total	52	3657	650	1530	37	5926



Whatever the type of passenger ship, the great majority of accidents (61.7%) take place in internal waters, in line with the high percentage of events during the anchorage, arrival or departure phases.

5.4 Accidental events and contributing Factors

Investigators look for the factors contributing to marine casualties and incidents in the analysis phase. Such causes are made up of accident events (underlying factors) and contributing factors.

Each marine casualty can have one or more casualty events. More than one accident events can be associated to a casualty event. The five accident events types are: human action, system or equipment failure, other agent or vessel, hazardous material and unknown.

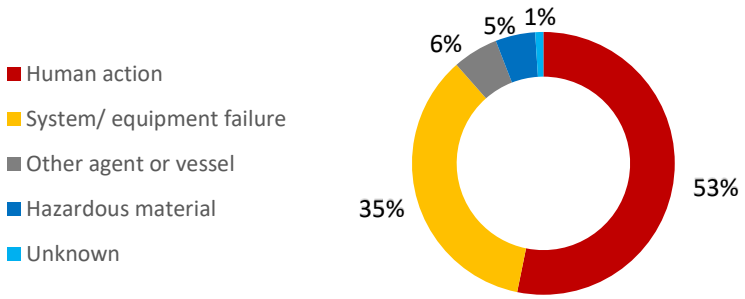
Each casualty event can have one or several contributing factors. Contributing factors have the following three main categories: external environment, shore management and shipboard operation.

5.4.1 Analysis of Accident events in EMCIP

Each investigated marine casualty with analysis data included in EMCIP can have one or more accident events so, it is possible to obtain two distributions, as explained above:

- Distribution of accident event types; and
- Distribution of accident event types related to the investigated marine accidents.

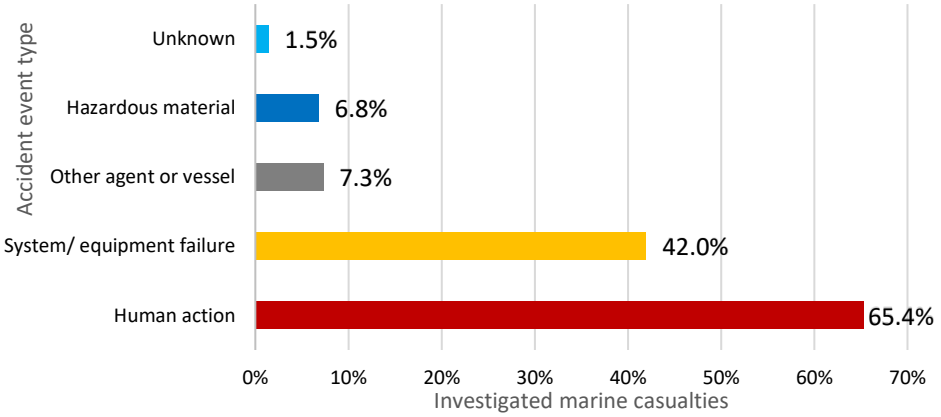
Figure 5.10: Distribution of accident events types for the period 2014-2020



Passenger ships have the same trend for accident event distribution than marine casualties in general. The distribution of the accident events by type has the same trend than from period from 2014 to 2019, with 53.2% of human action accident events and 35.3% of system /equipment failure.

In comparison with the period from 2014 to 2019, only system/equipment failure accident events have increased the percentage.

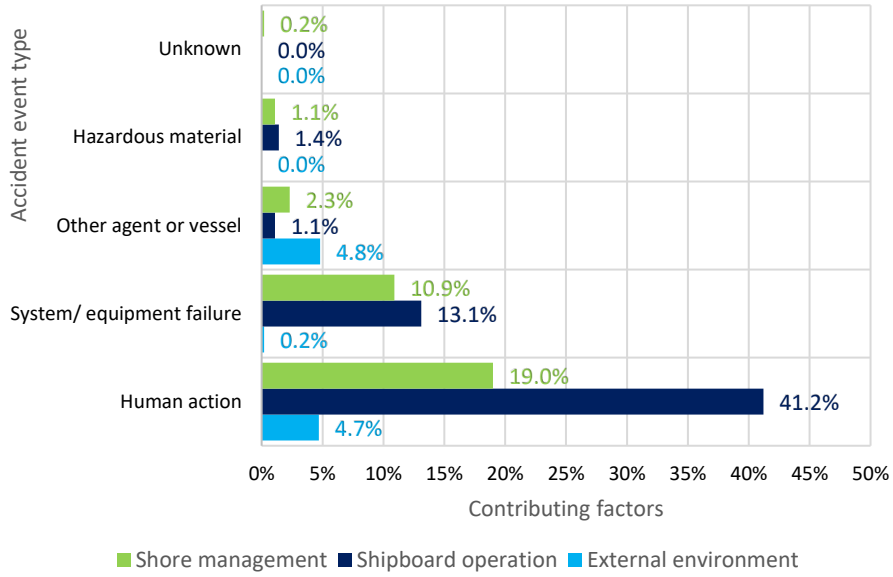
Figure 5.11: Distribution of accident event types related to the investigated marine accidents for the period 2014-2020



For passenger ships, Human action is related to the 65.4% of the investigated marine casualties. Human action and system/equipment failure accident events are the most important accident event types.

5.4.2 Analysis of contributing factors in EMCIP

Figure 5.12: Distribution of contributing factors in the accident event types for the period 2014-2020



For passenger ships, 64.9% of the contributing factors in EMCIP are related to human action accident events and 24.2% to system /equipment failure accident events.

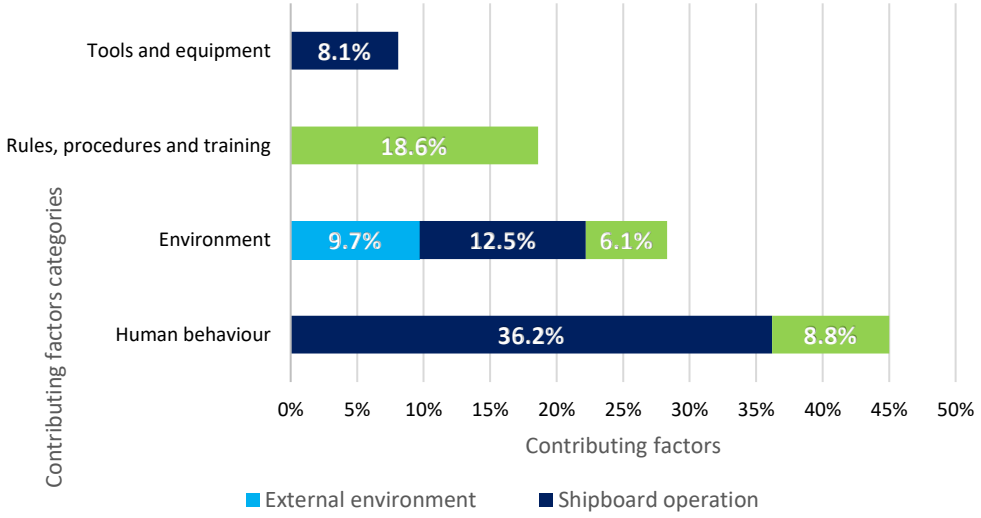
Shipboard operation contributing factors are the most frequently associated to accident events with a total of 56.8%. Shore management contributing factors are the second most frequently associated to accident events with a 33.5% of the contributing factors.

Each main category of contributing factors is divided in second level categories. These categories can be simplified by cataloguing them in only four categories, as explained above:

- Human behaviour.
- Environment (internal or external).
- Rules, procedures and training.
- Tools and equipment.

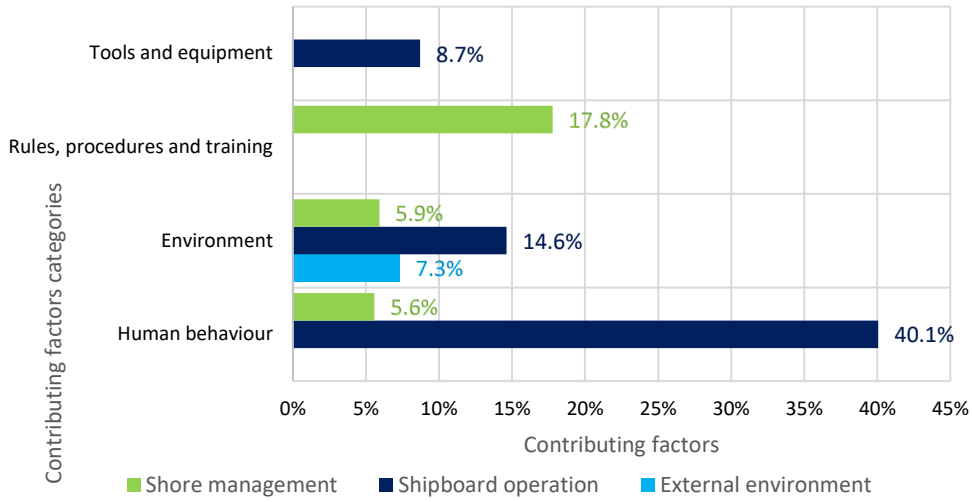
Second level contributing factors for each accident event type are grouped for main contributing factors categories in the following charts.

Figure 5.13: Contributing factors distributed by categories



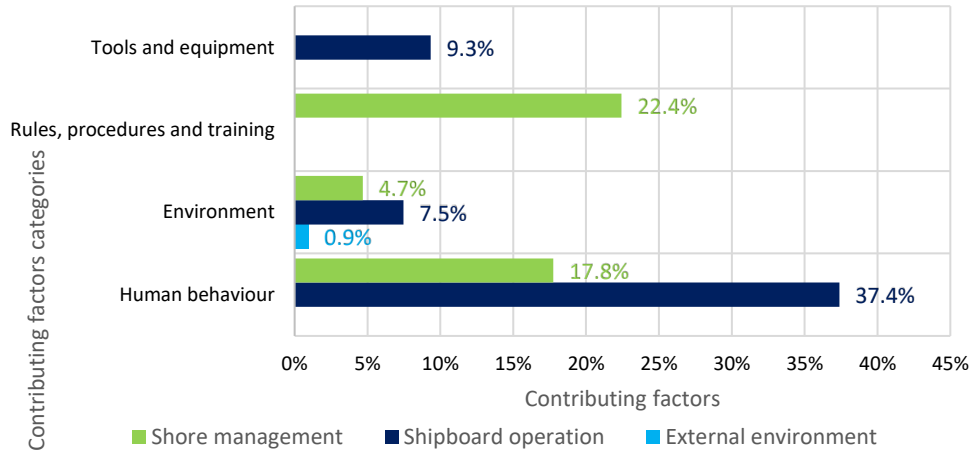
For passenger ships, the trend is the same than in the analysis of all the whole fleet. 45.0% of the contributing factors in EMCIP are related to human behaviour, 28.3% to environment and 18.6% to rules, procedures and training.

Figure 5.14: Contributing factors involved in human action accident events, distributed by categories



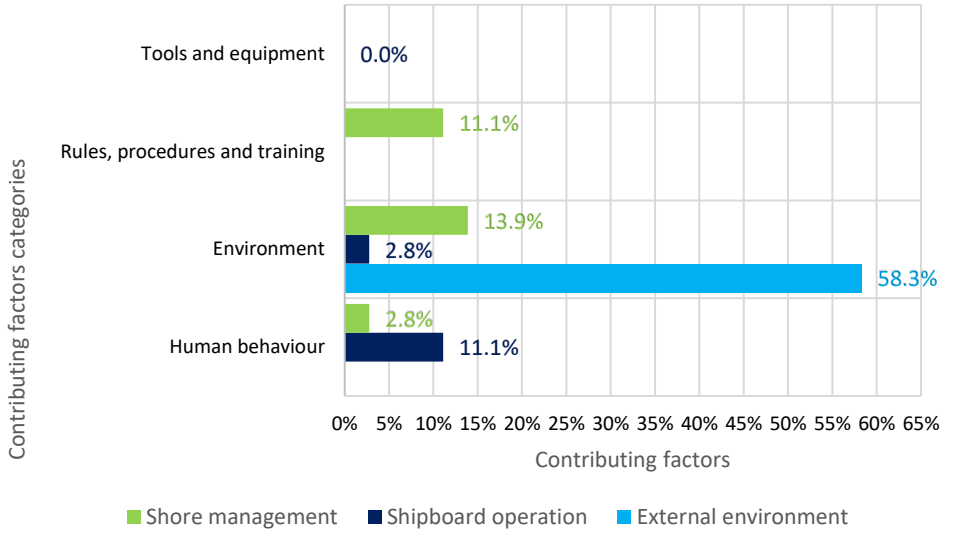
For passenger ships and human action accident events, the trend is the same than in the analysis of all the contributing factors for all the accident events. 45.6% of the contributing factors in EMCIP are related to human behaviour, 27.9% to environment, and 17.8% to rules, procedures and training.

Figure 5.15: Contributing factors involved in system/equipment failure accident events, distributed by categories



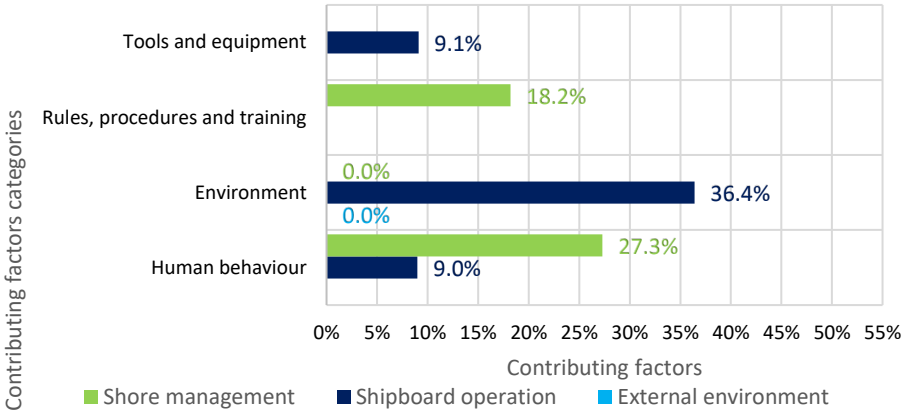
For passenger ships and system/equipment failure accident events, the trend has changed in environment and rules, procedures and training, comparing with the analysis of all the contributing factors for all the accident events. 55.2% of the contributing factors in EMCIP are related to human behaviour, 22.4% to rules, procedures and training and 13.1% to environment.

Figure 5.16: Contributing factors involved in other agent or vessel accident events, distributed by categories



For passenger ships and other agent or vessel accident events, the trend has changed in environment and human behaviour, comparing with the analysis of all the contributing factors for all the accident events, but is the same trend than for other agent or vessel accident events in the whole fleet. 75.0% of the contributing factors in EMCIP are related to environment, 13.9% to human behaviour and 11.1% to rules, procedures and training.

Figure 5.17: Contributing factors involved in hazardous material accident events, distributed by categories



For passenger ships and hazardous material accident events, 36.4% of the contributing factors in EMCIP are related to environment, 36.3% to human behaviour and 18.2% to rules, procedures and training.

5.4.3 Analysis of human element

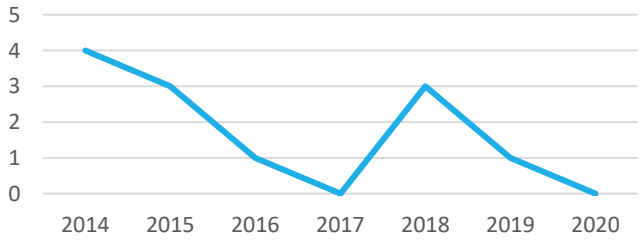
For passenger ships, 89.1% of the reported safety investigations have human action accident events or contributing factors catalogued as human behaviour, so they are affected by human element.

Figure 5.18: Influence of human element

5.5 Consequences

5.5.1 Consequences to ships

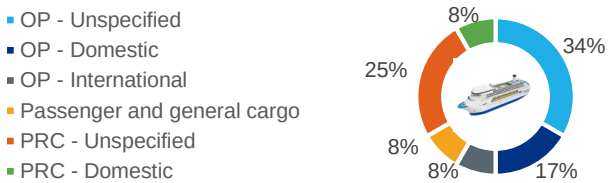
Figure 5.19: Passenger ships lost



	2014	2015	2016	2017	2018	2019	2020
Passenger ships lost	4	3	1	0	3	1	0

As in 2017, no passenger ship was lost in 2020.

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

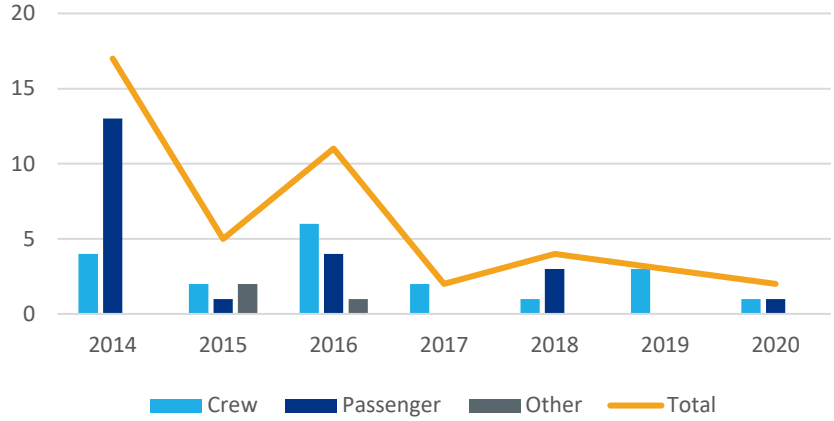


OP	4
OP - Domestic	2
OP - International	1
Passenger and general cargo - Domestic	1
PRC	3
PRC - Domestic	1
Total passenger ships lost	12

5.5.2 Consequences to persons

5.5.2.1 Fatalities

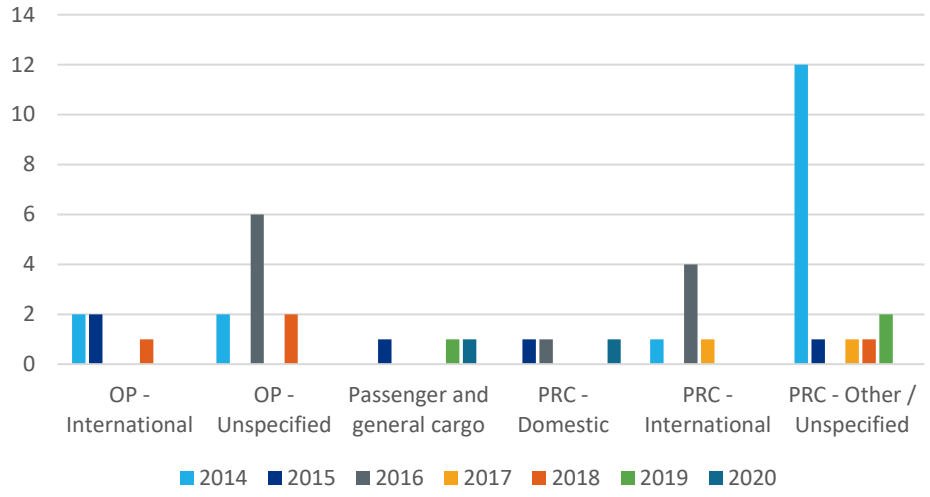
Figure 5.20: Number of fatalities



As in 2017, the number of fatalities was at its lowest level, with 2 lives lost.
The number of victims was almost equally shared between passengers and crew members.

	2014	2015	2016	2017	2018	2019	2020	Total
Crew	4	2	6	2	1	3	1	19
Passenger	13	1	4	0	3	0	1	22
Other	0	2	1	0	0	0	0	3
Total	17	5	11	2	4	3	2	44

Figure 5.21: Distribution of fatalities per passenger ship type

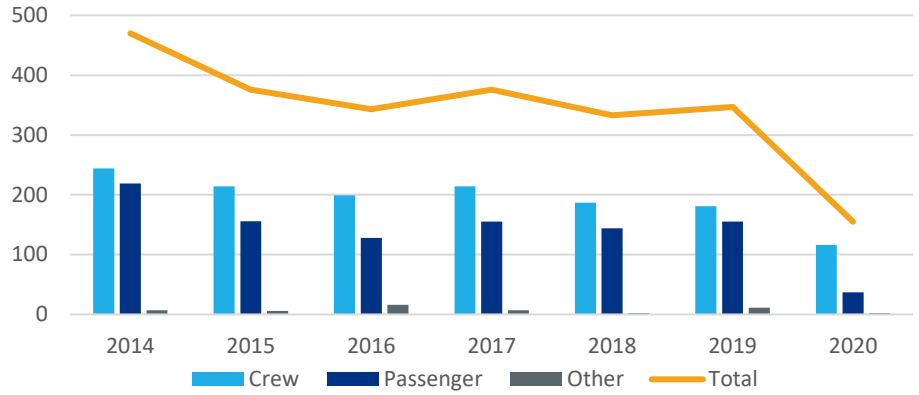


The abnormally high number of fatalities recorded in 2014 is explained by the death of 11 persons during fire of Norman Atlantic on 28/12/2014. 59.1% of the fatalities took place on Passenger and Ro-Ro cargo ships, also known as "ferries".

	2014	2015	2016	2017	2018	2019	2020	Total
OP - International	2	2	0	0	1	0	0	5
OP - Unspecified	2	0	6	0	2	0	0	10
Passenger and general cargo	0	1	0	0	0	1	1	3
PRC - Domestic	0	1	1	0	0	0	1	3
PRC - International	1	0	4	1	0	0	0	6
PRC - Other / Unspecified	12	1	0	1	1	2	0	17
Total	17	5	11	2	4	3	2	44

5.5.2.2 Injuries

Figure 5.22: Number of injuries

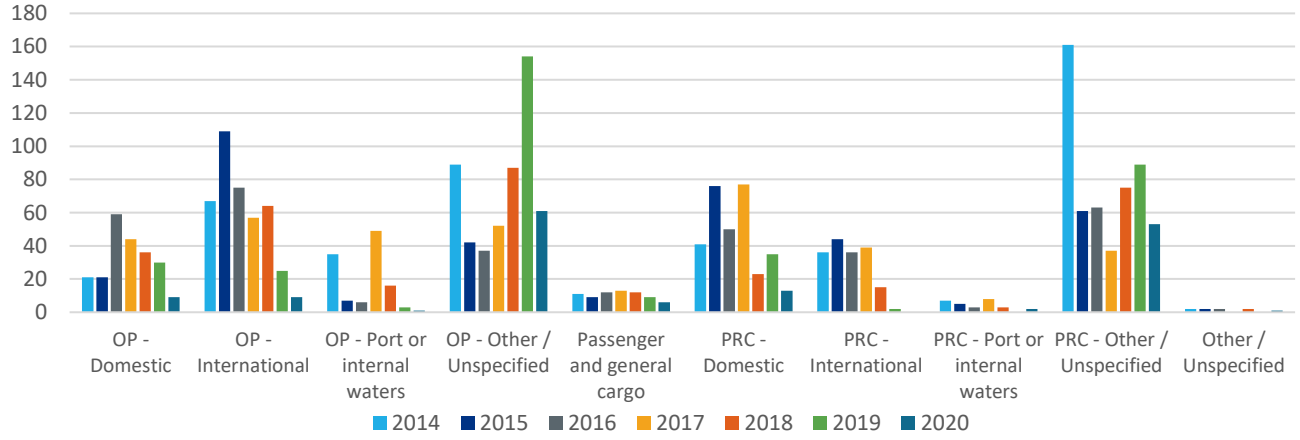


Since 2015, the annual total of injured persons has stabilised around an average of 350. It was divided by more than 2 in 2020.

Over the period, crew members remained more affected than the passengers.

	2014	2015	2016	2017	2018	2019	2020	Total
Crew	244	214	199	214	187	181	116	1355
Passenger	219	156	128	155	144	155	37	994
Other	7	6	16	7	2	11	2	51
Total	470	376	343	376	333	347	155	2400

Figure 5.23: Distribution of injuries by passenger ship types



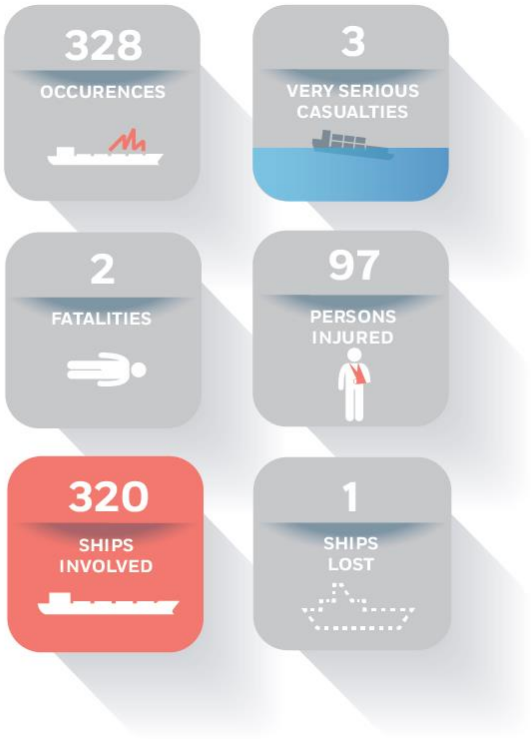
	2014	2015	2016	2017	2018	2019	2020	Total
OP - Domestic	21	21	59	44	36	30	9	220
OP - International	67	109	75	57	64	25	9	406
OP - Port or internal waters	35	7	6	49	16	3	1	117
OP - Other / Unspecified	89	42	37	52	87	154	61	522
Passenger and general cargo	11	9	12	13	12	9	6	72
PRC - Domestic	41	76	50	77	23	35	13	315
PRC - International	36	44	36	39	15	2	0	172
PRC - Port or internal waters	7	5	3	8	3	0	2	28
PRC - Other / Unspecified	161	61	63	37	75	89	53	539
Other / Unspecified	2	2	2	0	2	0	1	9
Total	470	376	343	376	333	347	155	2400

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 52.7% of the total injured persons, while ferries accounted for 43.9%.

Chapter 6: SERVICE SHIPS

KEY FIGURES 2020



Collision between Offshore Supply ship La Cassidaigne and Service ship “CB20” on 07/10/2020

6.0 Executive summary about Service Ships

Records related to service ships showed for 2020 some continued improvements.

The service ships occurrence indicator has the best value (84) among all ship types (181). It was also noted that the indicator decreased regularly from 2014 (100) to 2020 (64).

Over the period 2014-20202856 service ships were involved in 2741 marine casualties or incidents. Since 2014, the number of service ships involved decreased from 487 to 353, the average number over the period being 408. Among the various types of service ships, the very low indicators related to offshore supply vessels (29) and tugs (42) should be mentioned. If tugs indicator remained stable during the past years, the OSV indicator decreased from 61 to only 2 over 2014-2020.

Among the service ships, tugs represented the main type of all service ships involved (25%), followed by the special purpose ship (15%).

The rate of Very Serious casualties is 2.33%, and 20.2% 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.

From 2014 to 2020, more than half of the casualties with a ship (58.4%) were related to issues of a navigational nature, such as contacts, grounding/stranding and collision. As concerns occurrences to person(s), 33.5% were attributed to slipping, stumbling and falling of persons.

The lost service ships remained constant and low during the past years, the average over the period 2014-2020 being less than 3 ships lost per year. In 2020, only one service ship was lost.

Over the 2014-2020 period, 34 occurrences resulted in 50 fatalities. With 2 lives lost in 2020, the trend noted from 2015 to 2018 was continued. 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 an unusual total of 18. Crew have been the most impacted category of victims over this period with 48 fatalities.

In 2020, there were 97 injured persons reported. This number has continuously decreased since 2014.. Again, crew represent the main category of persons injured at sea (801, out of a total of 843 during the 2014-2020 period).

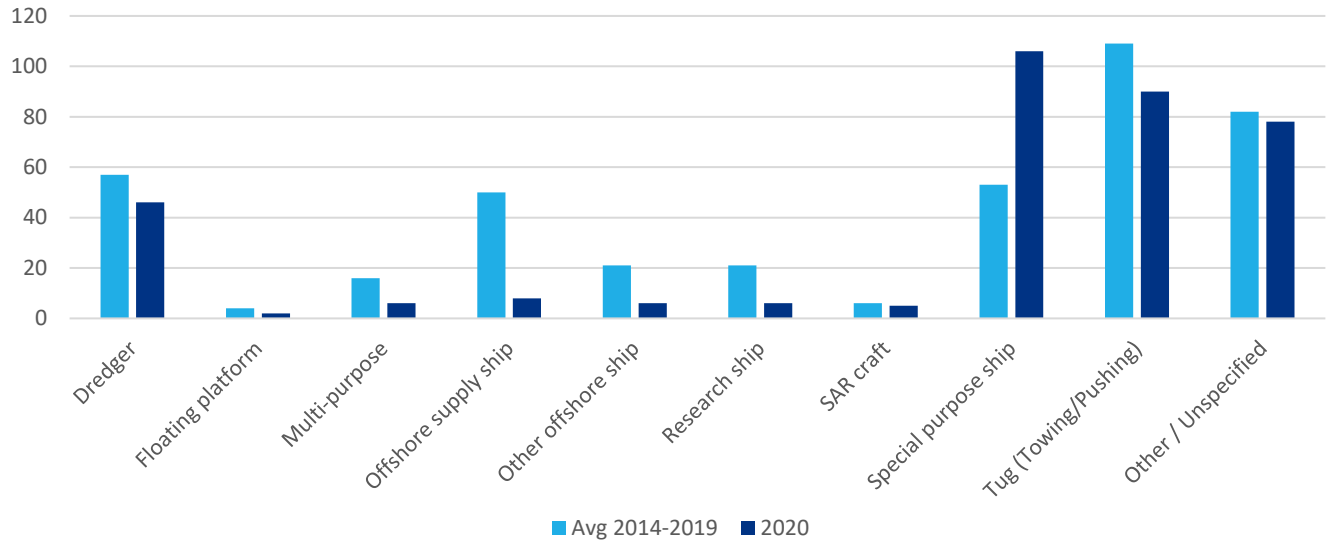
The departure phase was the safest segment (6%) of a voyage and “en route” was the most unsafe (42%). It was noted more than 27% of the casualties occurred in internal waters and 86% in coastal waters.

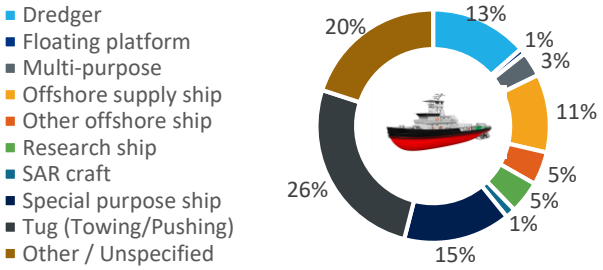
Analysis of underlying factors leading to casualties showed that 91.2% were related to “Human Action”, which is slightly higher to the ones for the other categories of ships. Shipboard operations represented 58.4% of the reported contributing factors, which is similar to all ship types figures.

In conclusion, with the exception of the Bourbon Rhode accident in 2019, most of the indicators, such as the occurrence indicator, the number of ships involved, number of fatalities, etc, indicated in 2020 a continuous improvement.

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	2020	Total
Dredger	79	44	59	54	52	52	46	386
Floating platform	5	3	4	5	2	2	2	23
Multi-purpose	10	15	20	24	11	13	6	99
Offshore supply ship	88	76	60	41	31	6	8	310
Other offshore ship	34	32	20	19	15	5	6	131
Research ship	27	17	25	22	16	16	6	129
SAR craft	6	8	7	4	4	6	5	40
Special purpose ship	24	51	33	32	82	96	106	424
Tug (Towing/Pushing)	105	119	115	108	108	98	90	743
Other / Unspecified	109	70	54	86	87	87	78	571
Total	487	435	397	395	408	381	353	2856

The decrease started in 2015 continued for most of the sub-categories over the period 2015-2020. However, an increase (10%) of occurrences related to Special Purpose Ships was noted in 2020.

Figure 6.2 Occurrence Indicators per service ship types

In order to draw objective comparisons between the different types of service ships and its evolutions, the following ratios between the number of occurrences involving a service ship and the corresponding fleet size over 2014 – 2020 were calculated. It covers only occurrences that involved service ships with an EU Flag and an IMO number.

Occurrences	Dredger	Offshore supply ship	Tug	Other Service ship	Total
2014	74	73	78	116	341
2015	42	65	83	106	296
2016	56	49	88	91	284
2017	44	31	80	100	255
2018	47	22	76	122	267
2019	45	3	79	133	260
2020	38	5	74	126	243

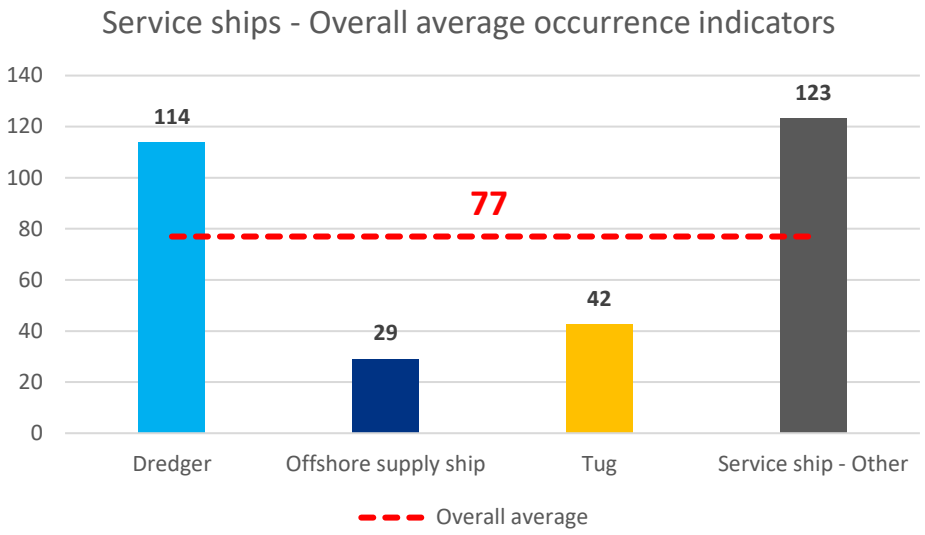
The reported accidents between 2014-2020 described a decreasing trendline, more appreciable between 2014-2017 and then steady afterwards.

Fleet	Dredger	Offshore supply ship	Tug	Other Service ship	Total
2014	451	1187	1837	878	4353
2015	437	1235	1875	892	4439
2016	434	1258	1892	904	4488
2017	432	1215	1900	874	4421
2018	428	1172	1883	890	4373
2019	418	1227	1869	976	4490
2020	429	1218	1889	1023	4559

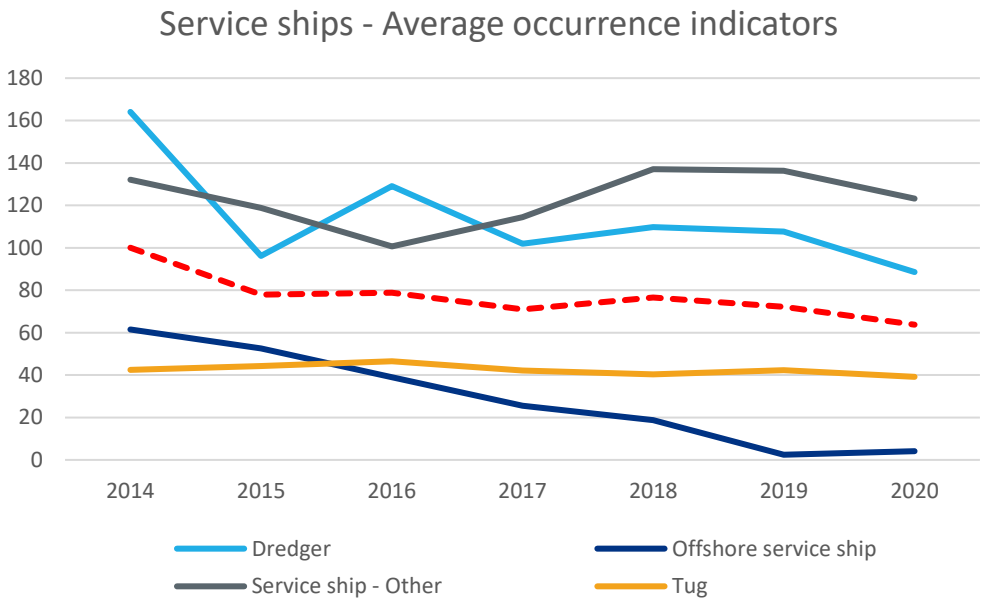
The number of service ships between 2014-2020 remained substantially stable, with a yearly average of 4,446 EU-flagged ships. Tugs and Offshore supply ships are the most common sub-types encompassing 42% and 27% of the fleet size.

Occurrences indicator	Dredger	Offshore supply ship	Tug	Other service ship	Average per year
2014	164	61	42	132	**100**
2015	96	53	44	119	**78**
2016	129	39	47	101	**79**
2017	102	26	42	114	**71**
2018	110	19	40	137	**77**
2019	108	2	42	136	**72**
2020	89	4	39	123	**64**
Average per ship type	**114**	**29**	**42**	**123**	**77**

The average indicator regularly decreased since 2014, from 100 to 64.



The service ships are divided in two categories: Dredgers and Others, with an occurrence indicator more than 50% above the average, in comparison with the Offshore supply ship and Tugs showing an indicator more than 50% less than the average.

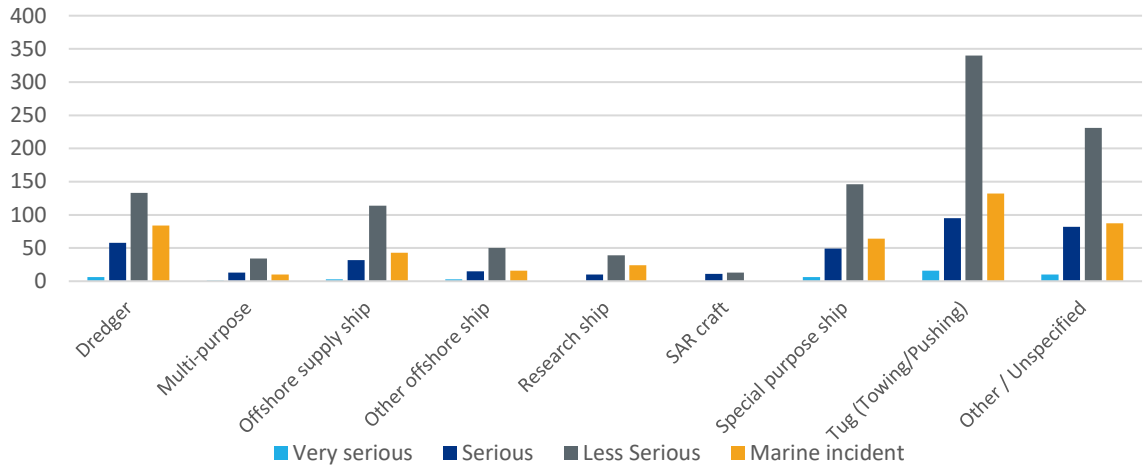


"Dredger" significantly decreased in 2015 and kept a horizontal trend until 2020.
"Offshore supply ships" index dropped sharply between 2014 and 2019; then it slowly raised in 2020.
The pattern described by "tugs" appears very stable over the entire period.
"Other service ships" presents a sideways trend, with a trough in 2016, increasing until 2019, then decreasing in 2020.

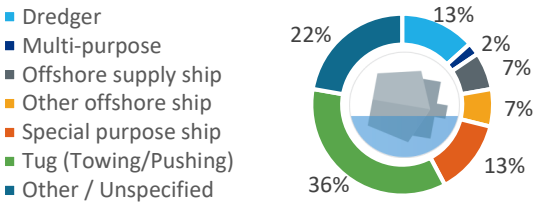
6.2 Nature of marine casualties and incidents

6.2.1 Occurrence with ship(s)

Figure 6.3: Distribution of severity per service ship type for 2014-2020

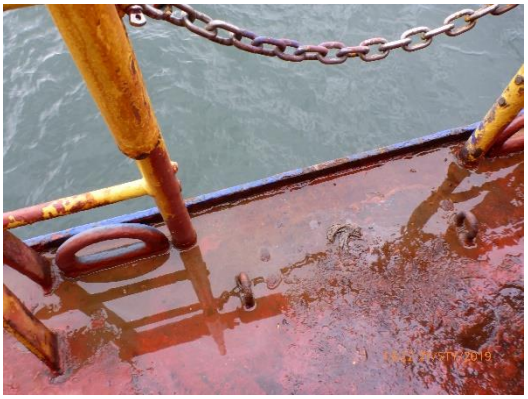


	Very serious	Serious	Less Serious	Marine incident	Total
Dredger	6	58	133	84	281
Multi-purpose	1	13	34	10	58
Offshore supply ship	3	32	114	43	192
Other offshore ship	3	15	50	16	84
Research ship	0	10	39	24	73
SAR craft	0	11	13	0	24
Special purpose ship	6	49	146	64	265
Tug (Towing/Pushing)	16	95	340	132	583
Other / Unspecified	10	82	231	87	410
Total	45	365	1100	460	1970



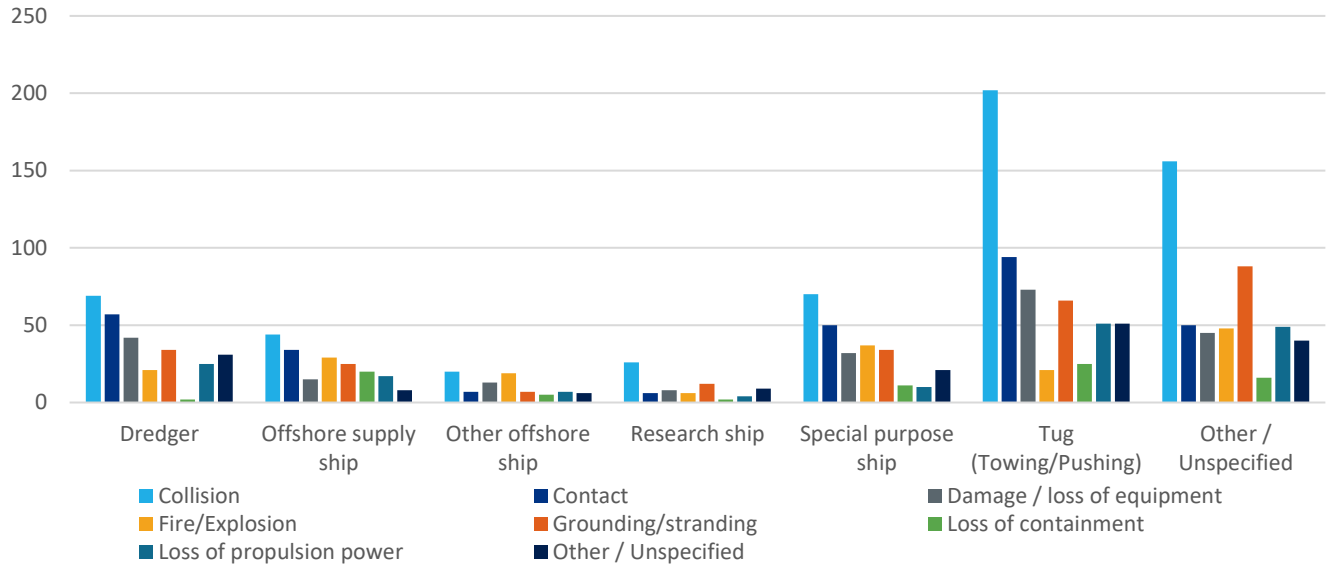
Tugs represent the category that has suffered one third of all very serious accidents.
Very serious encountered for 2.3% of all occurrences, in line with the percentage when looking at all ship types.

In case of serious occurrences, service ships recorded a rate of 18.5%, a bit lower that the 25% of serious for all ship types.



Braking pilot ladder on board MV San Diego, resulting in the fall of the pilot on the deck of the pusher Nosorozec G-01, on 19/01/2019.

Figure 6.4: Distribution of casualty events per service ship type for 2014-2020

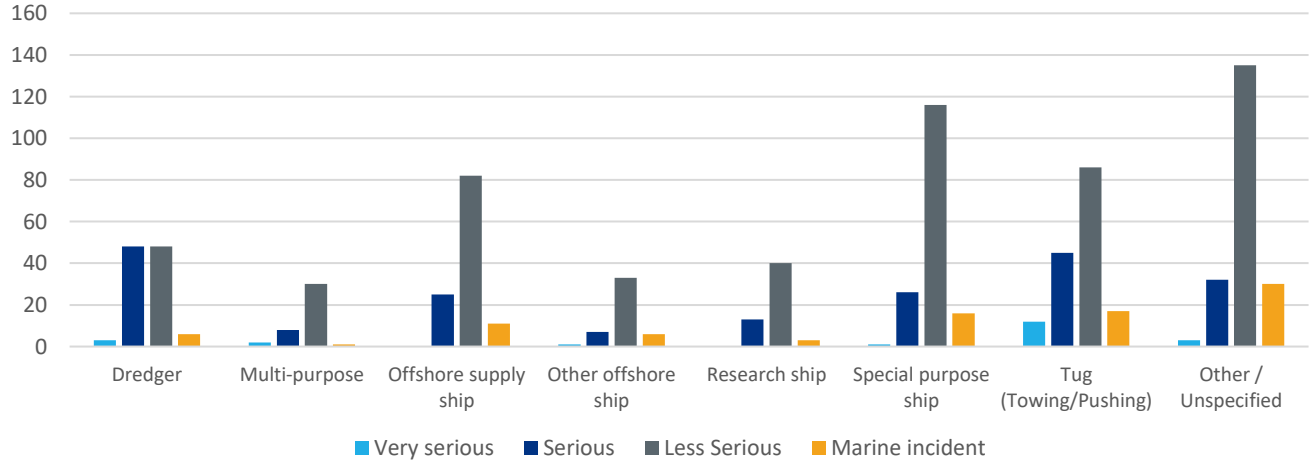


	Collision	Contact	Damage / loss of equipment	Fire / Explosion	Grounding / Stranding	Loss of containment	Loss of propulsion power	Other / Unspecified	Total
Dredger	69	57	42	21	34	2	25	31	281
Offshore supply ship	44	34	15	29	25	20	17	8	192
Other offshore ship	20	7	13	19	7	5	7	6	84
Research ship	26	6	8	6	12	2	4	9	73
Special purpose ship	70	50	32	37	34	11	10	21	265
Tug (Towing/Pushing)	202	94	73	21	66	25	51	51	583
Other / Unspecified	156	50	45	48	88	16	49	40	492
Total	587	298	228	181	266	81	163	166	1970

Navigational issues consisting in collision, contacts and groundings / strandings encountered for more than half of the casualty events (58.4%), tugs being involved in 31.4% of them.

6.2 Occurrence with person(s)

Figure 6.5: Severity of occurrence with person(s)s per service ship type for 2014-2020



	Very serious	Serious	Less Serious	Marine incident	Total
Dredger	3	48	48	6	105
Multi-purpose	2	8	30	1	41
Offshore supply ship	0	25	82	11	118
Other offshore ship	1	7	33	6	47
Research ship	0	13	40	3	56
Special purpose ship	1	26	116	16	159
Tug (Towing/Pushing)	12	45	86	17	160
Other / Unspecified	3	32	135	30	200
Total	22	204	570	90	886

The majority of the very serious accidents occurred by far on-board tug ships (55%). The serious ones are equally shared between tugs and dredgers. The highest rate of less serious accidents was noted against the special purpose ships.

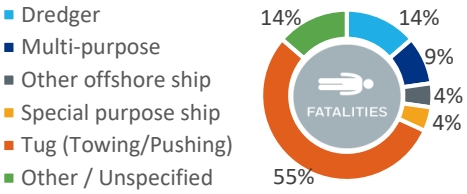
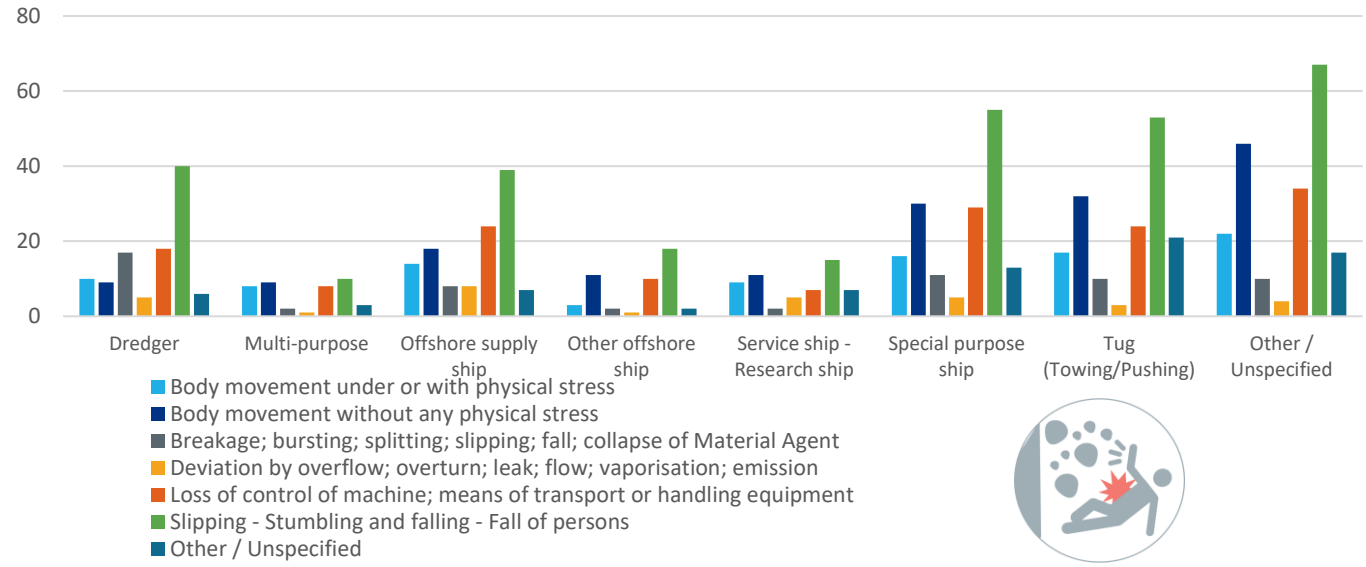


Figure 6.6: Distribution of deviations per service ship type for 2014-2020



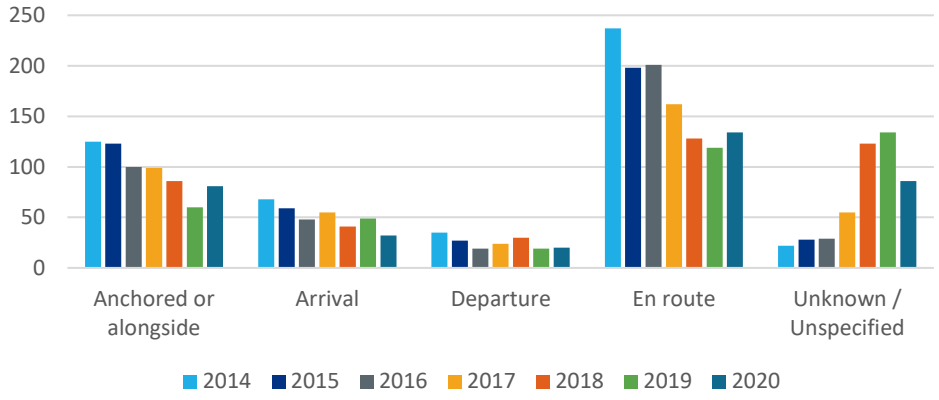
	Body movement under or with physical stress	Body movement without any physical stress	Breakage; bursting; splitting; slipping; fall; collapse of Material Agent	Deviation by overflow; overturn; leak; flow; vaporisation; emission	Loss of control (total or partial) of machine; means of transport or handling equipment	Slipping - Stumbling and Falling - Fall of persons	Other / Unspecified	Total
Dredger	10	9	17	5	18	40	6	105
Multi-purpose	8	9	2	1	8	10	3	41
Offshore supply ship	14	18	8	8	24	39	7	118
Other offshore ship	3	11	2	1	10	18	2	47
Research ship	9	11	2	5	7	15	7	56
Special purpose ship	16	30	11	5	29	55	13	159
Tug (Towing/Pushing)	17	32	10	3	24	53	21	160
Other / Unspecified	22	46	10	4	34	67	17	200
Total	99	166	62	32	154	297	76	886

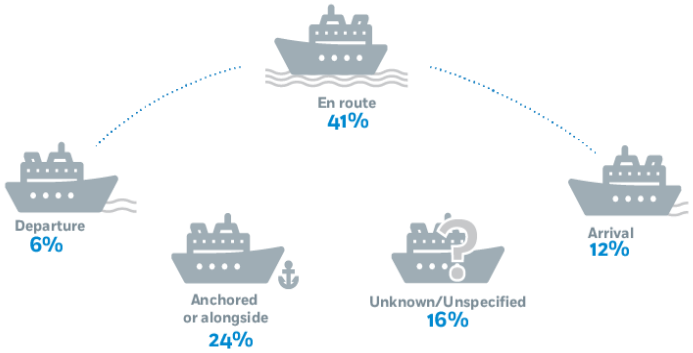
Falls on service ships represent, whatever the type of ships, the main deviation (33.5%).

6.3 Location of the marine casualties and incidents

6.3.1 Voyage segments

Figure 6.7: Distribution by voyage segment



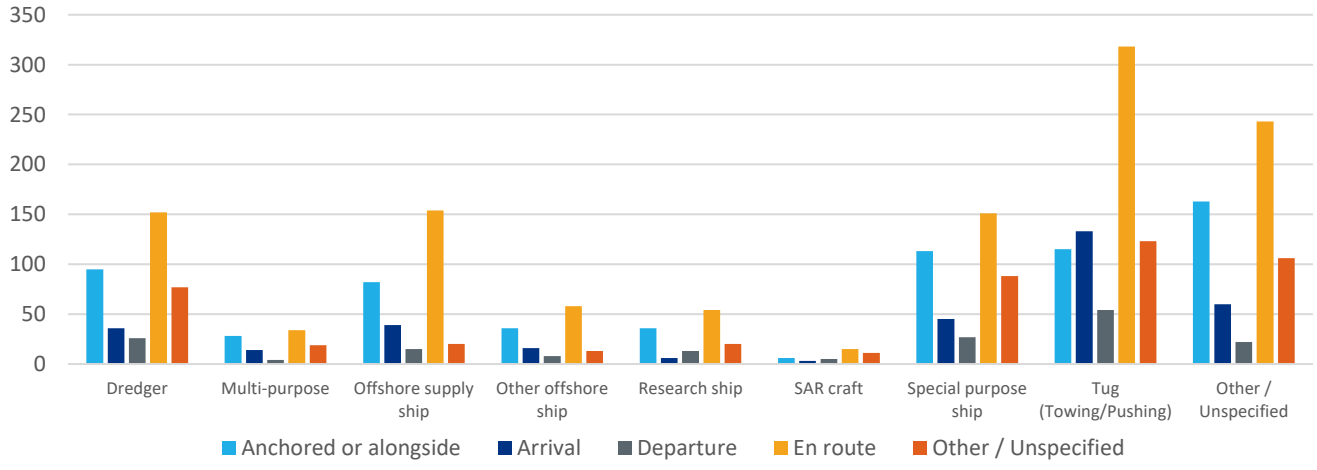


The phase "en route" represents the least safe voyage segment with 41% of all occurrences.

Service ships at anchorage or alongside were also regularly involved in casualties.

	2014	2015	2016	2017	2018	2019	2020	Total
Anchored or alongside	125	123	100	99	86	60	81	674
Arrival	68	59	48	55	41	49	32	352
Departure	35	27	19	24	30	19	20	174
En route	237	198	201	162	128	119	134	1179
Unknown / Unspecified	22	28	29	55	123	134	86	477
Total	487	435	397	395	408	381	353	2856

Figure 6.8: Distribution by voyage segment per service ship type for 2014-2020

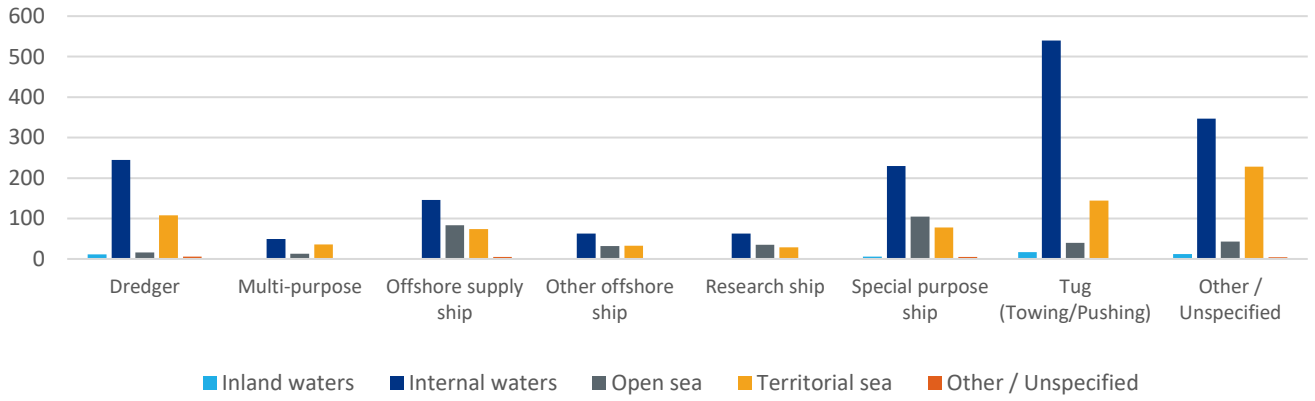


	Anchored or alongside	Arrival	Departure	En route	Unknown / Unspecified	Total
Dredger	95	36	26	152	77	386
Multi-purpose	28	14	4	34	19	99
Offshore supply ship	82	39	15	154	20	310
Other offshore ship	36	16	8	58	13	131
Research ship	36	6	13	54	20	129
SAR craft	6	3	5	15	11	40
Special purpose ship	113	45	27	151	88	424
Tug (Towing/Pushing)	115	133	54	318	123	743
Other / Unspecified	163	60	22	243	106	594
Total	674	352	174	1179	477	2856

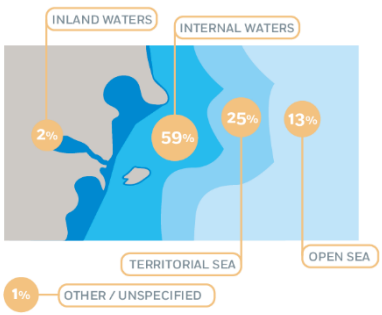
For all types of service ships, the unsafe segments are anchored /alongside or "en route".

6.3.2 Location

Figure 6.9: Distribution by location of marine casualties and incidents per service ship type for 2014-2020



	Inland waters	Internal waters	Open sea	Territorial sea	Other / Unspecified	Grand Total
Dredger	11	245	16	108	56	386
Multi-purpose	1	49	13	36	0	99
Offshore supply ship	2	146	83	74	5	310
Other offshore ship	1	63	32	33	2	131
Research ship	0	63	35	29	2	129
Special purpose ship	6	230	105	78	5	425
Tug (Towing/Pushing)	17	540	40	144	2	743
Service ship	12	347	43	228	4	634
Total	50	1683	367	730	26	2856



Internal waters were by far the main location of accidents 58.9%.

6.4 Accidental events and contributing Factors

Investigators look for the factors contributing to marine casualties and incidents in the analysis phase. Such causes are made up of accident events (underlying factors) and contributing factors.

Each marine casualty can have one or more casualty events. More than one accident events can be associated to a casualty event. The five accident events types are: human action, system or equipment failure, other agent or vessel, hazardous material and unknown.

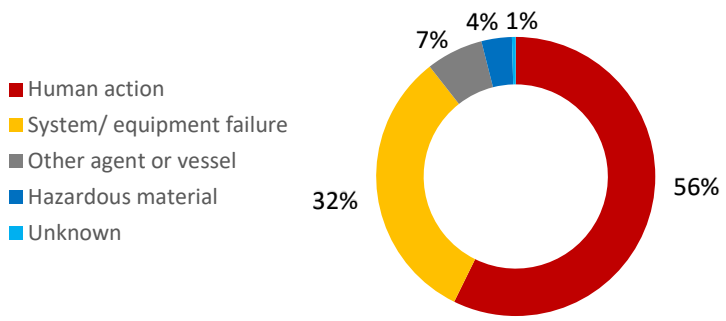
Each casualty event can have one or several contributing factors. Contributing factors have the three following main categories: external environment, shore management and shipboard operation.

6.4.1 Analysis of Accident events in EMCIP

Each investigated marine casualty with analysis data included in EMCIP can have one or more accident events so, it is possible to obtain two distributions, as explained above:

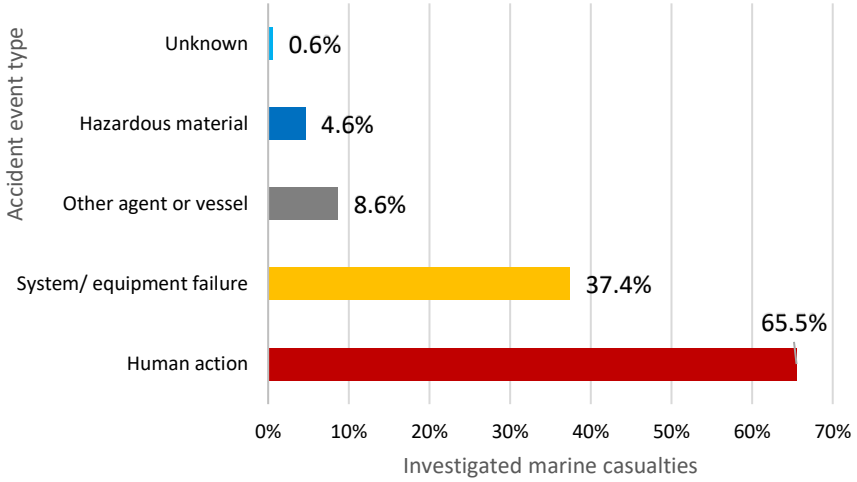
- Distribution of accident event types; and
- Distribution of accident event types related to the investigated marine accidents.

Figure 6.10: Distribution of accident events types for the period 2014-2020



Service ships show the same trend for accident event distribution than marine casualties in general. The distribution of the accident events by type has the same trend than from period from 2014 to 2019, with 57.3% of human action accident events and 32.2% of system /equipment failure accident events as the main values of the distribution. In comparison with the period from 2014 to 2019, only system/equipment failure accident events have increased the percentage.

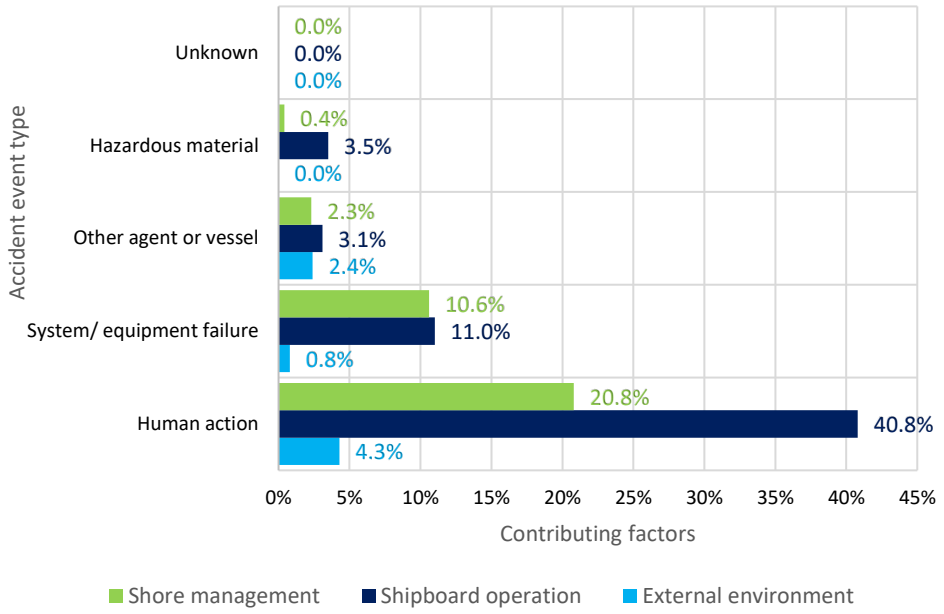
Figure 6.11: Distribution of accident event types related to the investigated marine accidents for the period 2014-2020



For service ships, Human action is reported in 65.5% of the investigated marine casualties. Human action and system/equipment failure accident events are the most important accident event types.

6.4.2 Analysis of contributing factors in EMCIP

Figure 6.12: Distribution of contributing factors in the accident event types for the period 2014-2020



For service ships, the trend is the same than in the analysis of all the whole fleet. 65.9% of the contributing factors in EMCIP are related to human action accident events and 22.4% system/equipment failure accident events.

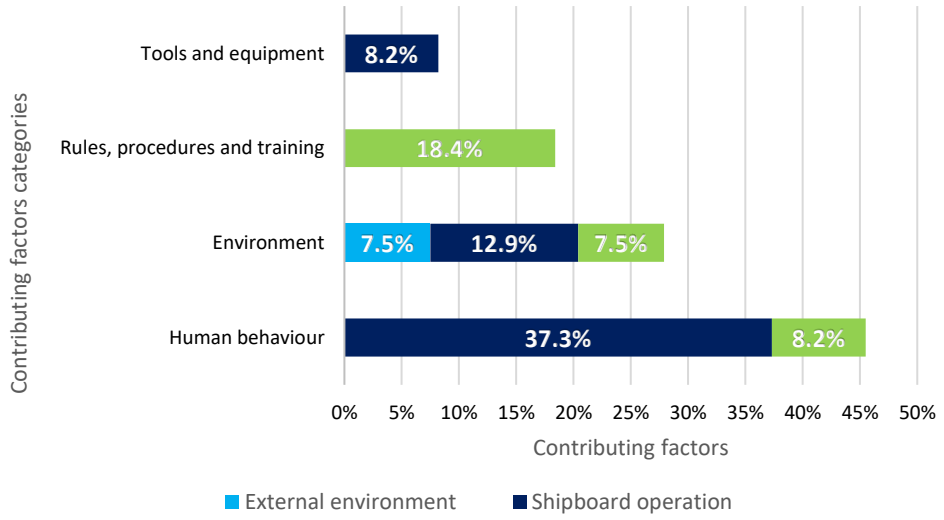
Shipboard operation contributing factors are the most frequently associated to accident events with a 58.4% of the contributing factors. Shore management contributing factors are the second most frequently associated to accident events with a 34.1% of the contributing factors.

Each main category of contributing factors is divided in second level categories. These categories can be simplified by cataloguing them in only four categories, as explained above:

- Human behaviour.
- Environment (internal or external).
- Rules, procedures and training.
- Tools and equipment.

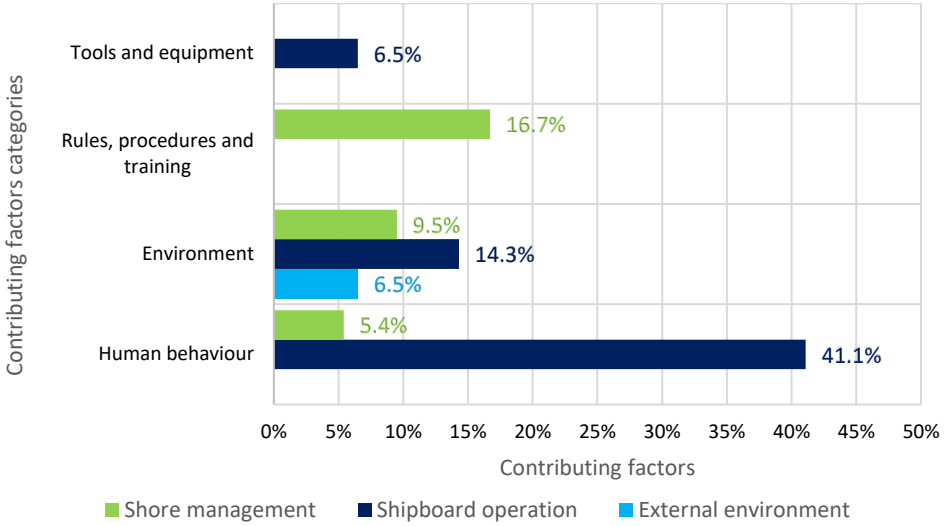
Second level contributing factors for each accident event type are grouped for main contributing factors categories in the following charts.

Figure 6.13: Contributing factors distributed by categories



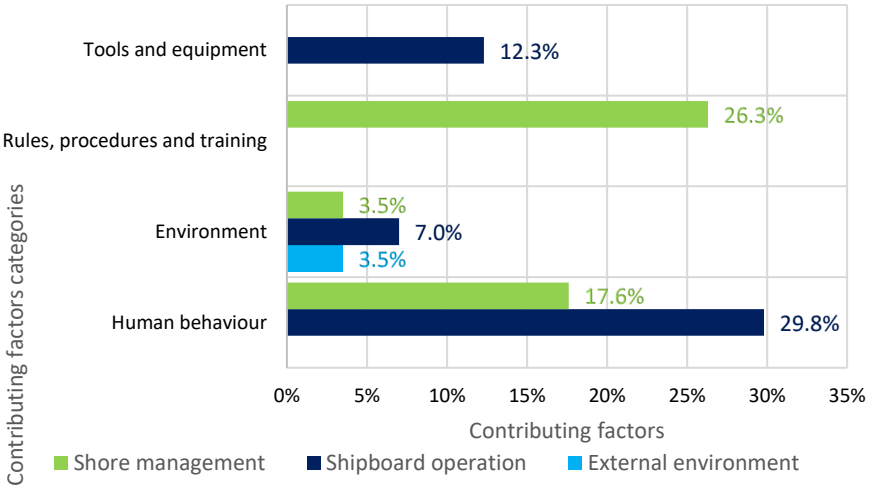
For service ships, the trend is the same than in the analysis of all the whole fleet. 45.5% of the contributing factors in EMCIP are related to human behaviour, 27.9% to environment and 18.4% rules, procedures and training.

Figure 6.14: Contributing factors involved in human action accident events, distributed by categories



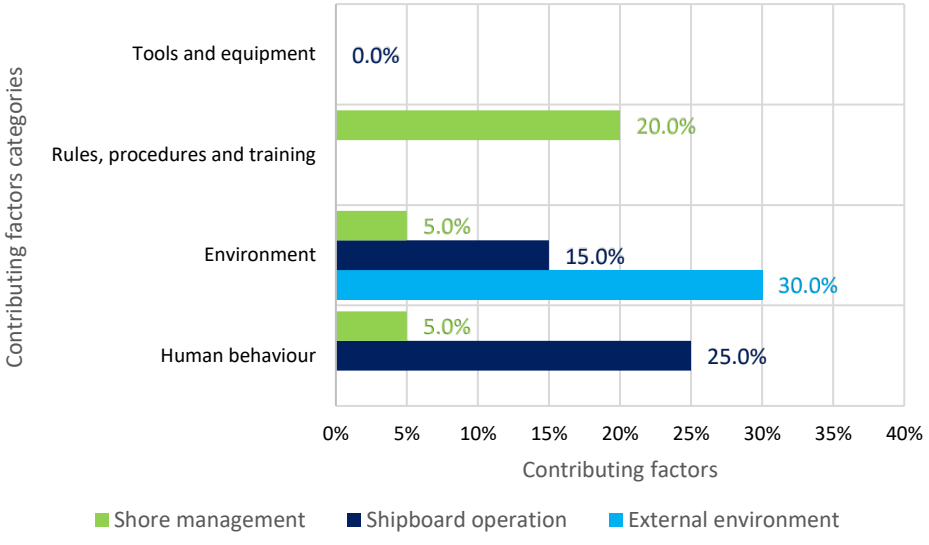
For service ships and human action accident events, the trend is the same than in the analysis of all the contributing factors for all the accident events. 46.5% of the contributing factors in EMCIP are related to human behaviour, 30.3% to environment and 16.7% to rules, procedures and training.

Figure 6.15: Contributing factors involved in system/equipment failure accident events, distributed by categories



For service ships and system/equipment failure accident events, the trend has changed in environment and rules, procedures and training, comparing with the analysis of all the contributing factors for all the accident events. 47.4% of the contributing factors in EMCIP are related to human behaviour, 26.3% to rules, procedures and training and 14.0% to environment.

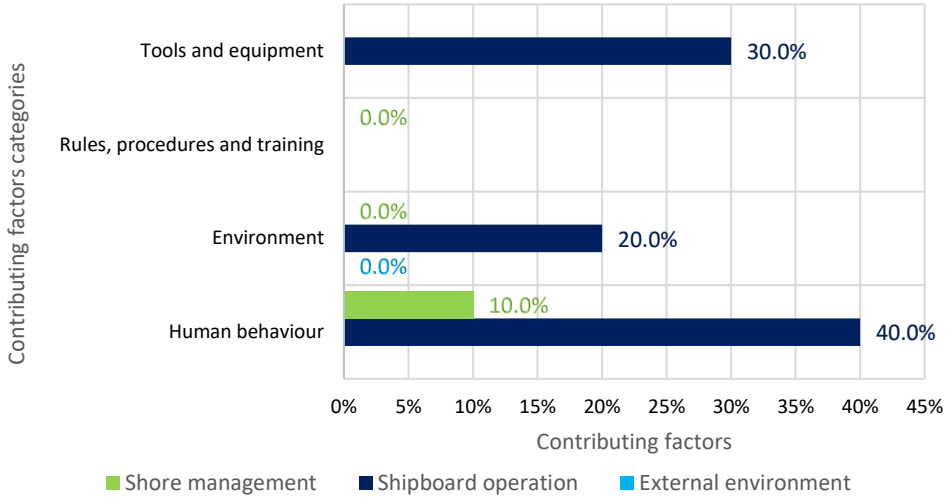
Figure 6.16: Contributing factors involved in other agent or vessel accident events, distributed by categories



For service ships and other agent or vessel accident events, the trend has changed in environment and human behaviour, comparing with the analysis of all the contributing factors for all the accident events, but is the same trend than for other agent or vessel accident events in the whole fleet.

50.0% of the contributing factors are related to environment, 30.0% to human behaviour and 20.0% to rules, procedures and training.

Figure 6.17: Contributing factors involved in hazardous material accident events, distributed by categories



For service ships and hazardous material accident events, 50.0% of the contributing factors in EMCIP are related to human behaviour, 30.0% to tools and equipment and 20.0% to environment.

6.4.3 Analysis of human element

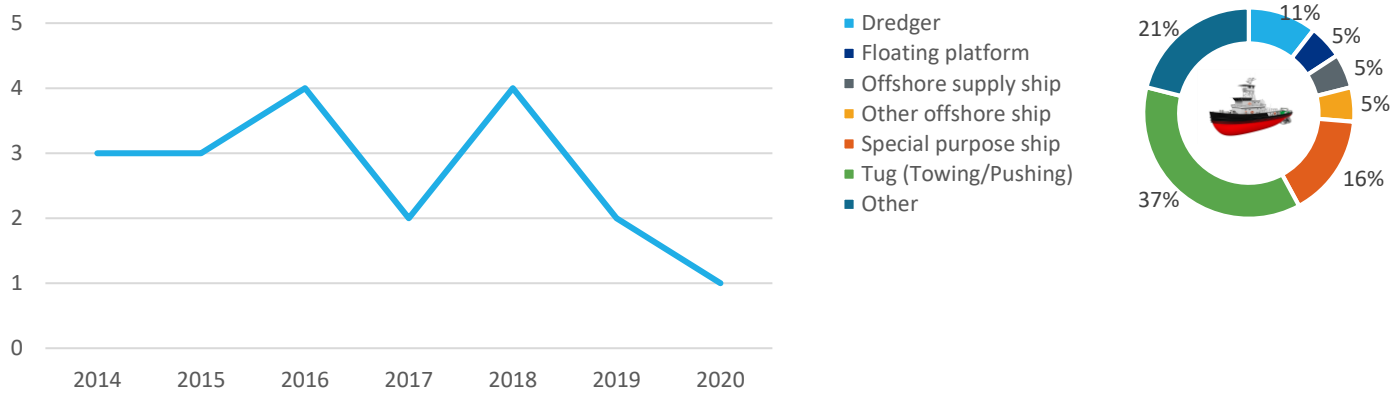
For "service ships", when combining Accident Events and Contributing Factors, 91.2% of investigations analysis quoted "human element" as part of the elements that led to the occurrence.

Figure 6.18: Human element influence

6.5 Consequences

6.5.1 Consequences to ships

Figure 6.19: Service ships lost



	2014	2015	2016	2017	2018	2019	2020
Service ships lost	3	3	4	2	4	2	1

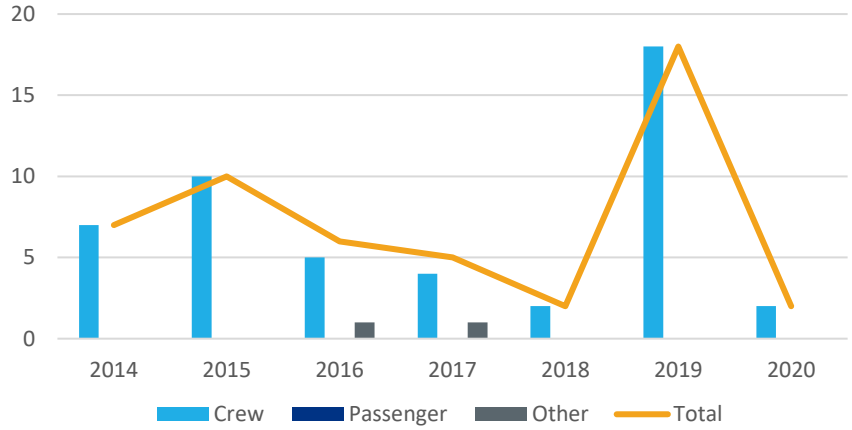
Dredger	2
Floating platform	1
Offshore supply ship	1
Other offshore ship	1
Special purpose ship	3
Tug (Towing / Pushing)	7
Other service ship	4
Total	19

In the reference period 2014 – 2019, the average number of service ships lost per year was 3. A decrease since 2018 was noted and only one service ship was lost in 2020. Of the 19 ships lost one third were tugs.

6.5.2 Consequences to persons

6.5.2.1 Fatalities

Figure 6.20: Number of fatalities

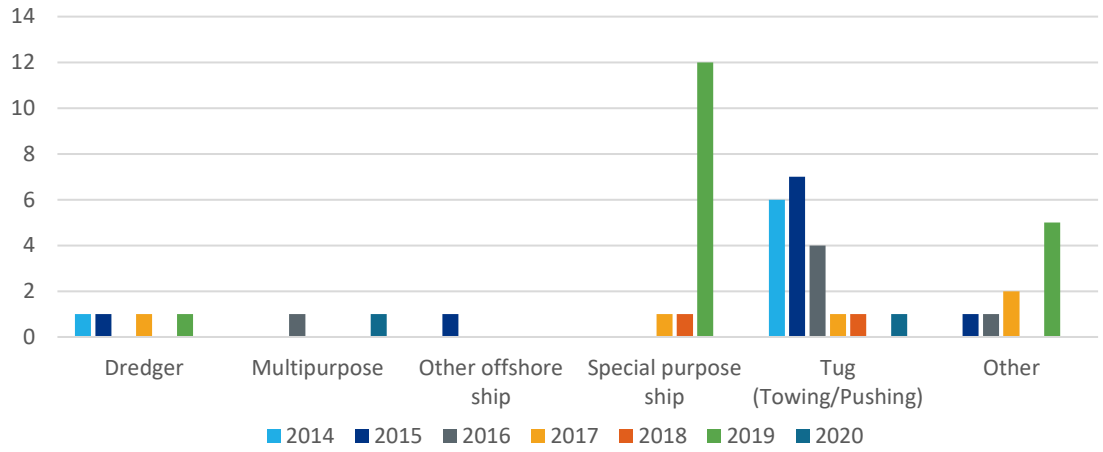


After a regular decrease in the number of fatalities from 2015 to 2018, a significant increase of deaths was noted in 2019. This is due to the sinking of the Bourbon Rhodes on 26 September that led to 4 lives lost and 7 persons being reported as missing. Only 2 fatalities occurred in 2020.

Almost all victims (96%) were crew members.

	2014	2015	2016	2017	2018	2019	2020	Total
Crew	7	10	5	4	2	18	2	48
Passenger	0	0	0	0	0	0	0	0
Other	0	0	1	1	0	0	0	2
Total	7	10	6	5	2	18	2	50

Figure 6.21: Distribution of fatalities per service ship type



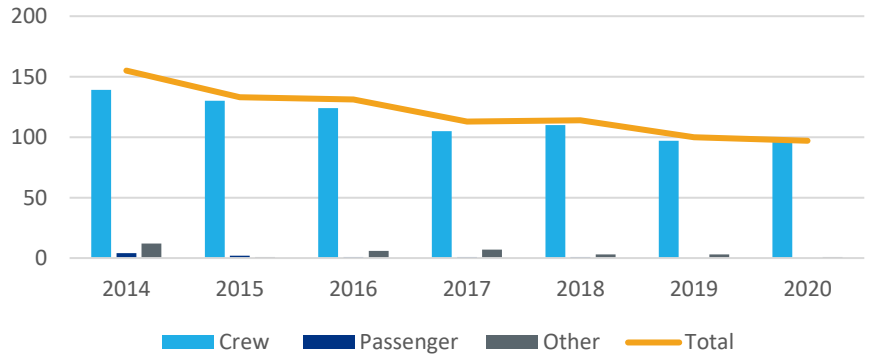
40% of the fatalities occurred on board tugs.

6.5.2.2

	2014	2015	2016	2017	2018	2019	2020	Total
Dredger	1	1	0	1	0	1	0	4
Multi-purpose	0	0	1	0	0	0	1	2
Other offshore ship	0	1	0	0	0	0	0	1
Special purpose ship	0	0	0	1	1	12	0	14
Tug (Towing/Pushing)	6	7	4	1	1	0	1	20
Other service ship	0	1	1	2	0	5	0	6
Total	7	10	6	5	2	18	2	50

Injuries

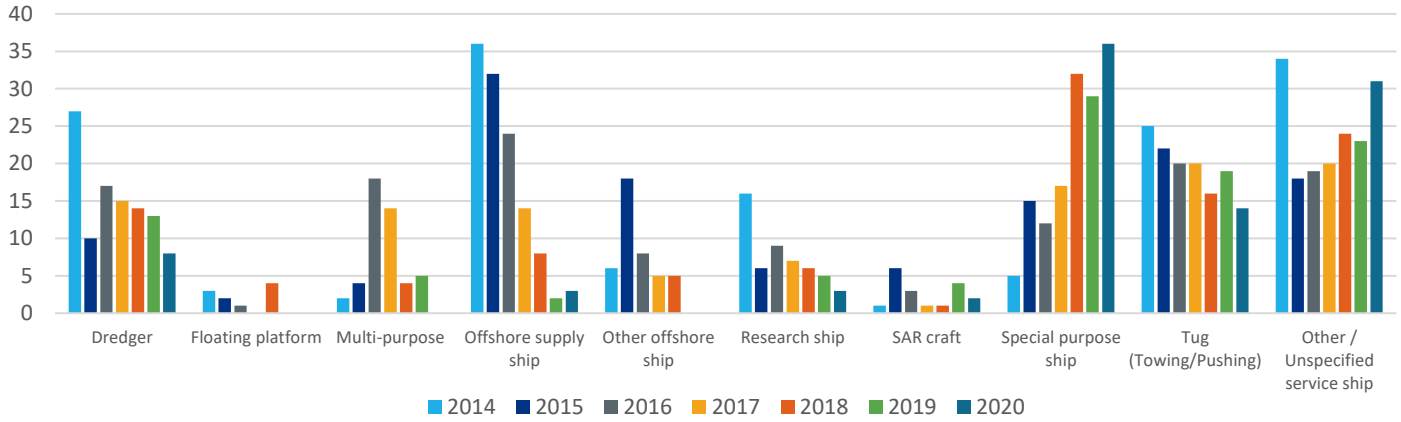
Figure 6.22: Number of injuries



The number of persons injured has continuously decreased since 2014. A reduction of 37.5% was noted between 2014 and 2020. Crew members were the main victims of injuries (95%).

	2014	2015	2016	2017	2018	2019	2020	Total
Crew	139	130	124	105	110	97	96	801
Passenger	4	2	1	1	1	0	0	9
Other	12	1	6	7	3	3	1	33
Total	155	133	131	113	114	100	97	843

Figure 6.23: Distribution of injuries by service ship type



	2014	2015	2016	2017	2018	2019	2020	Total
Dredger	27	10	17	15	14	13	8	104
Floating platform	3	2	1	0	4	0	0	10
Multi-purpose	2	4	18	14	4	5	0	47
Offshore supply ship	36	32	24	14	8	2	3	119
Other offshore ship	6	18	8	5	5	0	0	42
Research ship	16	6	9	7	6	5	3	52
SAR craft	1	6	3	1	1	4	2	18
Special purpose ship	5	15	12	17	32	29	36	146
Tug (Towing/Pushing)	25	22	20	20	16	19	14	136
Other / Unspecified service ship	34	18	19	20	24	23	31	169
Total	155	133	131	113	114	100	97	843

In 2020, the decrease of injuries benefited to almost all service ship types. An increase is only visible onboard Special Purpose Ships.

Chapter 7: OTHER SHIPS

Grounding of Sailing boat Lilla W in Klaipedia, Lithuania, on 15/09/2019. 2 lives lost and 5 injured persons.

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 2020 for the other types of ships was positive.

A total of 877 ships of other types than cargo, fishing vessel, passenger ship or service ship were involved in 805 marine casualties and incidents between 2014 and 2020. After a very significant increase in 2018 (162), the number of ships involved was reduced to 90 in 2020, which is the lowest number over the period 2014-2020.

Among the ships of other type affected, recreational sailboats represented the main type with 44.3% of all ships involved from 2014 to 2020.

Over this period, the rate of Very Serious casualties is 4.4%, and 11.9% when the severity is Serious. While the serious rate is only half of the average one for all ships, the very serious is 54% higher than the one calculated for all ships.

From 2014 to 2020, collisions represented 69% 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), 42.2% were attributed to slipping, stumbling and falling of persons.

In 2020, one ship was lost in this category. Over the period 2014-2020, a total of 21 ships were lost. The annual number has continuously fluctuated in the past five years, with an average close to three ships lost per year.

During the 2014-2020 period, 14 accidents involving the ships of other types resulted in a total of 25 lives lost. The number of fatalities over the period fluctuated between seven and zero fatalities, including a total of three in 2020.

In 2020, only seven persons were reported injured, in comparison with 42 in 2019 and an average of 28 from 2014 to 2020. 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 and 88% in coastal waters.

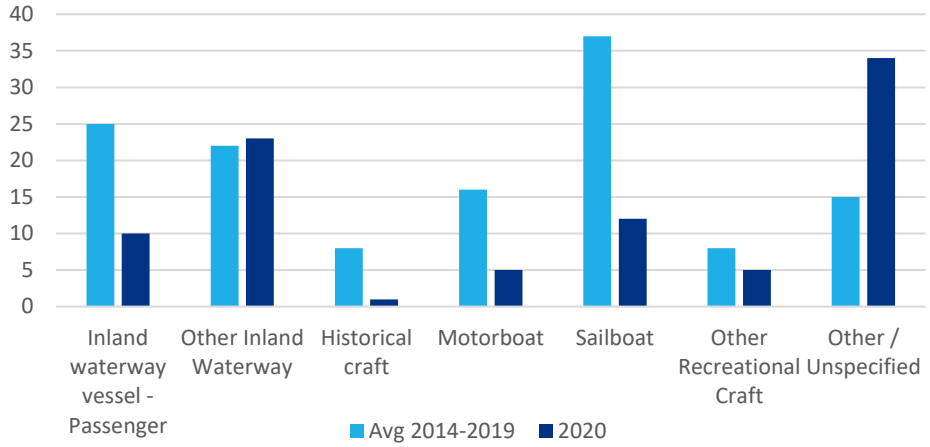
While analysis underlying factors leading to casualties that occurred from 2014 to 2020, it showed that 95.2% were related to "Human Action", which is significantly higher to the ones for the other categories of ships. Shipboard operations represented 50.4% of the reported contributing factors, which is less than for other types of ships.

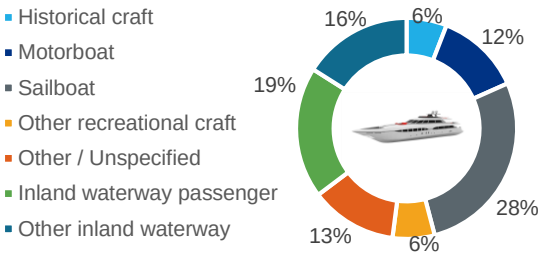
In conclusion, in the year 2020 signified the reduction or stability of some indicators such as the number of ships involved, the number of fatalities or injured persons, etc Impacts of COVID pandemic should, however, be considered, due, for example, to restrictions on recreational crafts during lockdown periods or reduced traffic by inland waterway vessels.

7.1 Detailed distribution

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 or a fire on board an inland waterway vessel sailing in internal waters).

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 recreational motorboats.

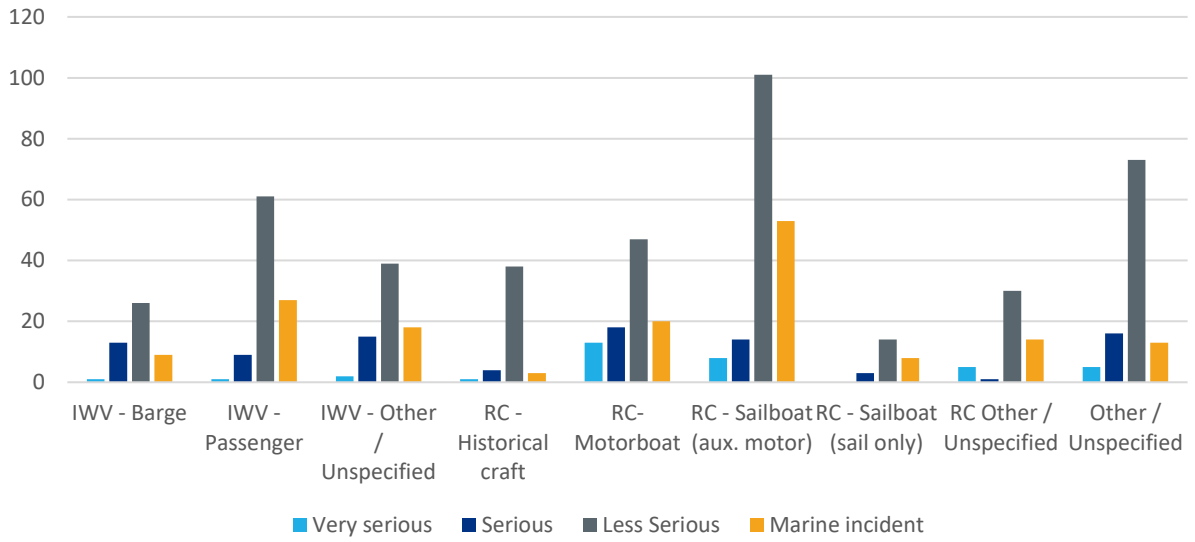
The number of occurrences has significantly decreased since the peak in 2018 (-45%). The decrease was seen for all ship types.

	2014	2015	2016	2017	2018	2019	2020	Total
Historical craft	15	9	4	8	7	7	1	51
Motorboat	20	14	18	14	14	17	5	102
Sailboat	57	30	38	29	47	19	12	232
Other recreational craft	8	6	10	5	11	8	5	53
Inland waterway passenger	44	29	16	25	19	17	10	160
Other inland waterway	17	15	29	15	27	29	23	155
Other / Unspecified	9	9	8	5	37	22	34	124
Total	170	112	123	101	162	119	90	877

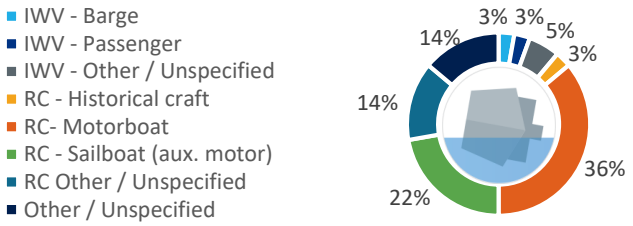
7.2 Nature of marine casualties and incidents

7.2.1 Occurrence with ship(s)

Figure 7.2: Distribution of severity per other ship type for 2014-2020

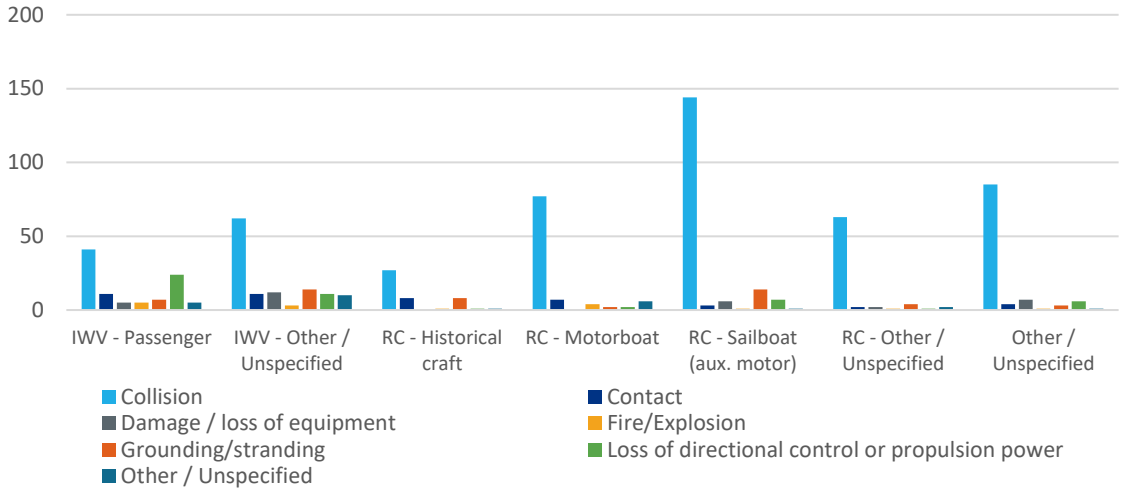


	Very serious	Serious	Less Serious	Marine incident	Total
IWV Barge	1	13	26	9	49
IWV Passenger	1	9	61	27	98
IWV Other/Unspecified	2	15	39	18	74
Recreational craft - Historical craft	1	4	38	3	46
RC Motorboat	13	18	47	20	98
RC Sailboat (aux. motor)	8	14	101	53	176
RC Sailboat (sail only)	0	3	14	8	25
RC Other/Unspecified	5	1	30	14	50
Other / Unspecified	5	16	73	13	107
Total	36	93	429	165	723



Severity rate of occurrences related to recreational craft motorboats and sailboats is very high in comparison with the rest of the category as they represent 58% of all very serious occurrences.

Figure 7.3: Distribution of casualty events per other ship type for 2014-2020

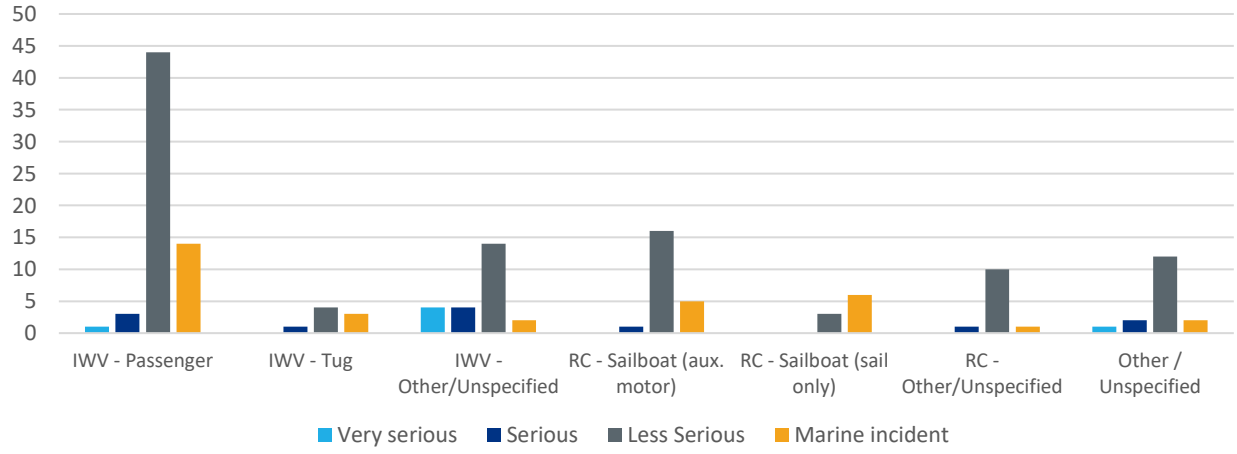


	Collision	Contact	Damage / loss of equipment	Fire / Explosion	Grounding / Stranding	Loss of directional control or propulsion power	Other / Unspecified	Total
IWV - Passenger	41	11	5	5	7	24	5	98
Other IWV	62	11	12	3	14	11	10	123
Recreational craft - Historical craft	27	8	0	1	8	1	1	46
Recreational craft - Motorboat	77	7	0	4	2	2	6	98
Recreational craft - Sailboat (aux. motor)	144	3	6	1	14	7	1	176
Other / Unspecified Recreational craft	63	2	2	1	4	1	2	75
Other / Unspecified	63	4	7	1	3	6	1	107
Total	499	46	32	16	52	52	26	723

Ships within this category, despite being excluded from the scope of Directive 2009/18/EC, were however recorded as they were involved in events falling under the scope. This explains the very high rate of collisions as a casualty event (69%), mainly with recreational craft being motorboats or sailing boats.

7.2.2 Occurrence with person(s)

Figure 7.4: Severity of occurrence with person(s)s per other ship type for 2014-2020



	Very serious	Serious	Less Serious	Marine incident	Total
IWV - Passenger	1	3	44	14	62
IWV - Tug	0	1	4	3	8
IWV - Other / Unspecified	4	4	14	2	24
Sailboat (aux. motor)	0	1	16	5	22
Sailboat (sail only)	0	0	3	6	9
RC - Other / Unspecified	0	1	10	1	12
Other / Unspecified	1	2	12	2	17
Total	6	12	103	33	154

Being involved in professional activities, inland waterway vessels are more affected by occupational accidents than the sea going ships of this category (eg recreational craft, etc…).

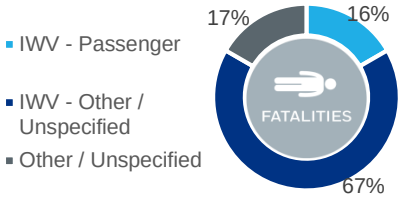
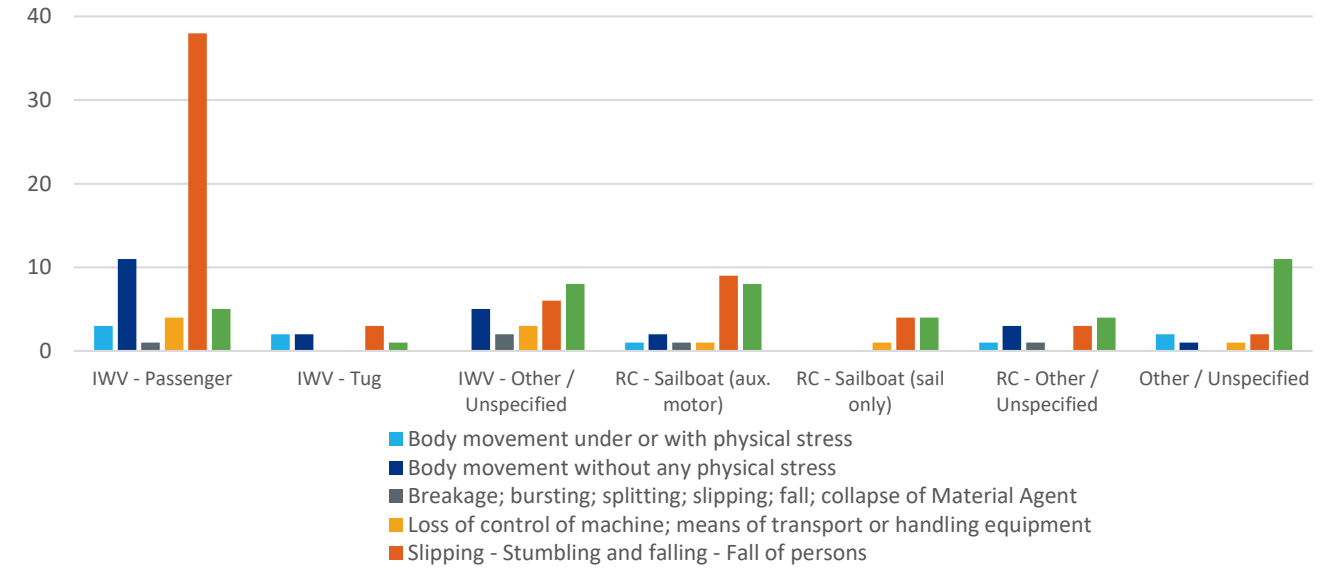


Figure 7.5: Distribution of deviations per other ship type for 2014-2020



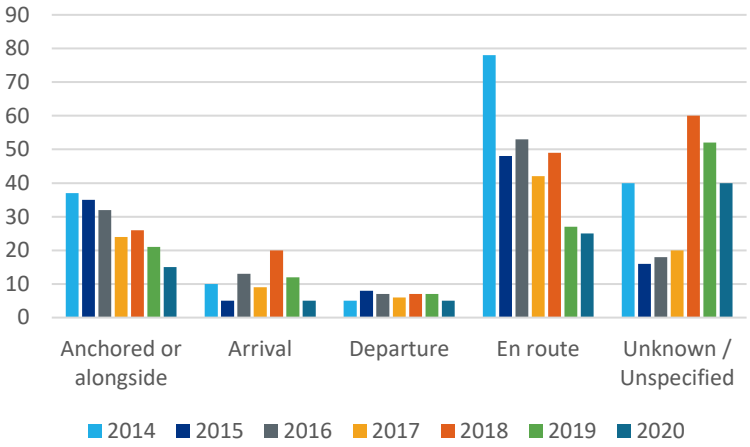
	Body movement under or with physical stress	Body movement without any physical stress	Breakage; bursting; splitting; slipping; fall; collapse of Material Agent	Loss of control (total or partial) of machine; means of transport or handling equipment	Slipping - Stumbling and falling - Fall of persons	Other / Unspecified	Total
IWV - Passenger	3	11	1	4	38	5	62
IWV - Tug	2	2	0	0	3	1	8
IWV - Other / Unspecified	0	5	2	3	6	8	24
Sailboat (aux. motor)	1	2	1	1	9	8	22
Sailboat (sail only)	0	0	0	1	4	4	9
RC - Other / Unspecified	1	3	1	0	3	4	12
Other / Unspecified	2	1	0	1	2	11	17
Total	9	24	5	10	65	41	154

Slipping and falling of persons was the most recorded deviation (42.2%) and more than two thirds of the fall occurred on board of inland waterway passenger ships (72.3%).

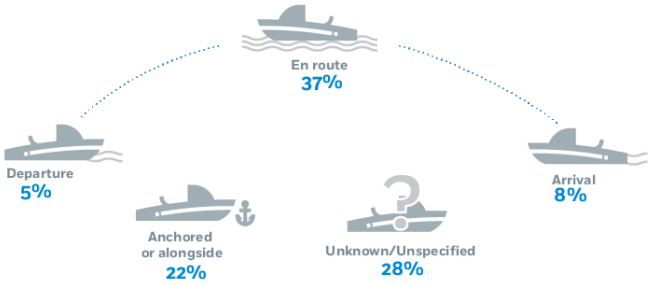
7.3 Location of the marine casualties and incidents

7.3.1 Voyage segments

Figure 7.6: Distribution by voyage segment

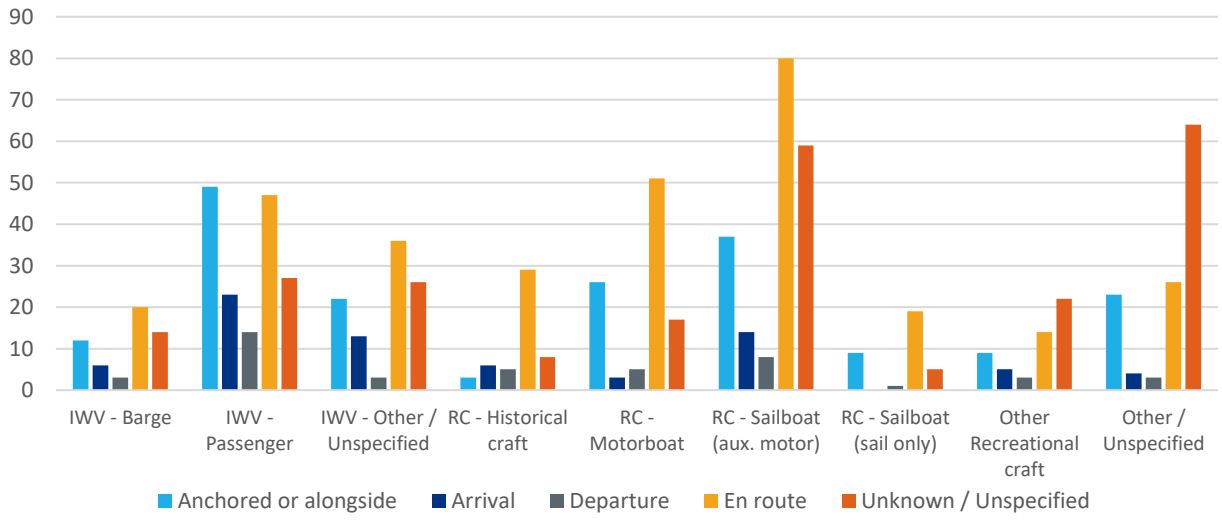


"En route" indicates that the least safe segment with a total of 37% of the occurrences. Occurrences than take place when the ship is at anchorage or alongside.



	2014	2015	2016	2017	2018	2019	2020	Total
Anchored or alongside	37	35	32	24	26	21	15	190
Arrival	10	5	13	9	20	12	5	74
Departure	5	8	7	6	7	7	5	45
En route	78	48	53	42	49	27	25	322
Unknown / Unspecified	40	16	18	20	60	52	40	246
Total	170	112	123	101	162	119	90	877

Figure 7.7: Distribution by voyage segment per other ship type for 2014-2020

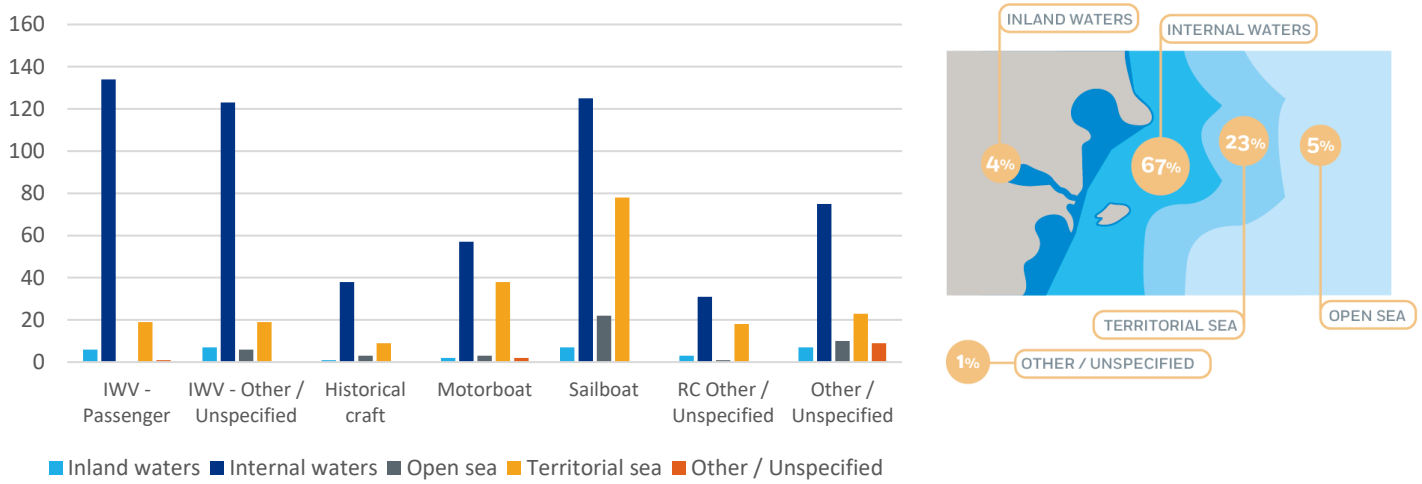


	Anchored or alongside	Arrival	Departure	En route	Unknown / Unspecified	Total
IWV - Barge	12	6	3	20	14	55
IWV - Passenger	49	23	14	47	27	160
IWV - Other / Unspecified	22	13	3	36	26	100
RC - Historical craft	3	6	5	29	8	51
RC - Motorboat	26	3	5	51	17	102
RC - Sailboat (aux. motor)	37	14	8	80	59	198
RC - Sailboat (sail only)	9	0	1	19	5	34
Other recreational craft	9	5	3	14	22	53
Other / unspecified	23	4	3	26	64	120
Total	190	74	45	322	242	873

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

7.3.2 Location

Figure 7.8: Distribution by location of marine casualties and incidents per other ship type for 2014-2020



	Inland waters	Internal waters	Open sea	Territorial sea	Other / Unspecified	Total
IWV - Passenger	6	134	0	19	1	160
IWV - Other / Unspecified	7	123	6	19	0	155
Historical craft	1	38	3	9	0	51
Motorboat	2	57	3	38	2	102
Sailboat	7	125	22	78	0	232
RC Other / Unspecified	3	31	1	18	0	53
Other / Unspecified	7	75	10	23	9	124
Total	33	583	45	204	12	877

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. With regards inland waterway vessels, they are involved when sailing in maritime ports and harbours, rather than in inland waters.

7.4 Accidental events and contributing factors

Investigators look for the factors contributing to marine casualties and incidents in the analysis phase. Such causes are made up of accident events (underlying factors) and contributing factors.

Each marine casualty can have one or more casualty events. More than one accident events can be associated to a casualty event. The five accident events types are: human action, system or equipment failure, other agent or vessel, hazardous material and unknown.

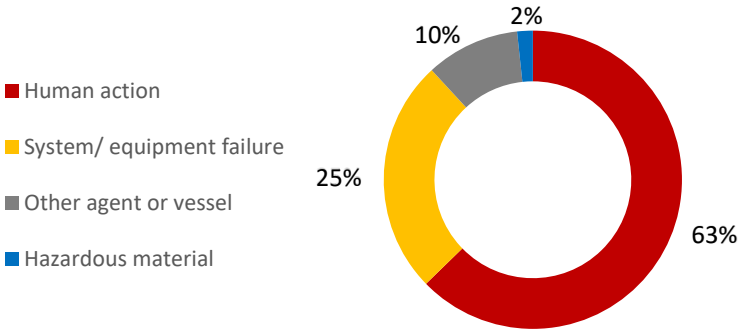
Each casualty event can have one or several contributing factors. Contributing factors have the following three main categories: external environment, shore management and shipboard operation.

7.4.1 Analysis of Accident events in EMCIP

Each investigated marine casualty with analysis data included in EMCIP can have one or more accident events so, it is possible to obtain two distributions, as explained above:

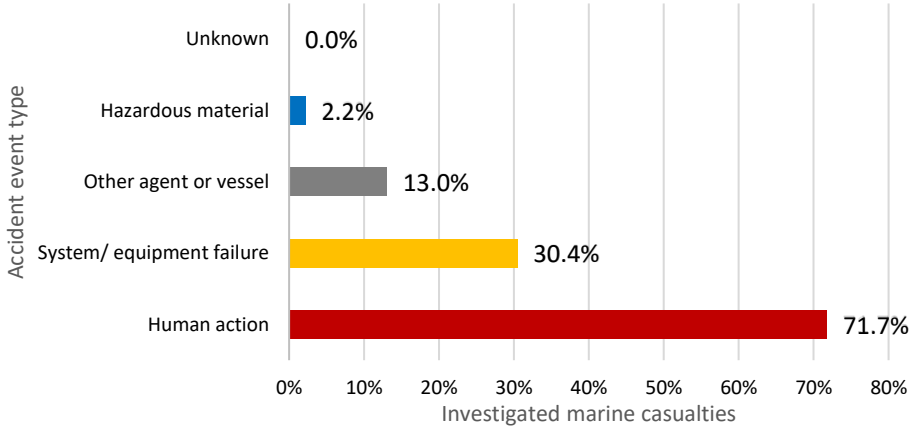
- Distribution of accident event types; and
- Distribution of accident event types related to the investigated marine accidents.

Figure 7.9: Distribution of accident events types for the period 2014-2020



The category "Other ships" offers the same trend for accident event distribution than the other categories. The distribution of the accident events by type has the same trend than from period from 2014 to 2019, with 62.7% of human action accident events and 25.4% of system/equipment failure accident events as the main values of the distribution. In comparison with the period from 2014 to 2019, only "Human action" accident events have increased their percentage.

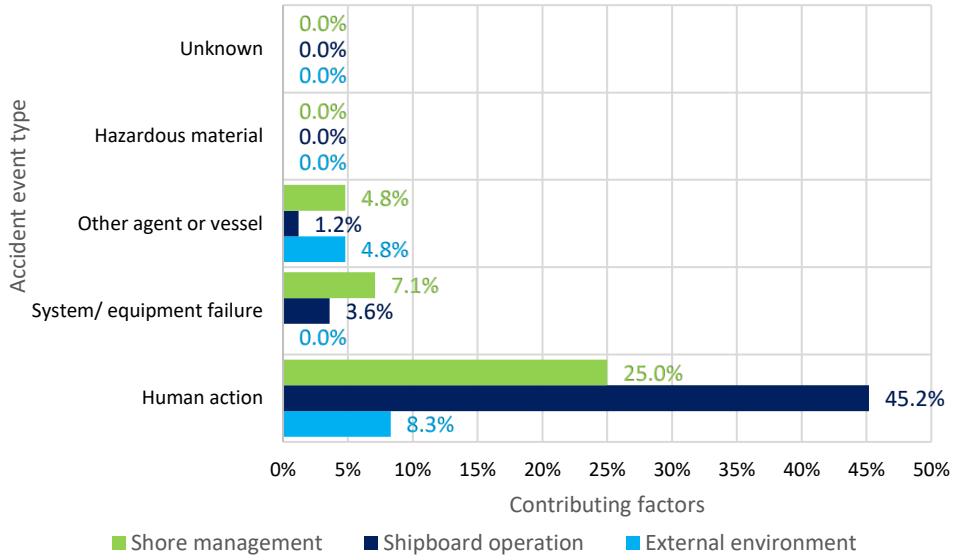
Figure 7.10: Distribution of accident event types related to the investigated marine accidents for the period 2014-2020



For other ships, Human action is related to the 71.7% of the investigated marine casualties. Human action and system/equipment failure accident events are the most important accident event types.

7.4.2 Analysis of contributing factors in EMCIP

Figure 7.11: Distribution of contributing factors in the accident event types for the period 2014-2020



For other ships, the trend is like the one the analysis of the whole fleet with a change between other agent or vessel and system/equipment failure accident events. 78.6% of the contributing factors in EMCIP are related to human action accident events, 10.8% to other agent or vessel accident events and 10.7% to system/equipment failure accident events.

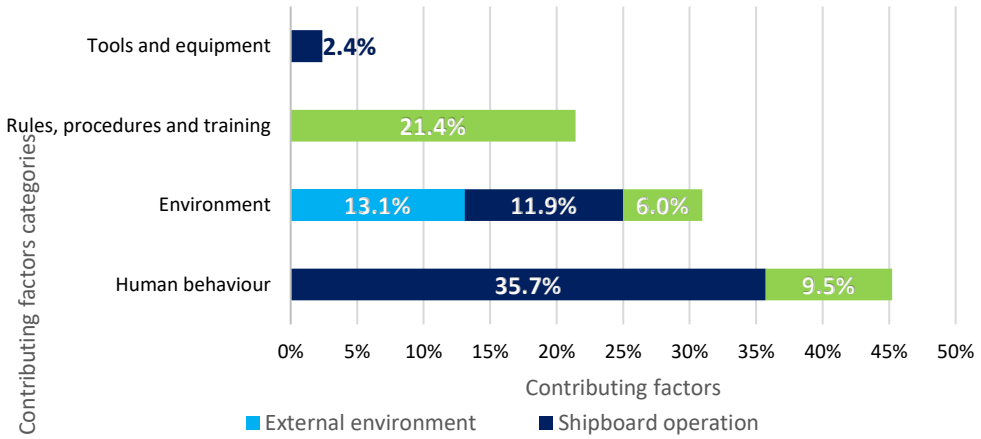
Shipboard operation contributing factors are the most frequently associated to accident events with a 50.0% of the contributing factors. Shore management contributing factors are the second most frequently associated to accident events with a 36.9% of the contributing factors.

Each main category of contributing factors is divided in second level categories. These categories can be simplified by cataloguing them in only four categories, as explained above:

- Human behaviour.
- Environment (internal or external).
- Rules, procedures and training.
- Tools and equipment.

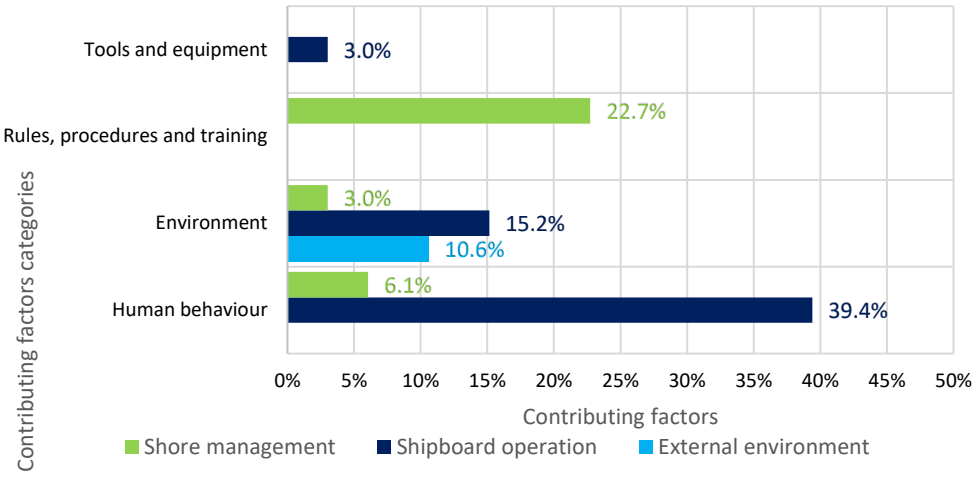
Second level contributing factors for each accident event type are grouped for main contributing factors categories in the following charts.

Figure 7.12: Contributing factors distributed by categories



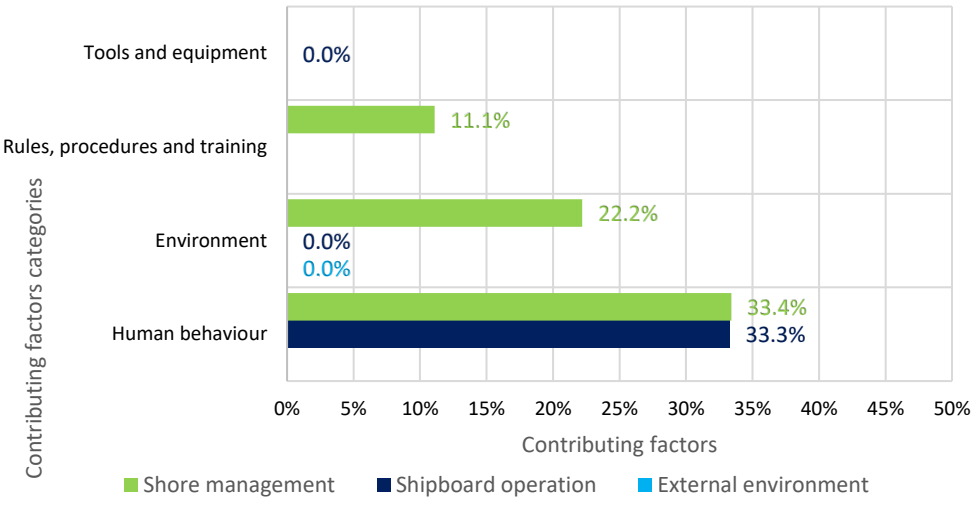
For other ships, the trend is the same than in the analysis of all the whole fleet. 45.2% of the contributing factors in EMCIP are related to human behaviour, 31.0% to environment and 21.4% to rules, procedures and training.

Figure 7.13: Contributing factors involved in human action accident events, distributed by categories



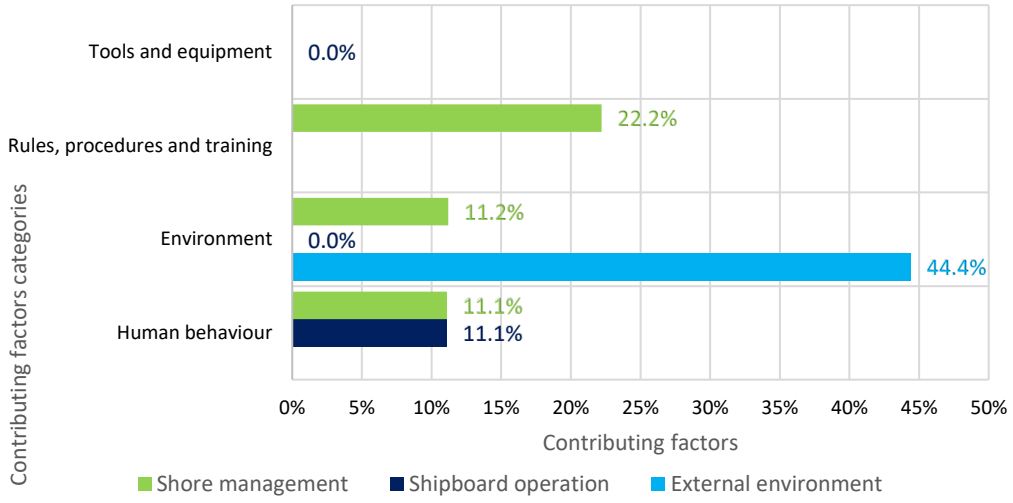
For other ships and human action accident events, rhe trend is the same than in the analysis of all the contributing factors for all the accident events. 45.5% of the contributing factors in EMCIP are related to human behaviour, 28.8 to environment and 22.7% to rules, procedures and training.

Figure 7.14: Contributing factors involved in system/equipment failure accident events, distributed by categories



For other ships and system/equipment failure accident events. 66.7 of the contributing factors in EMCIP are related to human behaviour, 22.2% to environment and 11.1% to rules, procedures and training.

Figure 7.15: Contributing factors involved in other agent or vessel accident events, distributed by categories



For other ships and other agent or vessel accident events, 55.6% of the contributing factors in EMCIP are related to environment, 22.2% to human behaviour and 22.2% to rules, procedures and training.

There are no contributing factors related in hazardous material events for other ships.

7.4.3 Analysis of human element

For "other ships", when combining Accident Events and Contributing Factors, 95.2% of investigations analysis quoted "human element" as part of the elements that led to the occurrence.

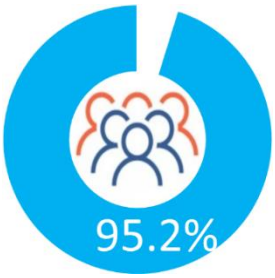
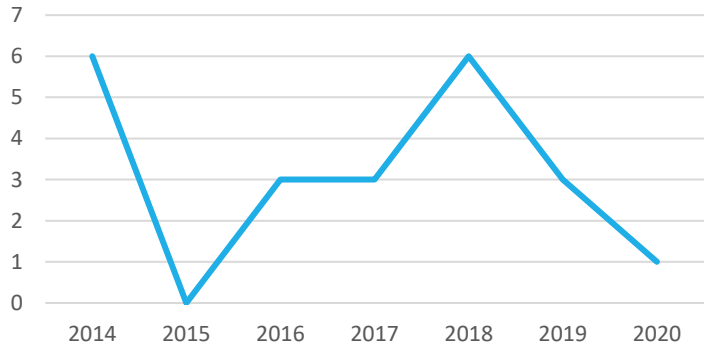


Figure 7.16: Influence of human element

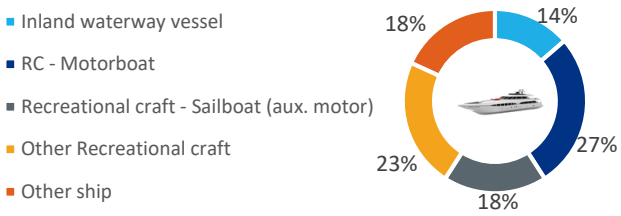
7.5 Consequences

7.5.1 Consequences to ships

Figure 7.17: Other ships lost



The reduction, noticed in 2019, continued in 2020, when only one ship was lost.



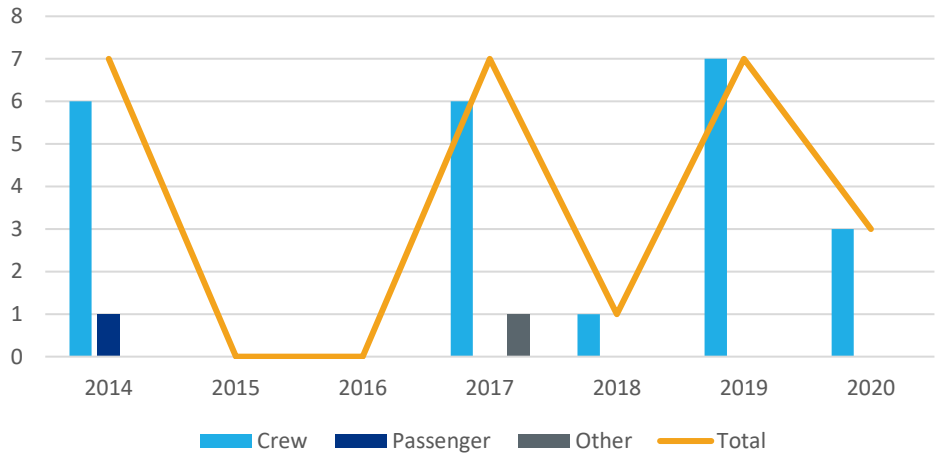
	2014	2015	2016	2017	2018	2019	2020	Total
Other ships lost	6	0	3	3	6	3	1	22

Of the 21 other type ships that were lost, the majority were recreational craft (68%).

7.5.2 Consequences to persons

7.5.2.1 Fatalities

Figure 7.18: Number of fatalities

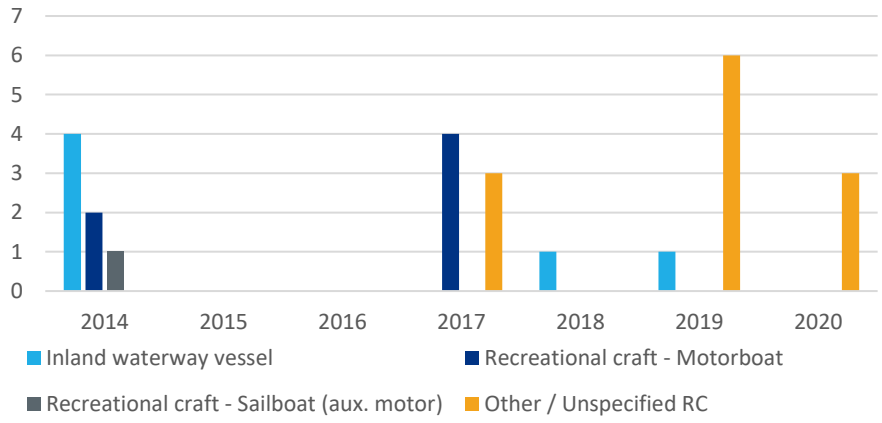


The number of fatalities fluctuated between 7 and 0 or 1 over the period 2014-2020.

Crew members remained the only affected category since 2018.

	2014	2015	2016	2017	2018	2019	2020	Total
Crew	6	0	0	6	1	7	3	23
Passenger	1	0	0	0	0	0	0	1
Other	0	0	0	1	0	0	0	1
Total	7	0	0	7	1	7	3	25

Figure 7.19: Distribution of fatalities per other ship type

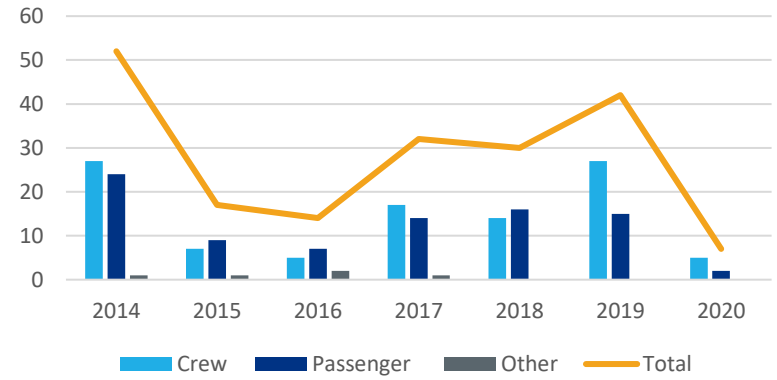


Most fatalities occurred on board recreational craft (76%).

	2014	2015	2016	2017	2018	2019	2020	Total
Inland waterway vessel	4	0	0	0	1	1	0	6
Motorboat	2	0	0	4	0	0	0	6
Sailboat (aux. motor)	1	0	0	0	0	0	0	1
Other / Unspecified RC	0	0	0	3	0	6	3	12
Total	7	0	0	7	1	7	3	25

7.5.2.2 Injuries

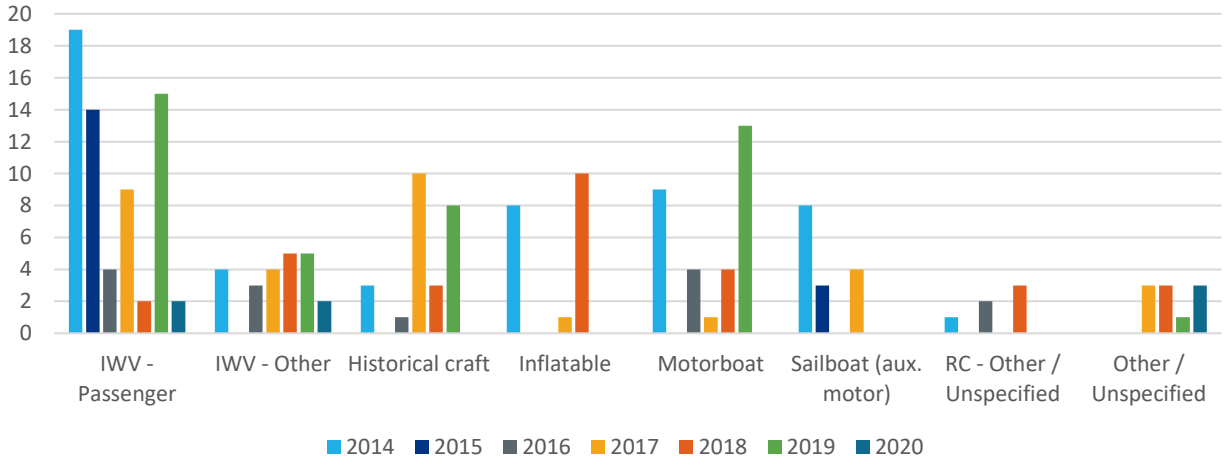
Figure 7.20: Number of injuries



After 4 years of continuous increase, the number of injured persons decreased in 2020 to its lowest level over the period. This decrease applied to both crews and passengers in the same proportion.

	2014	2015	2016	2017	2018	2019	2020	Total
Crew	27	7	5	17	14	27	5	102
Passenger	24	9	7	14	16	15	2	87
Other	1	1	2	1	0	0	0	5
Total	52	17	14	32	30	42	7	194

Figure 7.21: Distribution of injuries by other ship type



	2014	2015	2016	2017	2018	2019	2020	Total
IWV - Passenger	19	14	4	9	2	15	2	65
IWV - Other / Unspecified	4	0	3	4	5	5	2	23
RC - Historical craft	3	0	1	10	3	8	0	25
RC -Inflatable	8	0	0	1	10	0	0	19
RC - Motorboat	9	0	4	1	4	13	0	31
RC - Sailboat (aux. motor)	8	3	0	4	0	0	0	15
RC - Other / Unspecified	1	0	2	0	3	0	0	6
Other / Unspecified	0	0	0	3	3	1	3	10
Total	52	17	14	32	30	42	7	194

Inland waterway vessels have been, over the period, the sub-category where the main part of the injuries took place (34%).

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

OP: Passenger ship carrying only passengers

PRC: Passenger ship carrying passengers and Ro-Ro cargo

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.**

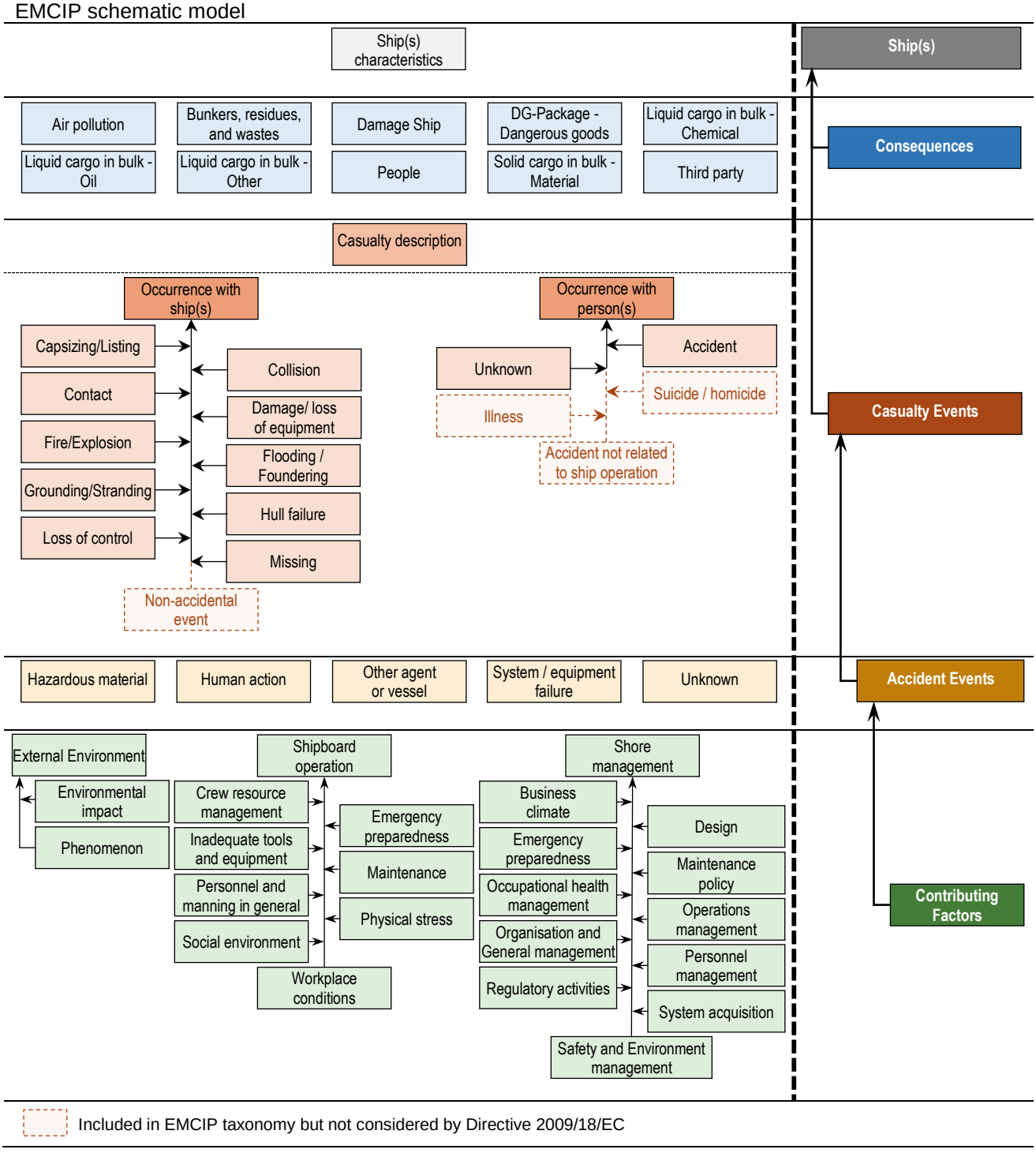
11. ***Unfit to proceed*** means that the ship is in a condition, which does not correspond substantially with the applicable international conventions or national legislation, presenting a danger to the ship and the persons on board or an unreasonable threat of harm to the marine environment.

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, a codification of the information resulting from marine casualties 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.

EMCIP schematic model



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.

The main elements of the EMCIP model are:

Ship:

For each Marine Casualty, accident or incident, is necessary to add the information for as many ships as involved. Usually only one ship will be included, excepting in the case of collisions where at least two ships will be involved.

Information about Casualty Events and Consequences are required for each Ship.

Consequences:

After a marine accident or incident some Consequences are expected. These Consequences are important not only for statistical reasons but also to determine the severity of the Occurrence. They are linked to each ship and are catalogued in 10 groups:

- Air pollution;
- Bunkers, residues and wastes;
- Damage Ship;
- DG-Package - Dangerous goods;
- Liquid cargo in bulk - Chemical;
- Liquid cargo in bulk - Oil;
- Liquid cargo in bulk - Others;
- People;
- Solid cargo in bulk - Material; and
- Third party.

For each group there are different fields to include detailed data related to the Consequences.

Casualty Events:

Casualty Events are the events representing the casualty itself.

Casualty Events are divided in two main groups, to distinguish between casualties with ships and occupational accidents:

- Occurrence with ship(s); and
- Occurrence with person(s).

The possible values for Casualty Events in a second level are only 10 for casualties with ships:

- Occurrence with ship(s) – Capsizing/Listing;
- Occurrence with ship(s) – Collision;
- Occurrence with ship(s) – Contact;
- Occurrence with ship(s) – Damage/loss of equipment;
- Occurrence with ship(s) – Fire/Explosion;
- Occurrence with ship(s) – Flooding/Foundering;
- Occurrence with ship(s) – Grounding/Stranding;
- Occurrence with ship(s) – Hull failure;
- Occurrence with ship(s) – Loss of control; and
- Occurrence with ship(s) – Missing.

The possible values for Casualty Events, in a second level, are only 2 for occupational accidents:

- Occurrence with person(s) – Accident; and
- Occurrence with person(s) – Unknown.

EMCIP taxonomy has other four second level options, but those options are not considered by the Directive 2009/18/EC.

EMCIP taxonomy includes third and fourth level options, not included in the schematic model for simplicity, to improve the definition of the Casualty Events.

Accident Events

Accident Events are events not representing a casualty itself but having influence in a Casualty Event.

Accident Events are always related to a Casualty Event and they should be considered in the context of the Casualty Event. Usually, Accident Events are unintended and unwanted.

There are 5 Accident Event Types:

- Hazardous material;
- Human action;
- Other agent or vessel;
- System/equipment failure; and
- Unknown.

Each Accident Event Type has specific taxonomy for its definition.

For the analysis of Accident Events two approaches are used in this Annual Overview:

- Percentage of Accident Event Types; and
- Percentage of investigated Marine Casualties reporting at least once an Accident Event Type.

The percentage of Accident Event Types gives information about the influence of each Accident Event Type in the total of Accident Events. The procedure it is:

- In a sample extracted from EMCIP, for each Accident Event Type, the times the Accident Event Type appears is counted. For the Accident Event Type number *i* a value N_i is obtained.
- The total number of appearances of Accident Event Types in the sample extracted from EMCIP, *T*, is obtained as the sum of all the values *Ni* for all the Accident Event Types.
- The percentage of each Accident Event Type is then obtained dividing the correspondent value N_i by *T*.
- The sum of all the percentages will be 100%.

The percentage of investigated Marine Casualties reporting at least once an Accident Event Type, gives information about the influence of each Accident Event Type in the investigated Marine Casualties, that means the percentage of investigated Marine Casualties influenced by each Accident Event Type. The procedure to obtain it is:

- In a sample extracted from EMCIP, for each Accident Event Type, the number of investigated Marine Casualties where the Accident Event Type appears at least once is counted. For the Accident Event Type number *i* a value M_i is obtained.
- The percentage of each Accident Event Type is then obtained dividing the correspondent value *Mi* by the total number of investigated Marine Casualties in the sample extracted from EMCIP.
- The sum of all the percentages can be greater than 100% because each investigated Marine Casualty can be influenced by one or more Accident Event Type.

Contributing Factors

Contributing Factors are the factors that helps cause the Accident Events.

Contributing Factors are always related to an Accident Event and are catalogued in three main groups:

- External Environment;
- Shipboard Operation; and
- Shore management.

The possible 21 values for Contributing Factors in a second level are:

- External Environment - Environmental impact;
- External Environment - Phenomenon;
- Shipboard Operation - Crew resource management;
- Shipboard Operation - Emergency preparedness;
- Shipboard Operation - Inadequate tools and equipment;
- Shipboard Operation - Maintenance;
- Shipboard Operation - Personnel and manning in general;
- Shipboard Operation - Physical stress;
- Shipboard Operation - Social environment;
- Shipboard Operation - Workplace conditions;
- Shore management - Business climate;
- Shore management - Design;
- Shore management - Emergency preparedness;
- Shore management - Maintenance policy;
- Shore management - Occupational health management;
- Shore management - Operations management;
- Shore management - Organization and General management;
- Shore management - Personnel management;
- Shore management - Regulatory activities;
- Shore management - System acquisition; and
- Shore management - Safety and Environment management.

EMCIP taxonomy also includes third and fourth levels for Contributing Factors. The total possible Contributing Factors to choose are 185 (37 External Environment, 72 Shipboard Operation and 76 Shore management).

Such a great taxonomy increases the difficulty of the analysis. In these Annual Overview the Contributing Factor categories are simplified by cataloguing them in only four categories:

- Human behaviour:
  - Shipboard operation: Crew resource management, Emergency preparedness, Maintenance, Personnel and manning in general
  - Shore management: Design and System acquisition
- Environment (internal or external):
  - External environment: Environmental impact and Phenomenon
  - Shipboard operation: Physical stress, Social environment and Workplace conditions
  - Shore management: Business climate, Personnel management and Safety and Environment management
- Rules, procedures and training:
  - Shore management: Emergency preparedness, Maintenance policy, Occupational health management, Operations management, Organisation and General management and Regulatory activities
- Tools and equipment:
  - Shipboard operation: Inadequate tools and equipment

This new categorization of Contributing factors facilitates the analysis.

Safety Recommendations

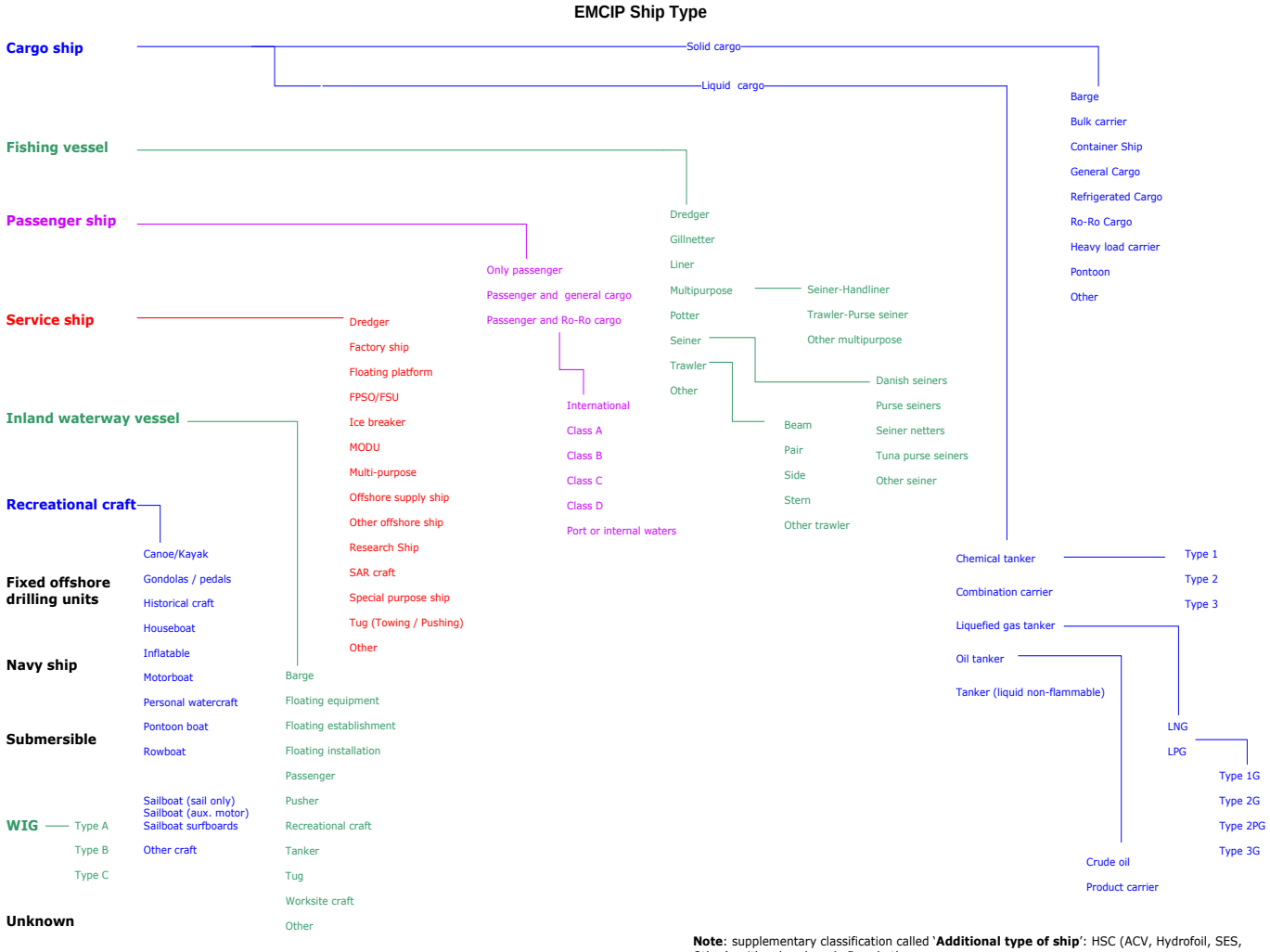
Issued by the investigation bodies, their objective is to “cut the links” between the Contributing Factors, Accident Events and Casualty events.

Safety Recommendations are related to the Marine Casualty and must be addressed to those that are best placed to implement them, as stablished in Directive 2009/18/EC.

EMCIP taxonomy includes Safety Recommendations but they are not included in the schematic model for simplicity

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: Methodology to determine the Occurrence Indicator

1. Introduction

Occurrence Indicators (OccID) are ratios between the number of reported accidents for a given ship type and the corresponding fleet size.

These indicators aim to provide insight on trends concerning the number of reported accidents and incidents against the evolution of the composition of the various types of ships.

OccIDs are not intended to come up with a judgement whether one ship type is safer than other, as a “safe system” cannot be simplistically defined by the lack of unwanted events.

2. Methodology

OccIDs have been calculated for a 7-years period (2014- 2020) applying the following simple mathematical formula:

$$OccID(i,t) = \frac{Nr.Accidents\ (i,t)}{Fleet\ size\ (i,t)}$$

Accident data to determine the numerators of the above equation come from EMCIP, while the denominators were calculated using data from:

- MARINFO for cargo, passenger and service ships provided with IMO number.
- EU Fleet database[6] for fishing vessels. The tool is managed by DG MARE and provides detailed information on fishing vessels registered in the EU (only EU28).

Further elements were considered when defining the methodology:

- OccIDs only refer to EU-flagged ships.
- For cargo, passenger and service ships OccID, the analysis considered only the accidents reported in EMCIP involving ships provided with an IMO number to guarantee consistency with MARINFO.
- The OccID for fishing vessels did not consider Norway and Iceland, as the respective fleets are not available in the EU Fleet database.
- Only fishing vessels above 15m. LOA (as per scope of the Directive 2009/18/EC) were considered.
- The attribute “main gear type” from the EU Fleet database was used to classify the fishing vessels in sub-types.
- For 2020 it was not possible to retrieve the UK-flagged fishing vessel fleet in the EU Fleet database; therefore an estimation using a linear regression based on data between 2016-2019 was conducted.
- The analysis considered all the EMCIP occurrences matching the methodology without discriminating between “occurrence with ships” and “occurrence with persons”.

[6] https://webgate.ec.europa.eu/fleet-europa/index_en

The ships' types have been mapped against four main categories and further detailed into 22 different ships' types, as shown in the following table.

Table 1 - OccID ships' types

Main categories	Ships' types
Cargo ships	Cargo - Bulk carrier
	Cargo - Container
	Cargo - General cargo
	Cargo - Other solid cargo
	Cargo - RoRo
	Cargo - Tanker - Chemical
	Cargo - Tanker - LG
	Cargo - Tanker - Oil
	Cargo - Tanker - Other liquid cargo
Passenger ships	Passenger - Only pax
	Passenger - Other
	Passenger - RoRo
Service ships	Service ship - Dredger
	Service ship - OSV
	Service ship - Other
	Service ship - Tug
Fishing vessels	Trawler
	Seiner
	Liner
	Gillnetter
	Dredger
	Other

Appendix 5: 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	https://aet.gouvernement.lu
Malta	Marine Safety Investigation Unit	MSIU	http://www.transport.gov.mt
The Netherlands	Dutch Safety Board	DSB	www.safetyboard.nl
Norway	Norwegian Safety Investigation Authority	NSIA	https://havarikommisjonen.no/Home
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	https://www.gov.si/en/state-authorities/ministries/ministry-of-infrastructure/about-the-ministry/sluzbe-za-preiskovanje-letalskih-pomorskih-in-zeleznikih-nesrec-in-incidentov/preiskovanje-pomorskih-nesrec-in-incidentov/
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

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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