Australian Government
Australian Maritime Safety Authority

Regulated Australian and Foreign Flagged Vessels

Annual Overview of Marine Incidents 2019

This report covers the period from 1 January 2016 to 31 December 2019

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Annual Overview of Marine Incidents 2019

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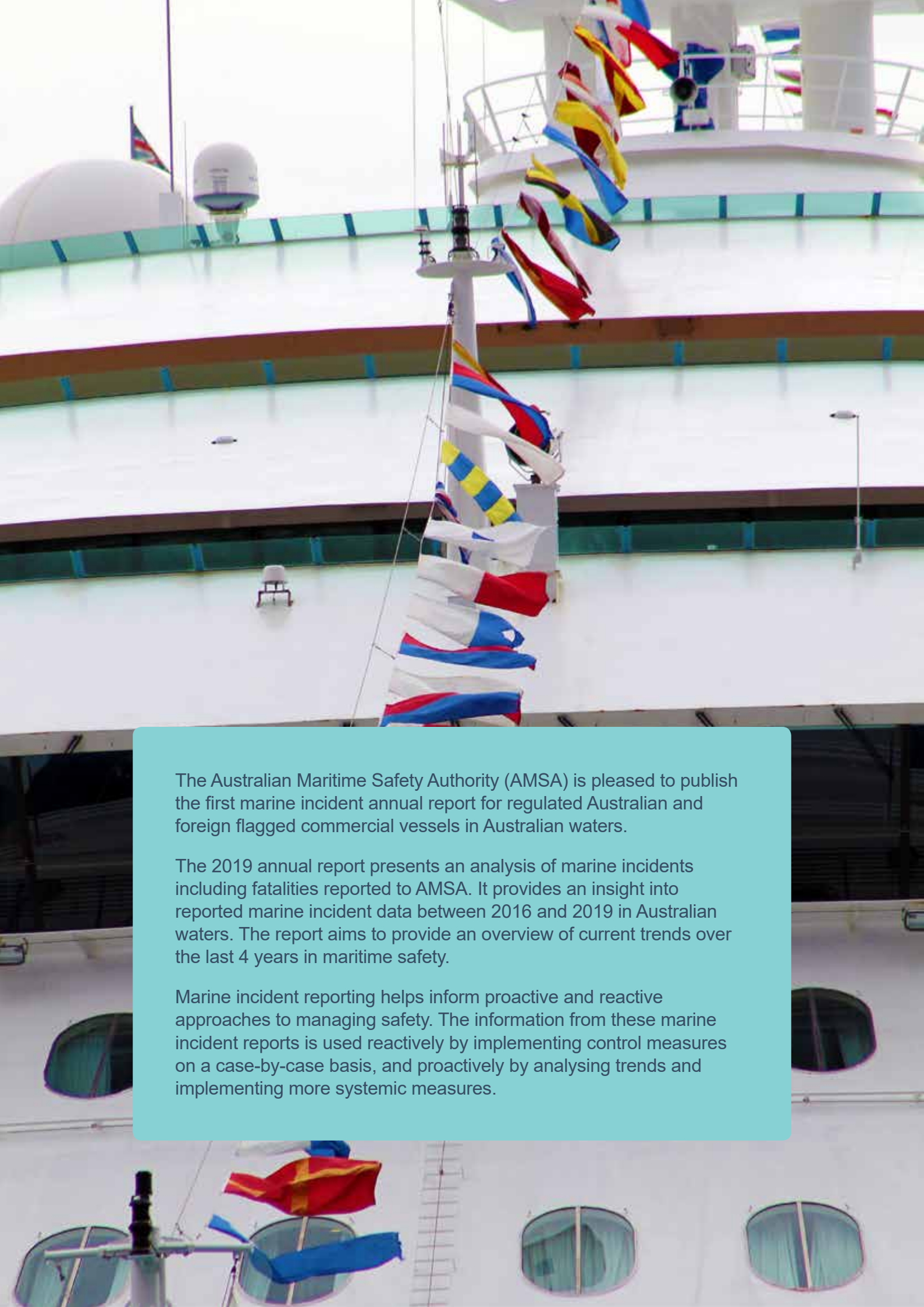
‘Improving safety together’

This report presents an analysis of the current trends in marine safety incidents reported from regulated Australian and foreign flagged vessels in Australian waters. It includes an analysis of reported marine incidents during 2016 to 2019, with a particular focus on 2019 data.

www.amsa.gov.au/incidentreporting



The Australian Maritime Safety Authority (AMSA) is pleased to publish the first marine incident annual report for regulated Australian and foreign flagged commercial vessels in Australian waters.

The 2019 annual report presents an analysis of marine incidents including fatalities reported to AMSA. It provides an insight into reported marine incident data between 2016 and 2019 in Australian waters. The report aims to provide an overview of current trends over the last 4 years in maritime safety.

Marine incident reporting helps inform proactive and reactive approaches to managing safety. The information from these marine incident reports is used reactively by implementing control measures on a case-by-case basis, and proactively by analysing trends and implementing more systemic measures.

Contents

Key findings – 2019

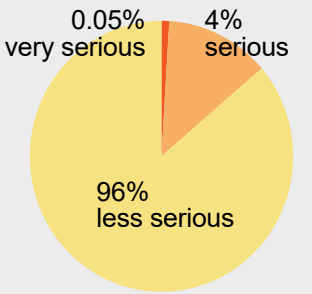
3371 reported marine incidents

2 crew fatalities

2 Very serious marine incidents

141 Serious marine incidents

3228 Less serious marine incidents



3371 marine incidents

215 crew injuries

104 passenger injuries

319 injuries

Introduction

Marine incident reporting is an important source of information that informs both regulation and approaches to managing safety. Additionally, findings from analyses of marine incident reports allows AMSA to use this information to shape our annual compliance plans.

AMSA has been working to improve the collection and use of marine incident data so that it can be used to better inform education and compliance activities. This report provides a historical trend of data between 2016 to 2019, with a particular focus on 2019 data.

Marine incident reporting

While marine incident reporting is mandatory, it is also important from a safety perspective as reporting informs the ongoing safety of operations, people and vessels.

AMSA's incident report allow those making a report to identify shortfalls in the risk assessment and subsequently review and update the vessel's safety management system. This information assures AMSA as the regulator that the owner, operator and master have an understanding of the safety issues that contributed to the marine incident and have implemented effective control measures to learn from incidents and prevent recurrence.

> The value of incident reporting and the resulting analysis is the development of more effective safety strategies and advice for owners, operators and seafarers to prevent recurrence. Incident reporting and subsequent analyses should also be part of the vessel's safety management system.

AMSA also has in place a mechanism for reporting marine safety concerns. This is available for anyone to report. A marine safety concern provides the opportunity to report any incidents observed that endangers, or if not corrected could endanger, the safety of vessels or persons. AMSA deals with marine safety concerns in the same way as it deals with incident reports.

Reporting assists AMSA in responding quickly and efficiently to a marine incident when it occurs. This is done with the intention of ensuring that appropriate control measures are implemented to prevent a re-occurrence.

> Further information on incident reporting is available on the AMSA website at amsa.gov.au/vessels-operators/incident-reporting

1 Regulated Australian Vessel (RAV) is defined under section 16 of the Navigation Act 2012.

Foreign flag vessel arrivals

In 2019, there were 28,584 port arrivals by 5981 foreign-flagged vessels in Australian ports. While this is a decrease in port arrivals by 1.8% from 2018, there was an increase in the number of unique ships by 1.4%.

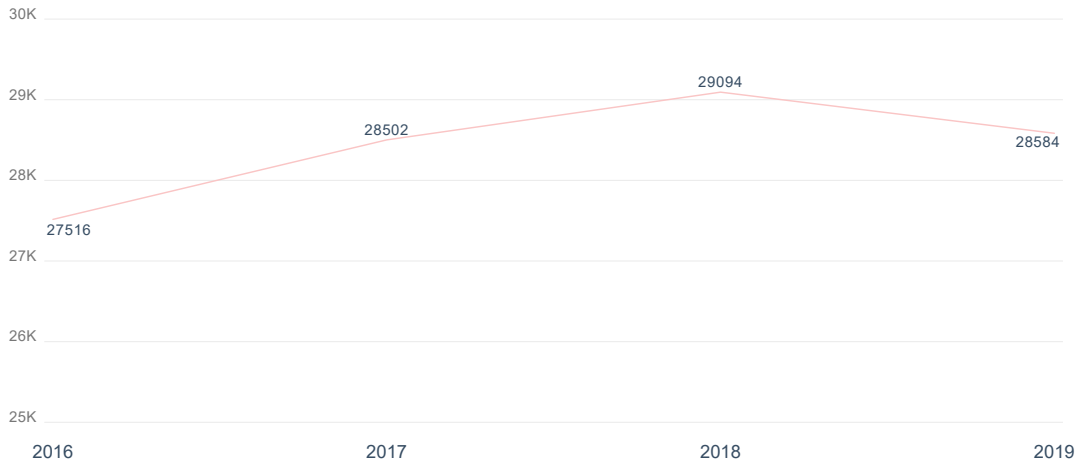


Figure 1a. Total foreign-flag vessel port arrivals by year

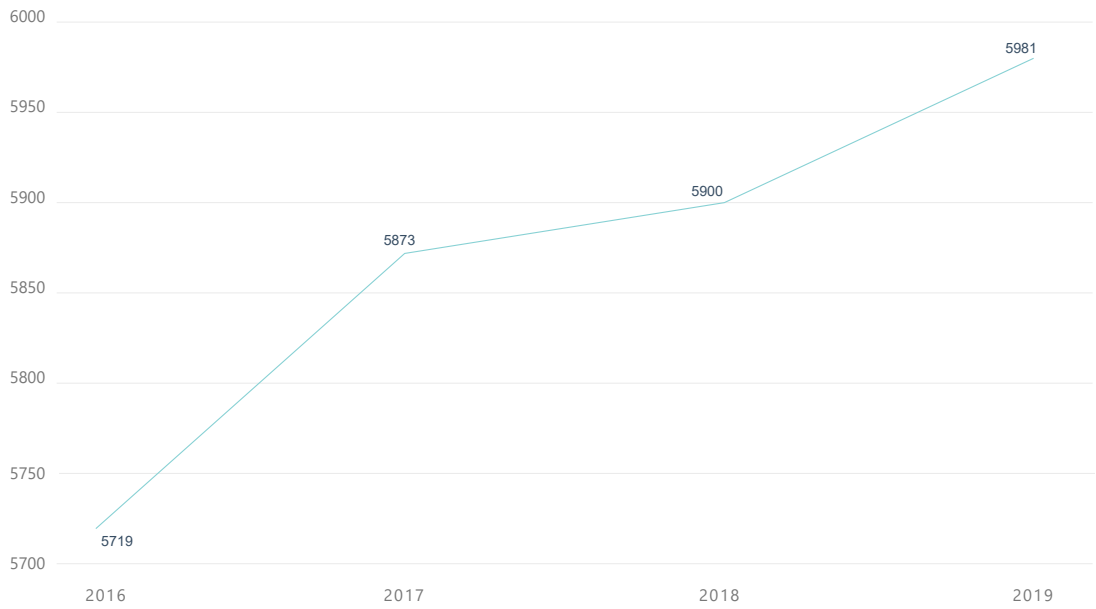


Figure 1b. Total unique vessel port arrivals by year

Bulk carriers accounted for the majority (50.4%) of foreign flag port arrivals in 2019, with container vessels being the next most common (15.2%).[2]

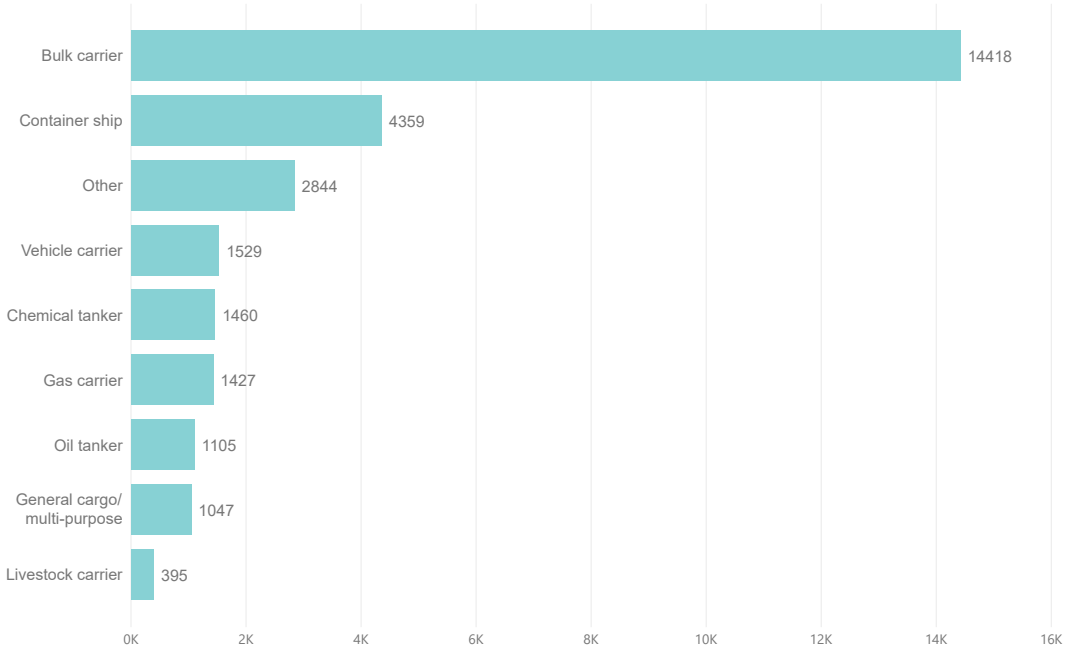


Figure 2. Foreign-flagged port arrivals by vessel type (2019)

The proportion of port arrivals by vessel type remained relatively consistent across the years (Figure 3), with bulk carriers dominating.

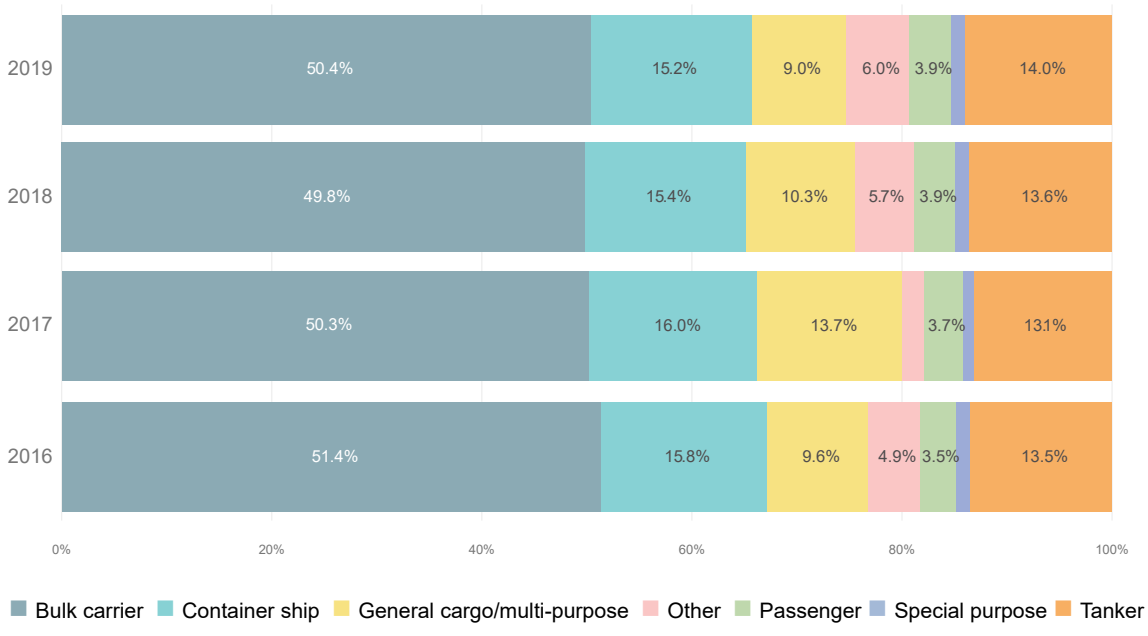


Figure 3. Foreign flag port arrivals by vessel type and year (2016 to 2019)

2 'Other' vessel types includes tugs, offshore service vessels and other vessel types.

Marine incident reporting trends

Reported marine incidents

Between 2016 and 2019, AMSA received a total of 12,349 marine incident reports. There was an increasing number of reports received each successive year. The increase in reporting trends specifically of less serious incidents across each year is viewed as a positive trend with more awareness on the importance of reporting marine incidents (Figure 4). In 2019, there was a total of 3371 marine incidents reported to AMSA.

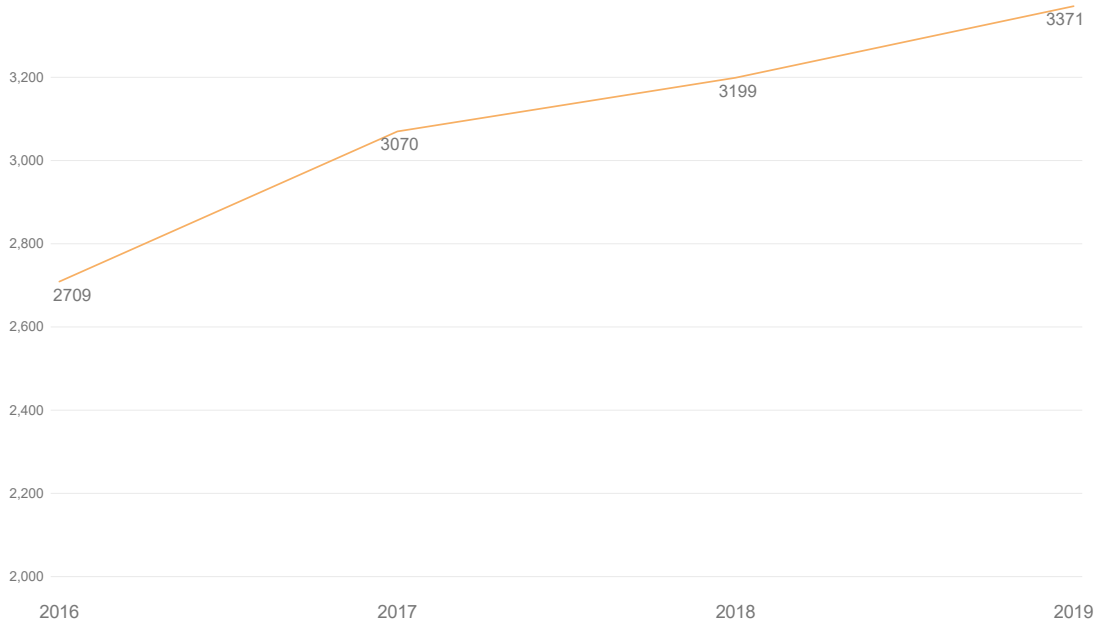


Figure 4. Reported number of incidents by year

Incident trends by severity

Marine incidents are classified by AMSA into one of three severity levels, as described below:

Very serious incidents include loss of vessel, loss of life (fatalities) due to the operation of the vessel and serious pollution.

Serious incidents *(none of the above)* include serious injuries (operational), fire, explosion, collision, grounding, contact, heavy weather damage, ice damage, hull cracking, or suspected hull defect, critical equipment failure (i.e. main engines, steering gear), extensive accommodation damage, severe structural damage (penetration of the hull under water), loss of stability, pollution, and breakdown necessitating towage or shore assistance.

Less serious incidents *(none of the above)* include minor injuries, illness, main engine stoppage for maintenance, minor contacts, minor oil spills, near misses.

AMSA also classifies injuries into one of two categories as below:

Serious injuries include injuries that require emergency treatment, in most cases leading to an emergency medivac from the vessel, and/or hospitalisation.

Minor injuries *(none of the above)* may require first aid treatment on the vessel. Crew are able to continue working on the vessel without taking time off.

On average, 96.4% of incidents reported each year are less serious incidents. The number of very serious incidents has been stable over the last four years with a total of seven very serious incidents reported between the 2016 to 2019 period. One occurred in 2016 and two annually from 2017 through 2019.

In 2019, 0.06% of reported incidents were very serious (2), 4.2% serious (141) and 95.8% less serious (3228).

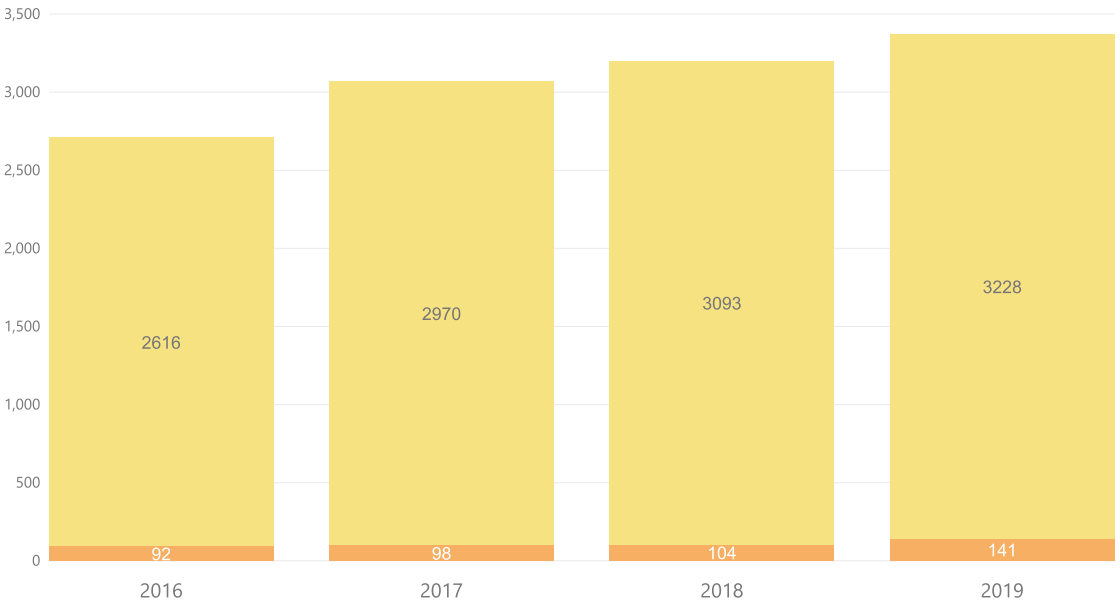


Figure 5. Number of incidents reported each year classified by severity

Reported incidents by vessel type

Between 2016 and 2019, 4909 unique vessels were associated with the 12,349 marine incident reports. This represents an average of 2.5 incidents reported per vessel over the four year period. Annually, the average of 1.7 incidents reported per vessel has remained consistent.

In 2019, 2004 unique vessels were involved in the 3371 marine incidents reported.

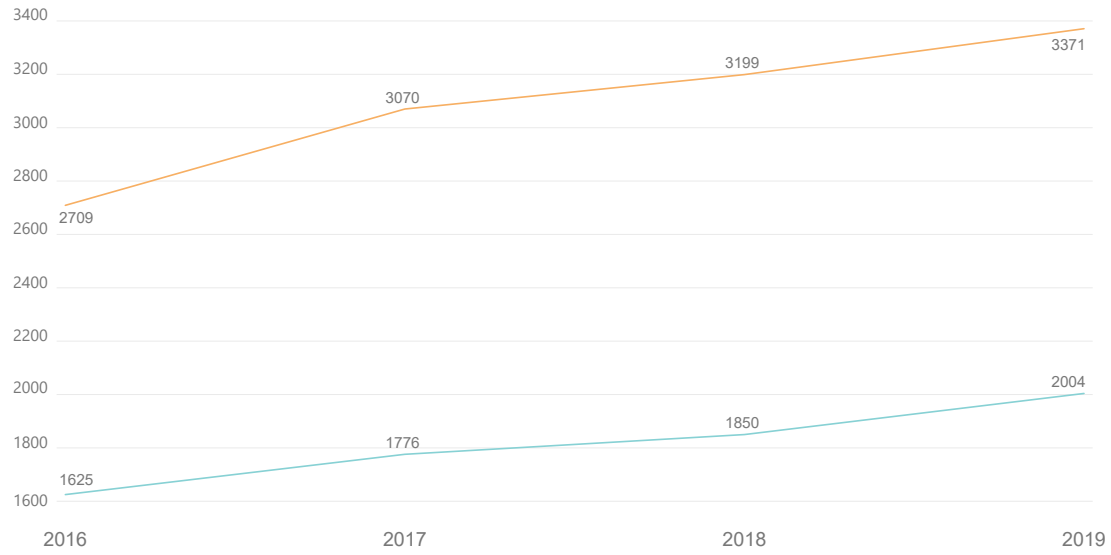


Figure 6. Number of vessels involved in marine incidents to number of incidents reported by year

In 2019, the majority (54.5%) of incident reports came from bulk carriers followed by container vessels. This is consistent with previous years' data.

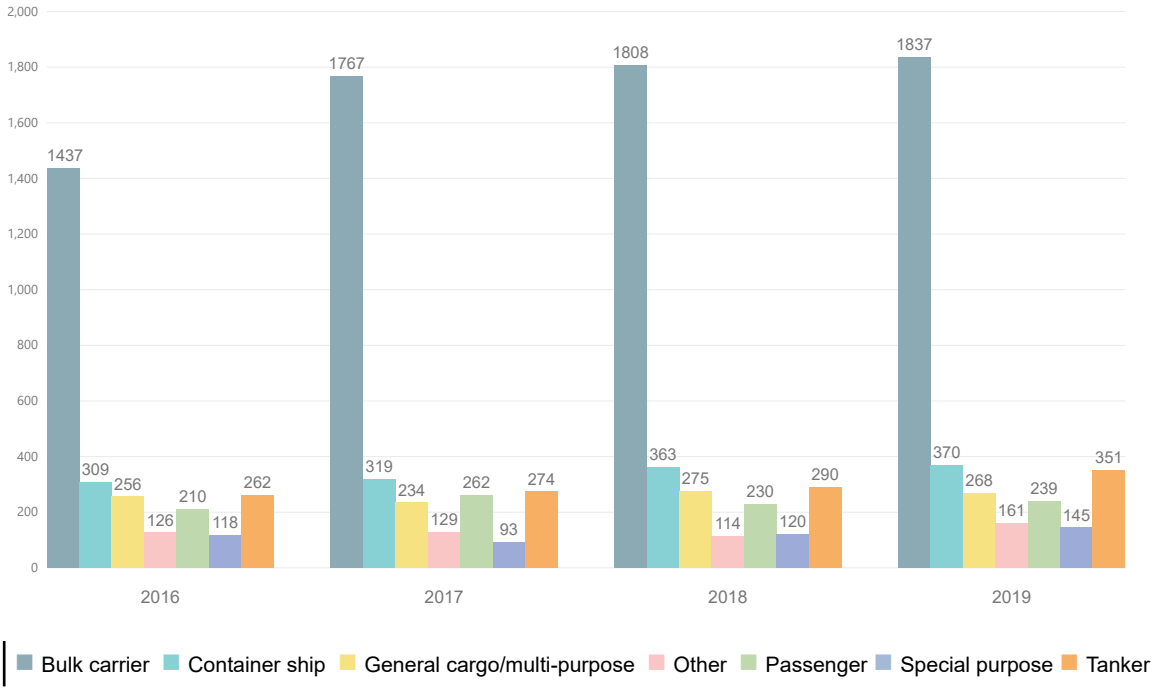


Figure 7. Distribution of reported incidents by vessel type and year

Figure 8 represents the annual percentage of reported incidents in relation to the percentage of port arrivals from 2016 to 2019. Although the results show consistency across the years in the proportion of reported incidents as related to the proportion of port arrivals, there are some minor differences. For example, between 2018 and 2019 the increase in the bulk carrier sector did not result in an increase in reporting.

In 2019, bulk carriers represented 55.4% of reported marine incidents and 50.4% of port arrivals. Although passenger vessels only represented 3.9% of port arrivals, they represented 7.1% of reported incidents. Similarly, special purpose vessels represented 1.4% of 2019 port arrivals but 4.3% of reported incidents.

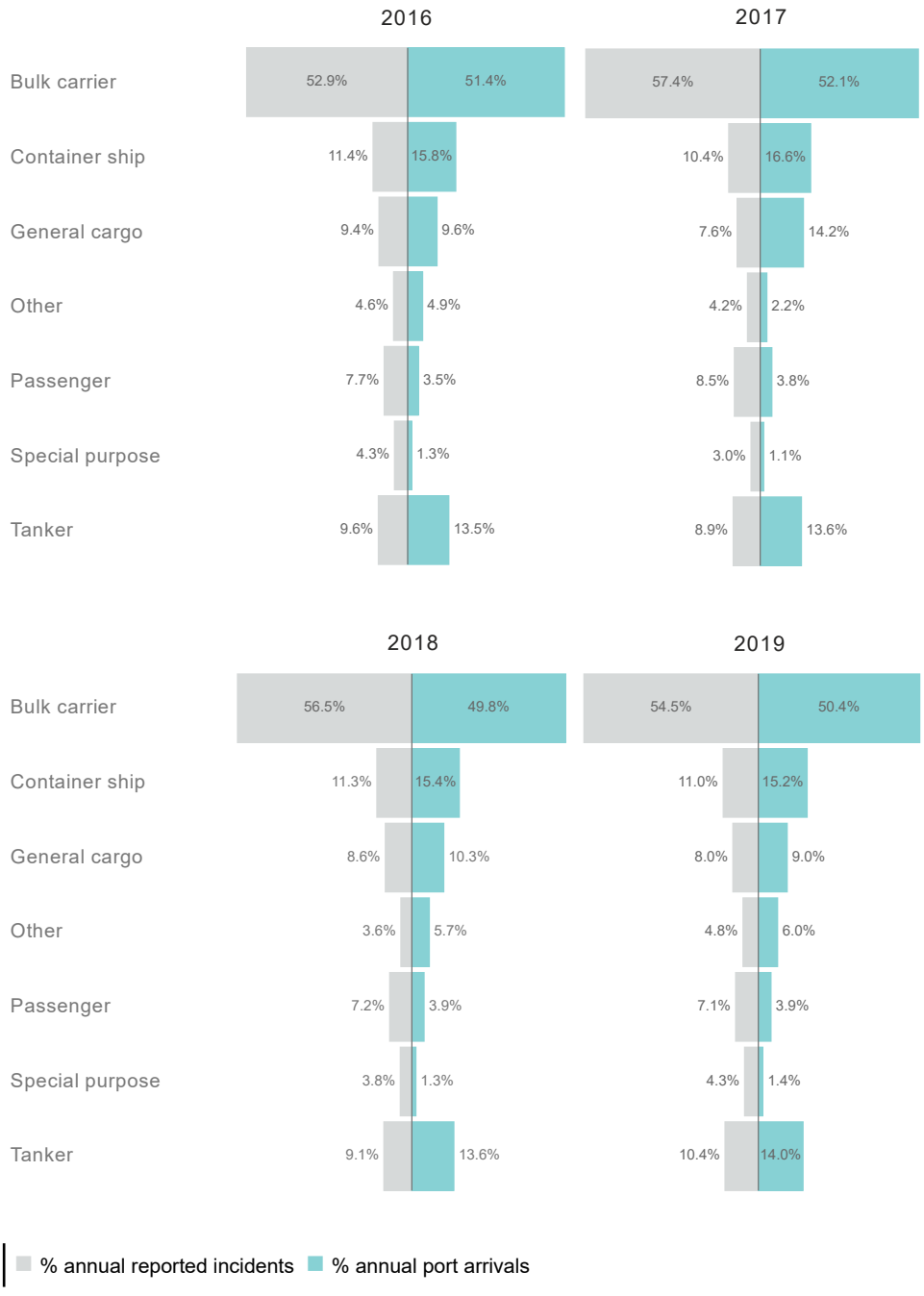


Figure 8. Distribution of reported incidents and port arrivals by vessel type and year (2016 to 2019)

The proportion of very serious and serious incidents in relation to less serious incidents varies by the type of vessel. Although bulk carriers have the highest number of reported incidents, the rate of very serious and serious incidents is proportionally lower (3.2%) when compared to other vessel types. The ‘other’ vessel types (which include tugs, offshore service vessels and other) represent the highest proportion (9.9%) of very serious and serious incidents. This is followed by 7.9% for passenger vessels and 7.7 % for special purpose vessels.

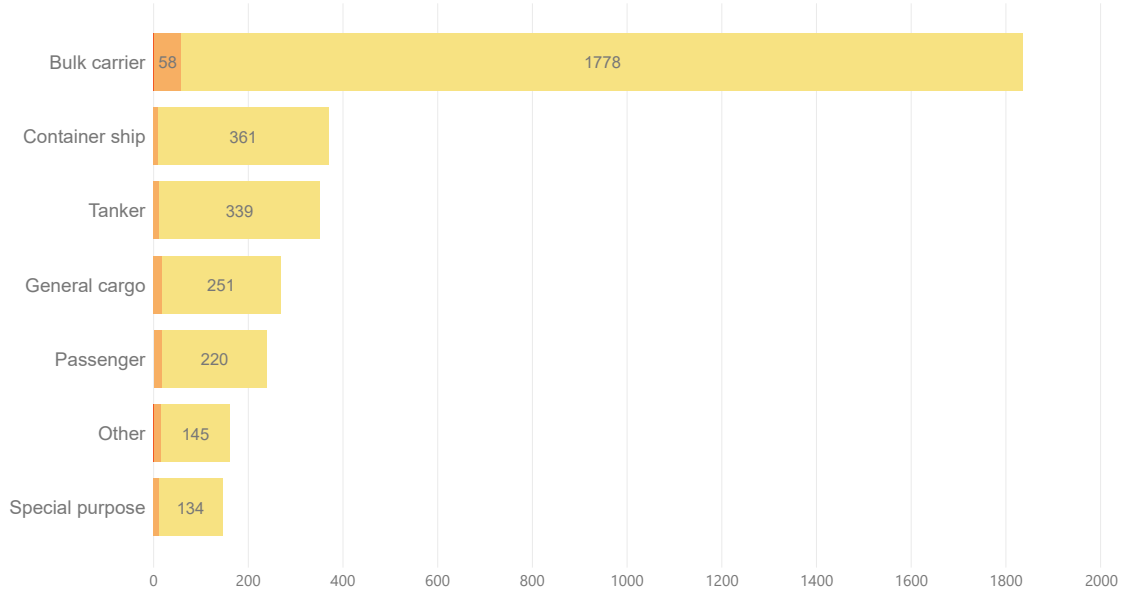


Figure 9. Number of reported incidents by vessel type and severity (2019)

Reported incidents by location

Most incidents in 2019 occurred while the vessel was within port limits (44.2%) with a similar percentage (42.8%) occurring outside of coastal waters[3] but within the limits of the exclusive economic zone (EEZ).

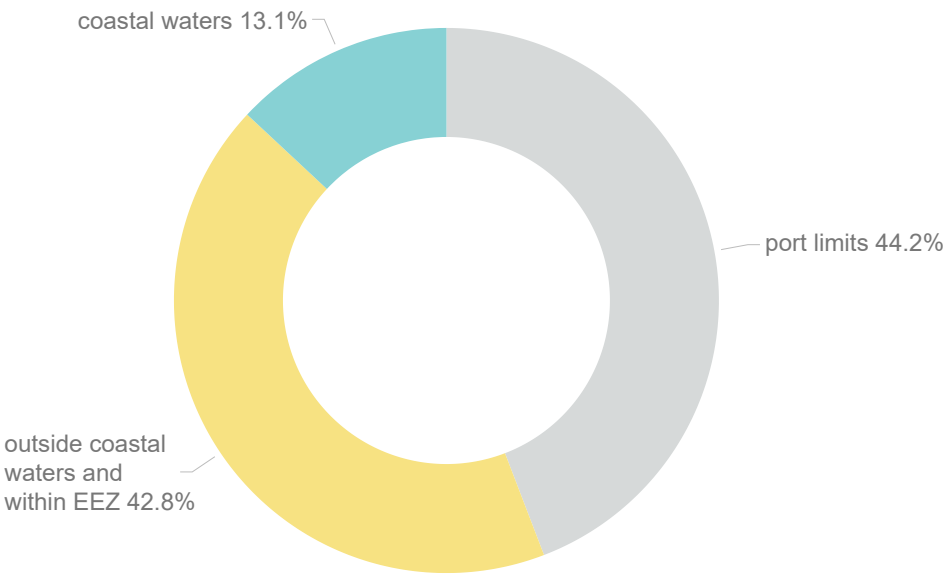


Figure 10. Location of incidents (2019)

3 Coastal waters incidents occur within 3 nautical miles offshore.

Reported incidents by age of vessel

In 2019, vessels more than 15 years old represented approximately 8% of port arrivals and 24% of reported incidents.

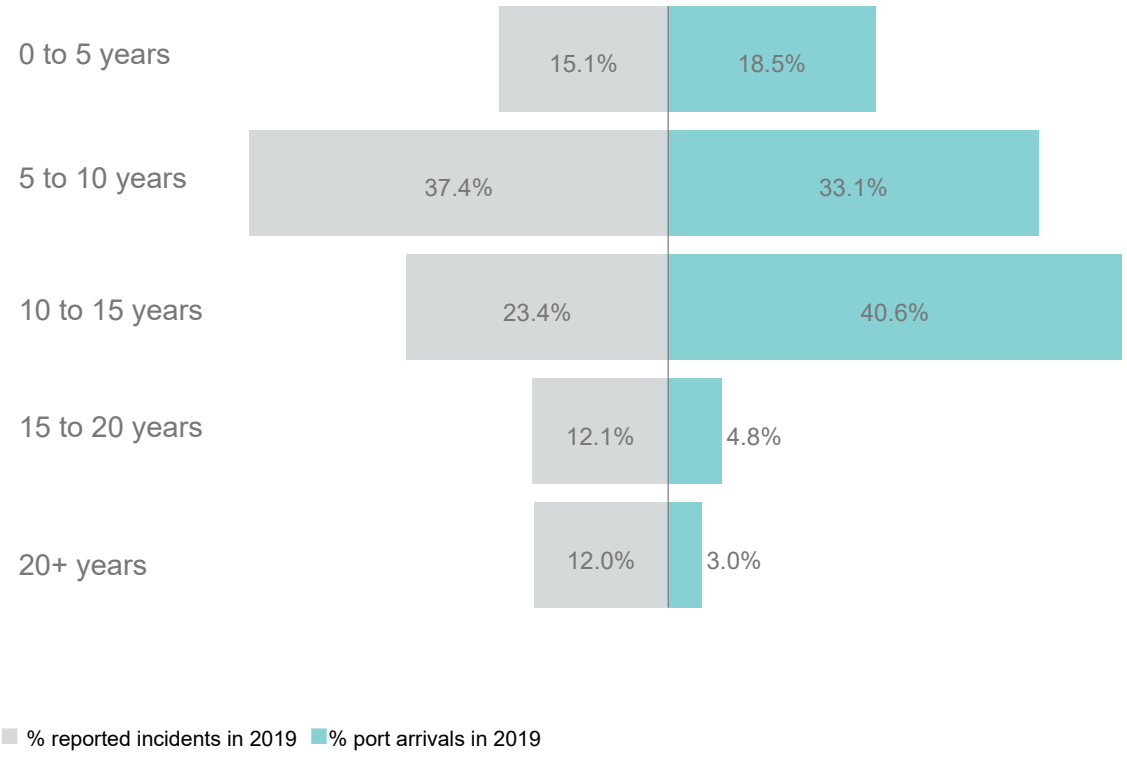


Figure 11. Distribution of reported incidents and port arrivals by age of vessel (2019)

Marine incident categorisation

Incidents are usually the result of a complex set of circumstances, often involving a chain of events. To gain a better understanding of what incident reports are telling us, AMSA categorises all incident reports into one or more 'occurrence types', to consistently describe what happened in each incident. Classifying incidents in this way helps to understand patterns of what has taken place and identify potential areas for safety improvement.

The categorisation of incidents does not explain why a marine incident happened—it describes what occurred.

Incident categories

The coding of all incident reports into occurrence types consists of a three-level hierarchy. The first level of the hierarchy is categorised into the following occurrence type groupings:

1. Personal consequence

2. Vessel consequence

3. Technical

4. Operational

5. Infrastructure and support

6. Non-operational

The table below provides a descriptor of each of the level 1 occurrence types.

Level 1 occurrence type groupings	Marine incidents related to:
Personal consequence	The impact / outcome of one of the other Level 1 groupings on persons on the vessel.
Vessel consequence	The impact / outcome of one of the other Level 1 groupings on the vessel.
Technical	A technical failure / missing / defective vessel structure, equipment or system.
Operational	An operational shortfall. This is usually associated with an action someone did or did not do that impacted on the safe operation of the people and/or vessel.
Infrastructure and support	A failure or issue with port, VTS, navigational aids and other infrastructure support facilities that directly affect vessel operations.
Non-operational	Other causes that are not directly related to the operations of the vessel (potentially piracy, acts of war) that impact the safe operation of a vessel.

Each of the level 1 occurrence types are sub-divided into a number of related level 2 occurrence types. In turn, level 2 occurrence types are further sub-divided into level 3 occurrence types. The hierarchical nature of the occurrence types is of fundamental importance, as it helps in the identification of trends. For example, a series of incidents may be seen to be unrelated as they reflect collisions with other vessels, collisions with wharves, and grounding. However, the underlying issue in all these incidents may be engine failure.

Figure 12 provides a visual representation of part of this framework with the level 1 occurrence type 'Technical', expanded into its level 2 and level 3 occurrence types.

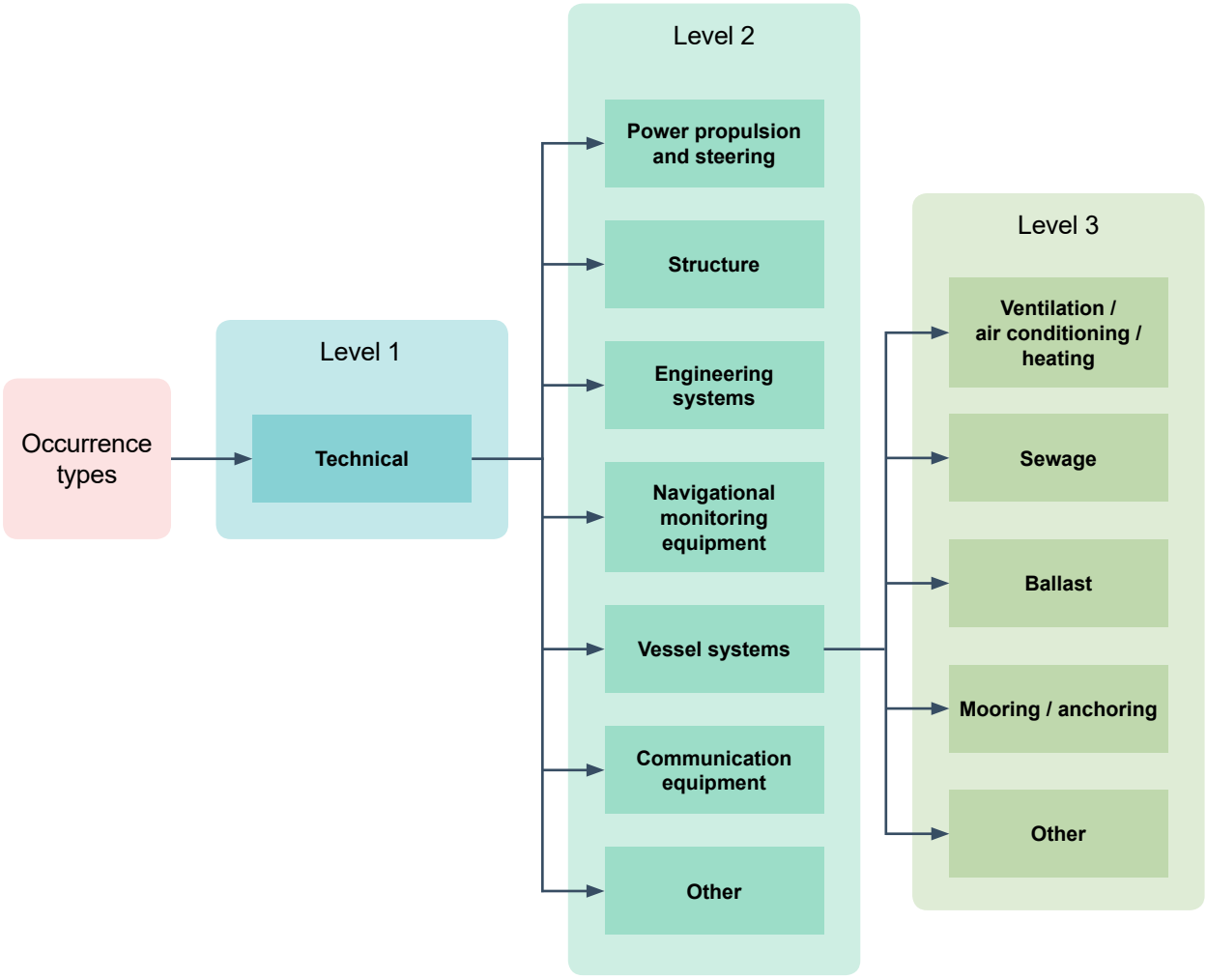


Figure 12. An example of the level 1 'Technical' occurrence type expanded into its level 2 and level 3 occurrence types.

Figure 13 shows a breakdown of the 3371 marine incidents reported in 2019 into their level 1 occurrence types by severity [4]. Overall, the most common level 1 occurrence type associated with reported incidents is Technical (78.4% of incidents) followed by Personal Consequence (14.7% of incidents).

Occurrence types – Level 1

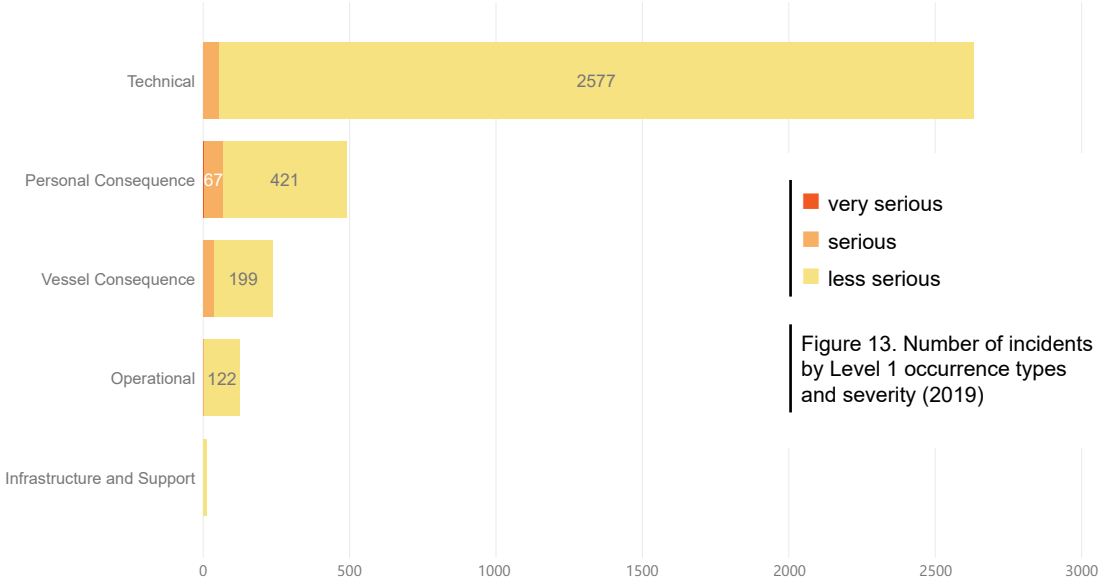


Figure 13. Number of incidents by Level 1 occurrence types and severity (2019)

Technical occurrences are the most common level 1 occurrence type with the data showing an increasing trend in technical related incident reports between 2016 and 2019. The relative distribution of the other occurrence types has been consistent across the years from 2016 to 2019.

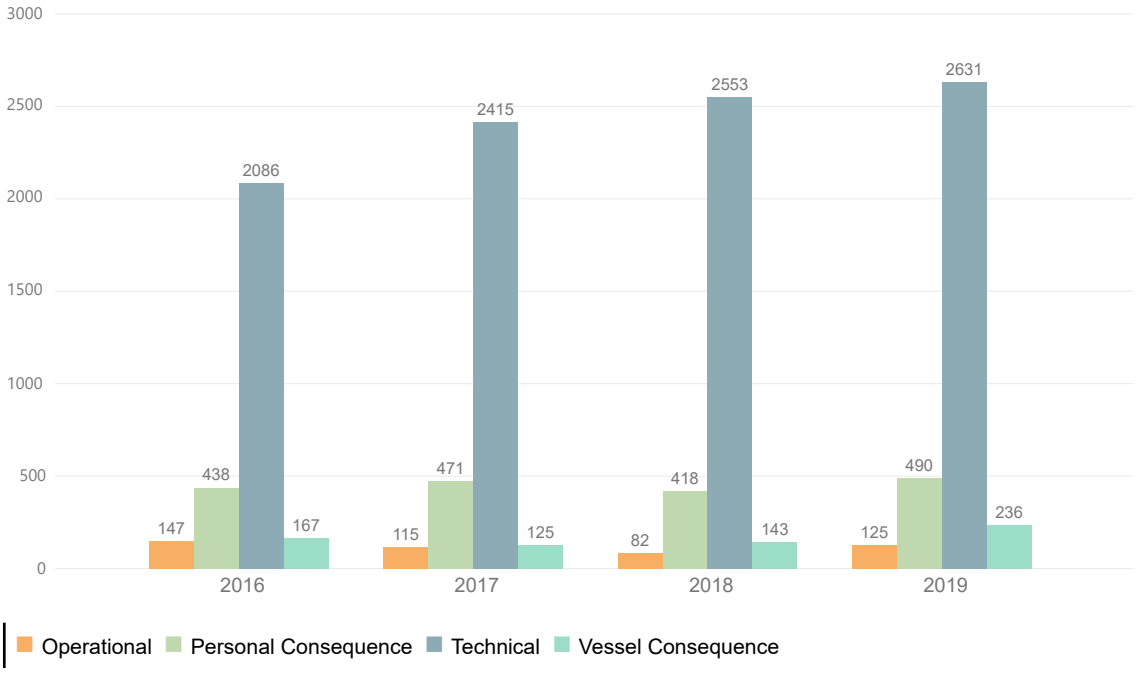


Figure 14. Trend in level 1 occurrence types by year

4 Note that one incident may be coded into multiple categories.

Consequences to people

Some marine incidents result in consequences to passengers or crew on-board. These consequences can include injury, person over-board or fatalities. Figure 15 shows the incidents involving personal consequence by severity across each year (2016 to 2019).

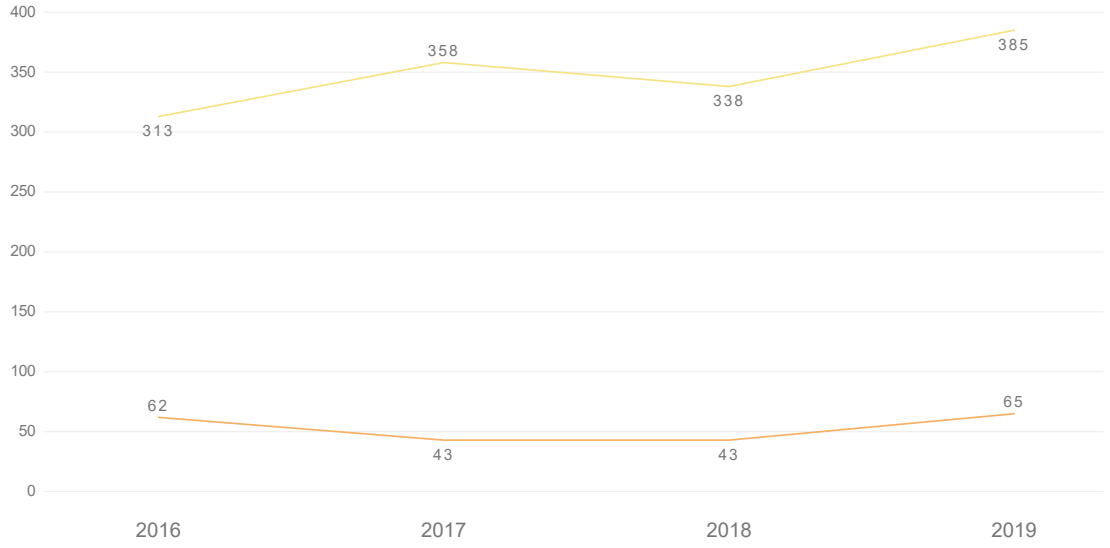


Figure 15. Number of incidents involving personal consequences, by severity and year (2016-2019)

Figure 16 details the non-fatal personal consequences by crew and passengers. The majority of injuries, illnesses and persons overboard involved crew members.

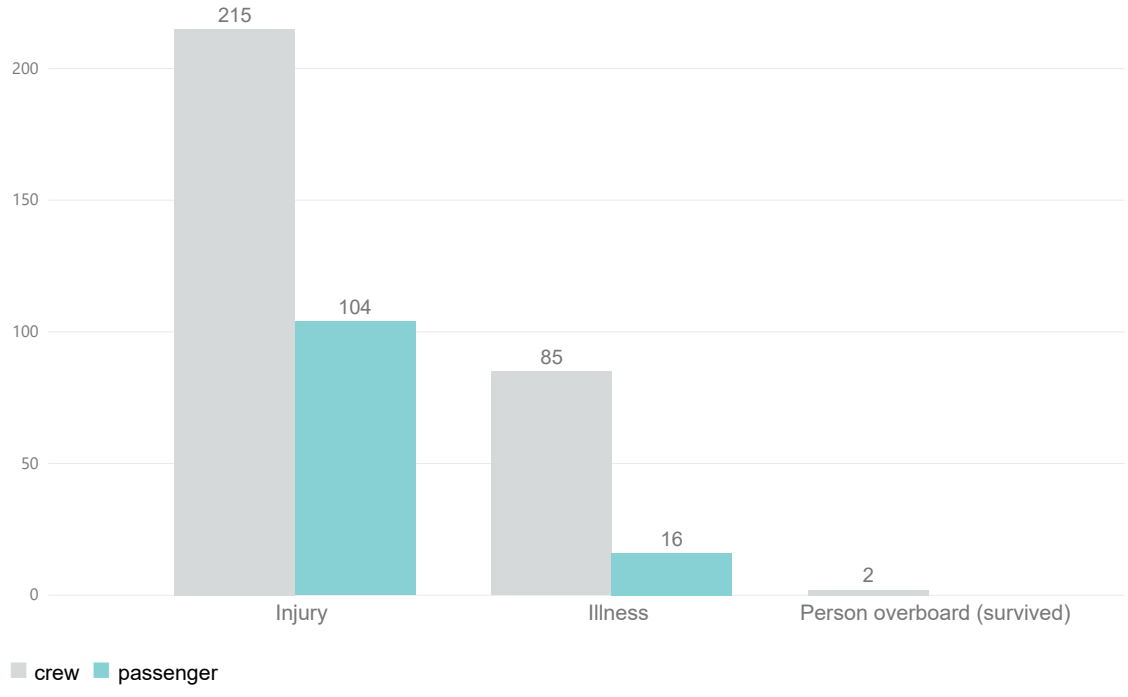


Figure 16. Distribution by type of non-fatal personal consequence by injury, illness and person overboard (2019)

From 2016 to 2019, a total of 1180 incidents were reported to AMSA which involved a non-fatal injury to a passenger or crew member. Of these, 60% (710 incidents) involved crew.

In 2019, there were 215 reported crew injuries and 104 reported passenger injuries.

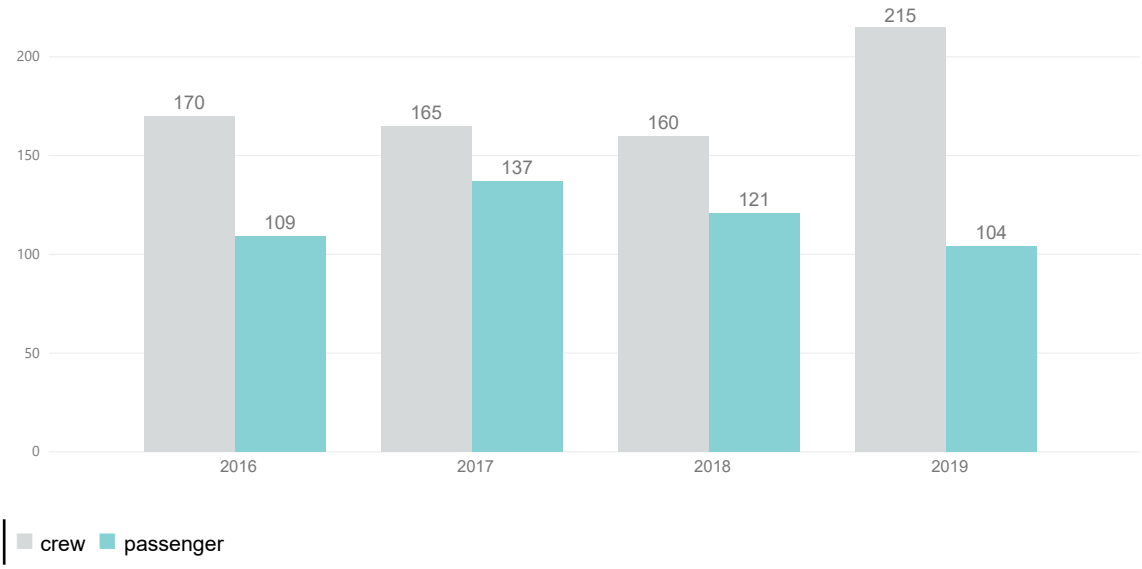


Figure 17. Number of incidents reported with injuries for crew and passengers by year

Most injuries occurred during incidents classified as less serious. In 2019, 12.9% of injuries occurred as a result of serious incidents. This represents an increase from the previous years.

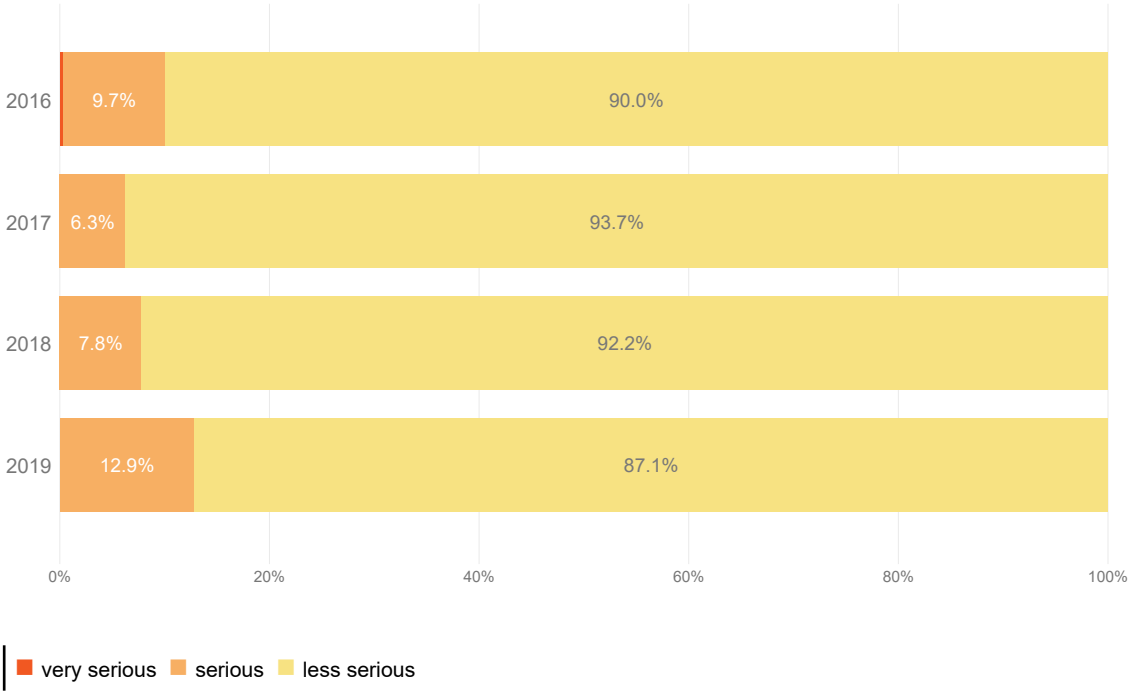


Figure 18. Incident severity distribution of injuries by year

Fatalities (2016–2019)

AMSA collects and records data on operational related fatalities[5] on regulated Australian and foreign flagged vessels. Between 2016 and 2019, there were seven fatalities associated with seven incidents (Figure 19). All occurred on foreign-flagged vessels. Six involved crew members and one (in 2016) was a passenger fatality.

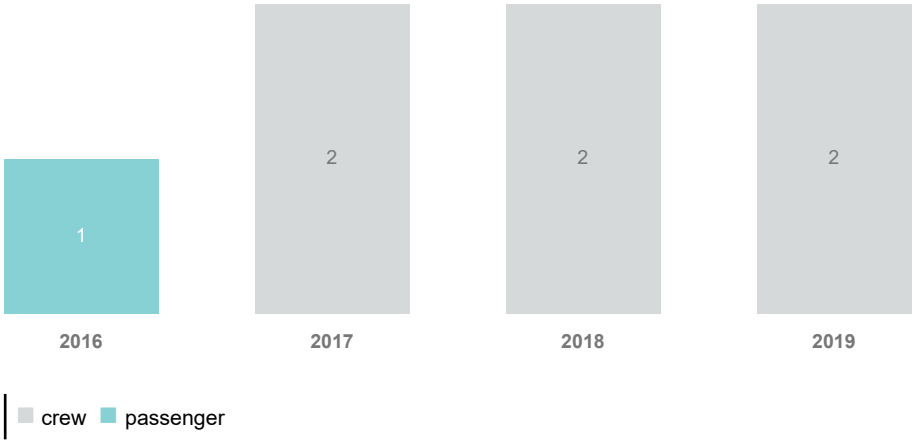


Figure 19. Total number of fatalities reported by year, by crew and passengers

Of the six crew fatalities, two involved elevator maintenance, one was a result of an electrical shock and three of the crew fatalities involved falls.

In response to these incidents, AMSA has published safety bulletins and marine notices on these topics, including:

- Electrical Safety (2016/03) – This safety bulletin explores electrical safety and aims to provide further awareness and recommended actions that will promote an effective electrical safety culture on board ships.
- Working over the side (2016/04) – This safety bulletin focuses on working over the side and safety issues associated with such tasks.
- Fatal accidents caused by moving elevators on ships (2020/01) – This marine notice highlights shipowners, operators, masters and crews obligation to ensure safe working arrangements are in place for any work involving a ship's elevator.

5 These include fatalities associated with the operation of the vessel and are captured as a fatality occurring during a marine incident.

Figure 20 provides a breakdown of the fatality data for the period 2016 to 2019 by vessel type with most fatalities occurring on bulk carriers.

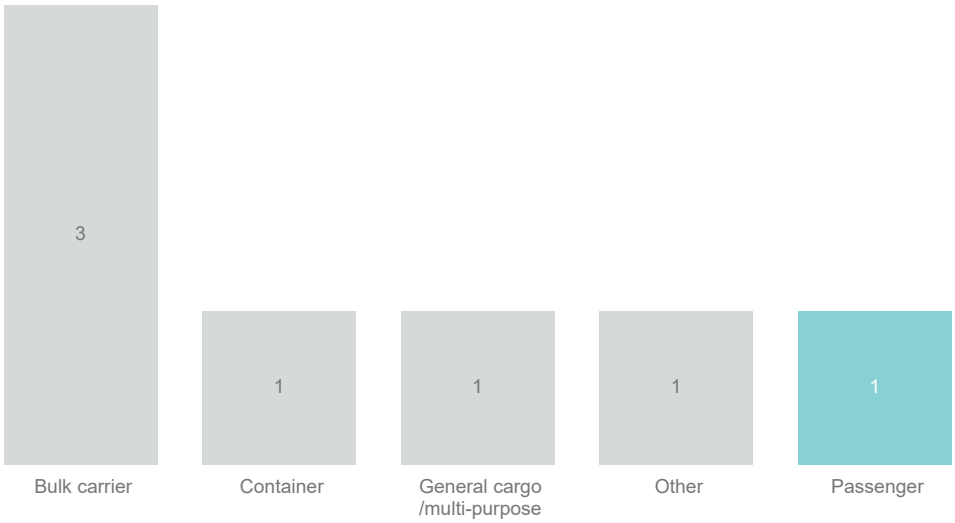


Figure 20. Total number of fatalities reported by vessel type (2016-2019)

Consequences to vessels

In 2019, 236 incidents resulted in a vessel consequence.

Figure 21 provides an overview of the vessel consequence as a result of a marine incident for 2019. The most common vessel consequence occurring in 2019 were contact (24.2%) followed by pollution (23.3%), disablement (15.7%) and close quarters (13.1%).

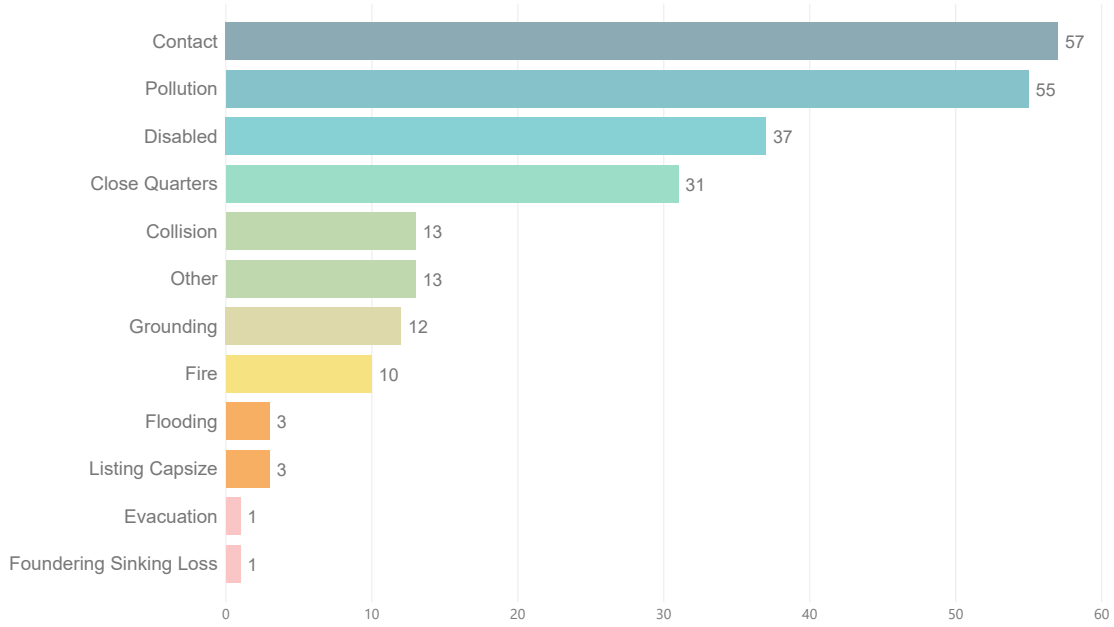


Figure 21. Vessel consequences in 2019

Although “Other” vessels (including tugs, offshore service vessels and other) only represent 4.8% of reported incidents, they had the highest frequency of incidents in 2019 involving contact (18), and the second highest number of incidents involving pollution (12).

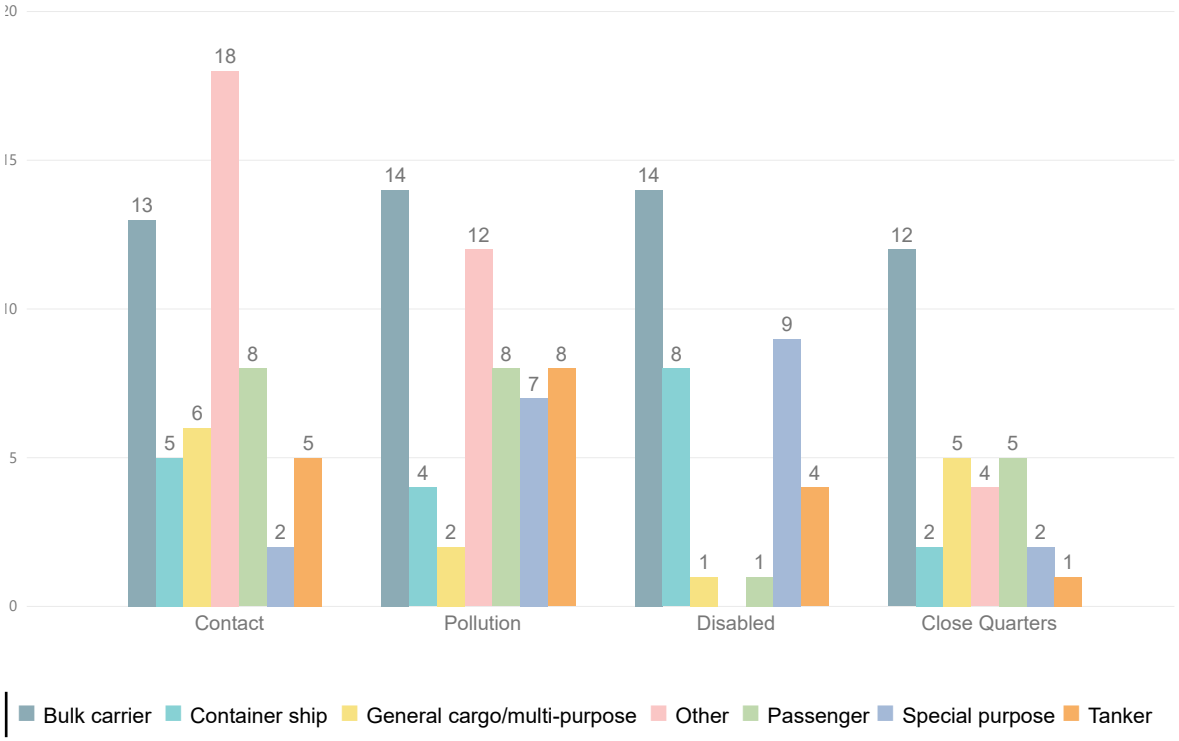


Figure 22. Top four vessel consequences occurring in 2019 by vessel type

The incidents involving pollution in 2019 are further broken down as shown in Figure 23. The number of reports of pollution have been consistent over previous years.

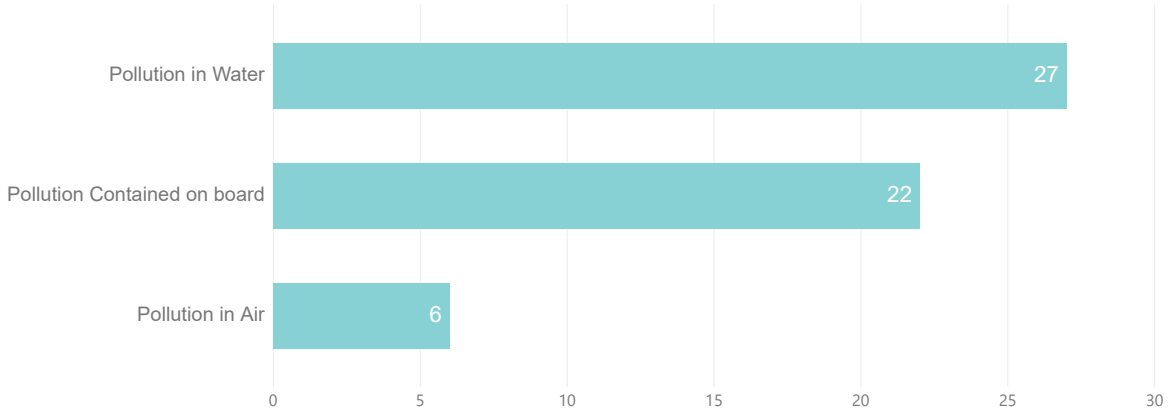


Figure 23. Pollution incidents (2019)

Technical incidents

Incidents that involved a failed, missing or defective structure, equipment or system are categorised as Technical occurrence types. The most frequently reported category of technical failures in 2019 were power propulsion and steering (26%), followed by navigational monitoring equipment (17.6%). Of the 56 serious incidents in 2019 involving a technical failure, 41 were related to power propulsion and steering (73%).

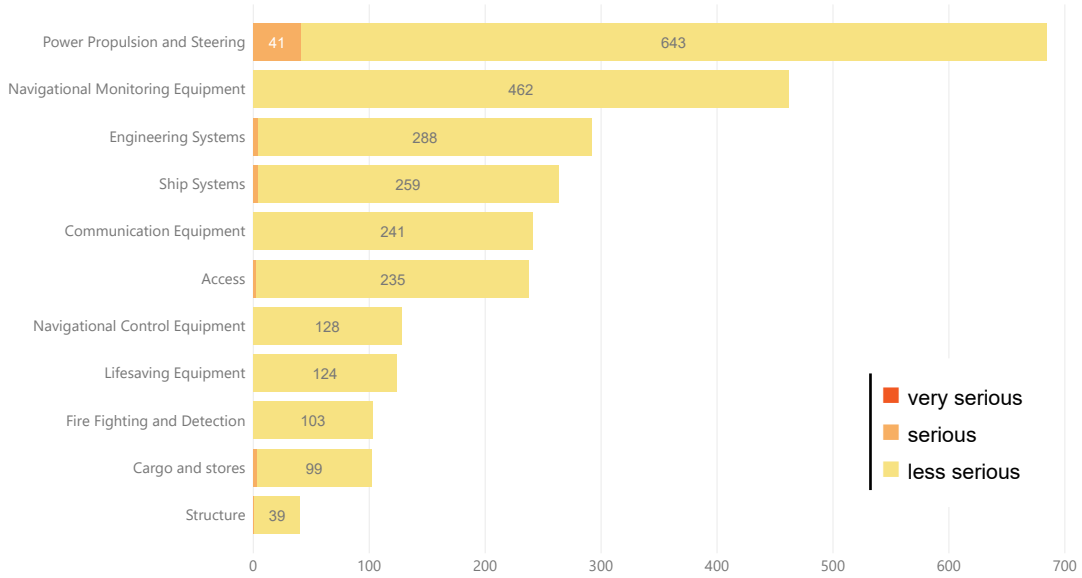


Figure 24. Number of incidents categorised by technical occurrence type and severity (2019)

Figure 25 presents the top 10 most frequently occurring level 3 equipment and/or system faults that resulted in the above level 2 technical failures for 2019. Under Power propulsion and steering, the following level 3 technical failures include main engine/gearing (406), auxiliary engines/ alternators (130) and steering gear/rudder (70). Equipment related to the navigational monitoring equipment failures were radar (175), voice data recorder (VDR) (85) and electronic chart display and information system (ECDIS) (76).

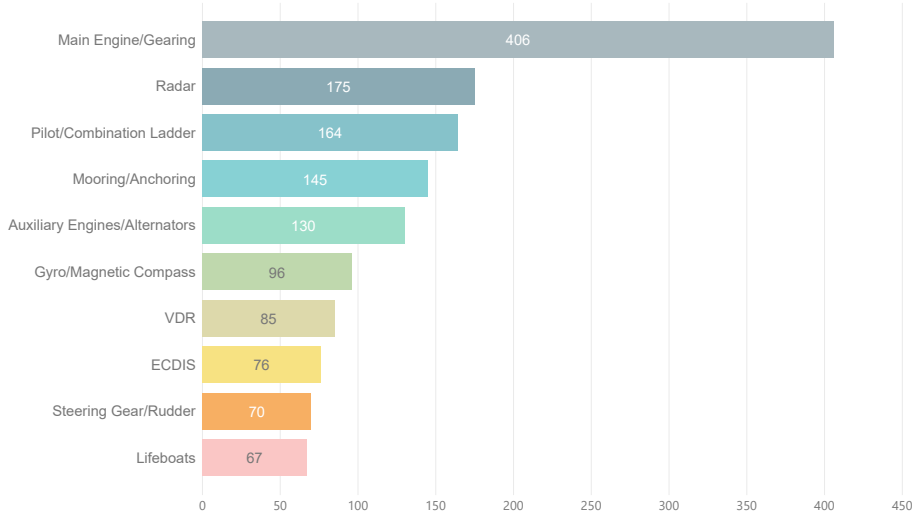


Figure 25. Top 10 most frequently occurring equipment failures reported (2019)

Figure 26 shows that the number of power propulsion and steering failures are proportionally higher compared to other technical failures for vessels aged 20 years and over.

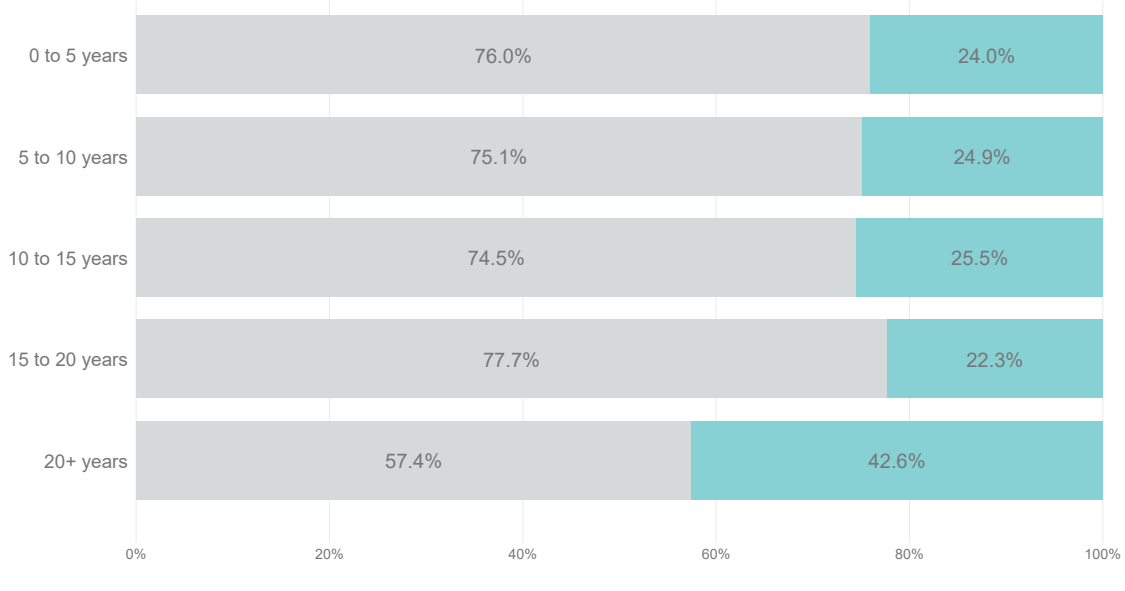


Figure 26. Proportion of technical incidents related to Power Propulsion and Steering by vessel age (2019)

Operational incidents

Operational marine incidents are related to shortfalls in the operation of the vessel. For example, of the incidents reported in 2019, 3.7% had an operational related event.

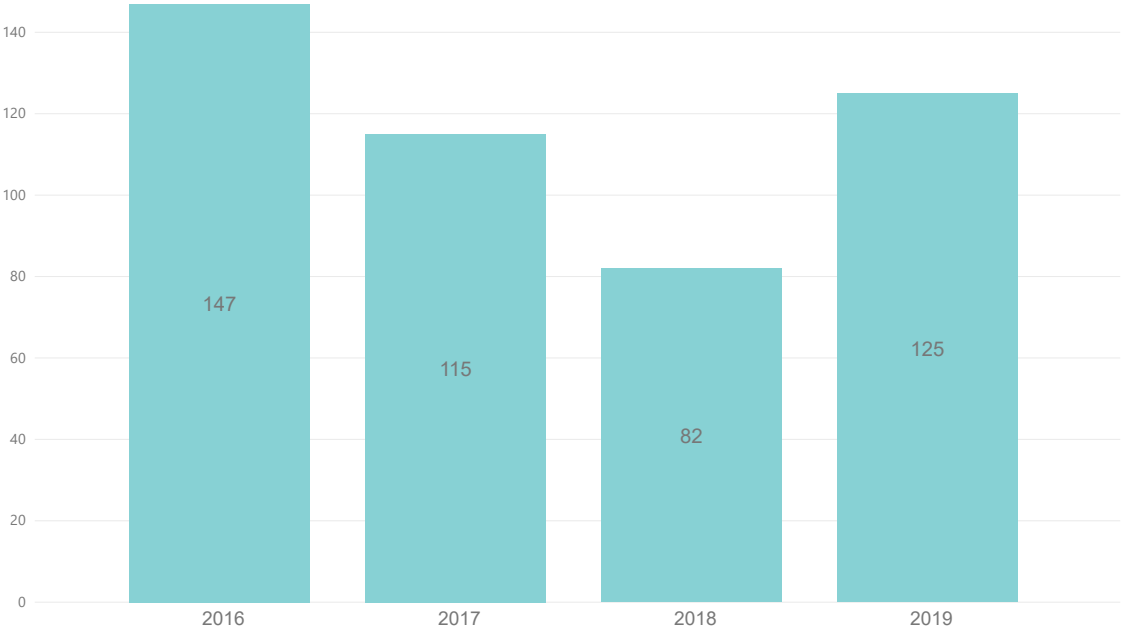


Figure 27. Operational-related incidents by year

Bulk carriers accounted for 52% of operational related incidents in 2019.

The three operational incidents categorised as serious occurred on tankers (2) and general cargo (1) vessels.

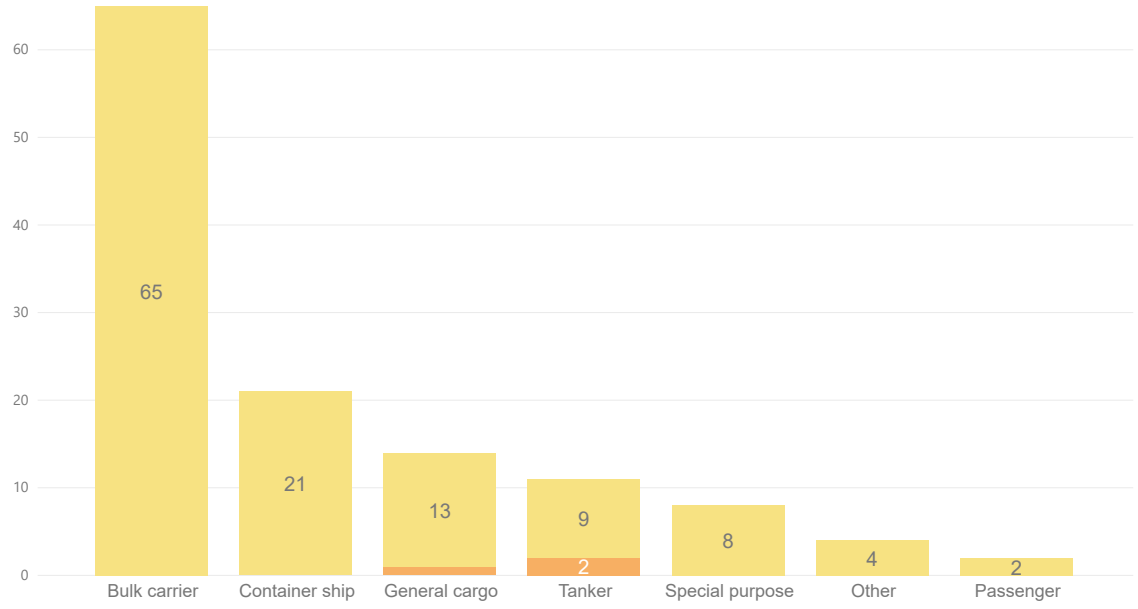


Figure 28. Operational-related incidents by vessel type and incident severity (2019)

Cargo handling was the most common operational incident (43), followed by communication (40).

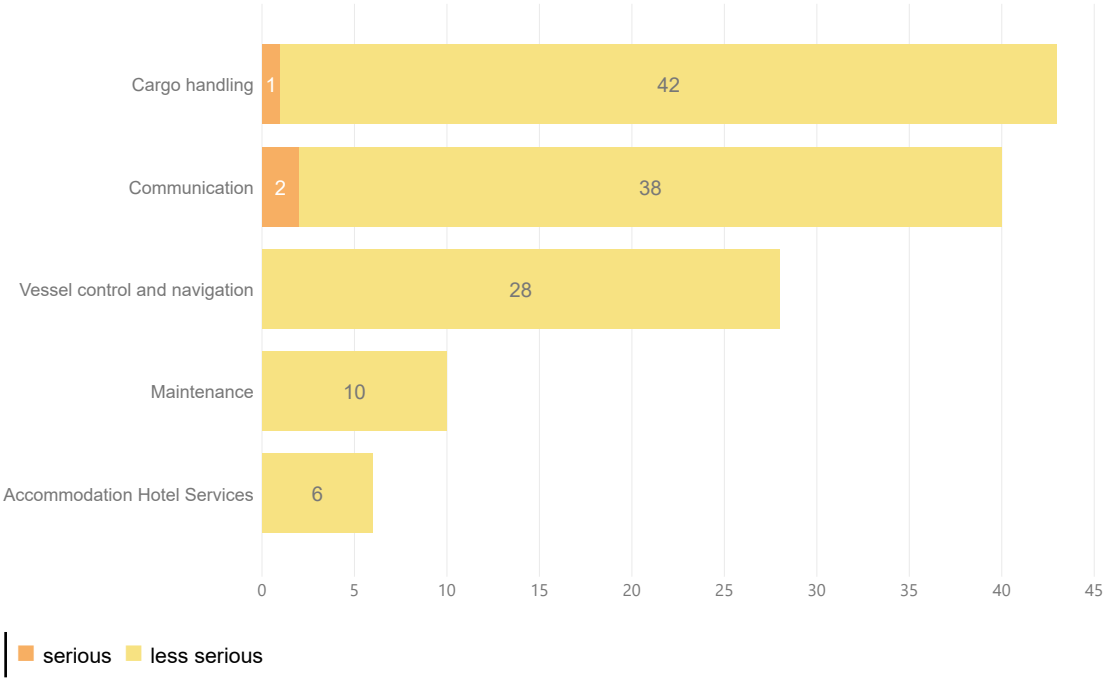


Figure 29. Level 2 coding of incidents with an operational component, by severity (2019)

Figure 30 breaks down cargo handling into its level 3 components. Loading / Unloading and Containers account for more than half of these incidents.

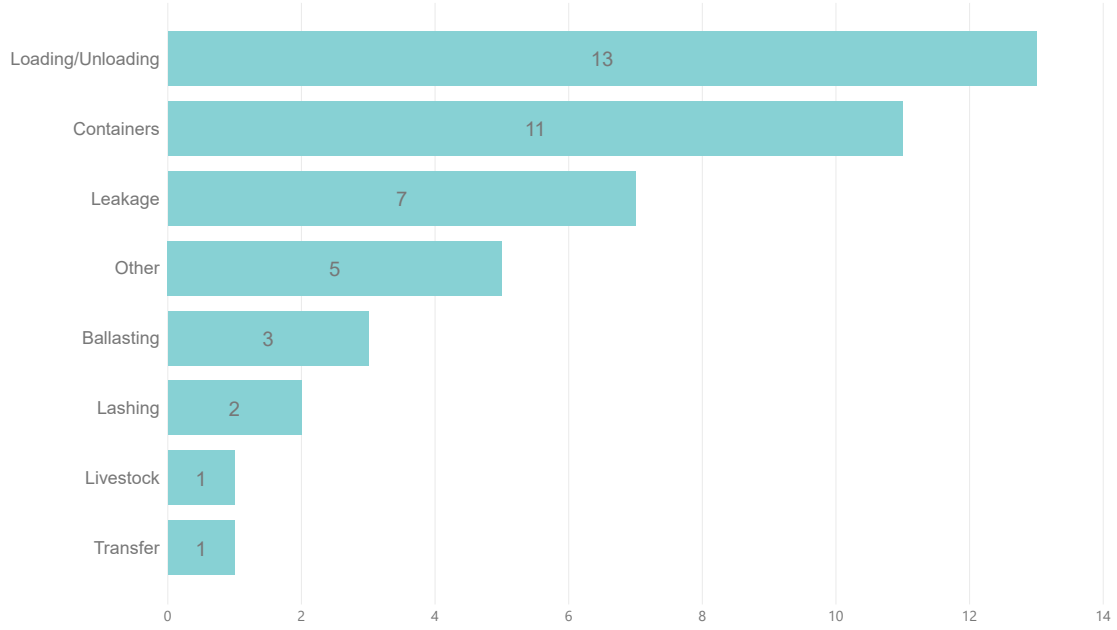


Figure 30. Level 3 for cargo handling operational incidents (2019)

Conclusion

This annual report will support a data-driven approach which is essential for improving safety in an increasingly complex maritime context.

The data suggests that reporting of maritime incidents has improved, with a significant increase in the reporting of less serious incidents. The vast majority of these reports are of a technical nature (78.4%), with personal consequences representing 14.7% of incident reports. The increased reporting rate is a positive sign in terms of industry commitment to safety, and suggests that industry engagement initiatives are yielding results. However, the upward trend in serious incidents between 2018 and 2019 indicates that a concerted effort on improving safety, and safety culture should remain a priority for the maritime sector.

There were seven incidents that resulted in fatalities between 2016 and 2019. Six of these incidents involved crew members and were associated with elevator maintenance (2), electrical shock (1) and falls from height (3). These present immediate focus areas for improving safety. As a result of these fatalities, AMSA has issued marine notices and safety awareness bulletins focusing specifically on the safety issues that contributed to these fatalities.

The majority of technical failures reported involved power, propulsion and steering, followed by navigation monitoring equipment and engineering systems. Again, these leading sources of failure provide valuable focus for safety initiatives. Additionally, the higher percentage of serious incidents on vessels greater than 20 years old highlights the need for a focus on effective maintenance to improve reliability and safety in ageing vessels.

The second highest consequence of maritime incidents for 2019 was pollution, at 23.3%. This highlights the impact maritime incidents can have on our fragile marine environment.

Analysis of the data summarised in this report provides insights that have, and will continue to guide AMSA's education and engagement initiatives.

AMSA recognises the strategic importance of collaborating with our stakeholders, and this includes educating our maritime community. As such, AMSA has leveraged incident data and the latest maritime safety and human factors research to produce a range of publications that target the safety priorities identified in this report. These publications include Safety Awareness Bulletins and Marine Notices.

Safety Publications

Safety Awareness Bulletins are published biannually, with topics prioritised on safety data. In particular, the following safety awareness bulletins were published in response to maritime incident trends, as summarised in this report:

1. Working at heights (February 2015)
2. Electrical safety (March 2016)
3. Working over the side (September 2016)
4. Risk assessment (September 2016)
5. Marine incident reporting (September 2017)
6. Maintenance (March 2018)
7. Safe vessel access (September 2018)

Additionally, AMSA issued a number of marine notices in response to safety incidents, including Marine Notice 2020/01 Fatal accidents caused by moving elevators on ships.

Glossary – vessel type classifications

Bulk	bulk carriers
Tanker	oil tanker, gas carrier, chemical tanker, NLS tanker
General cargo / multi-purpose	vehicle carrier, general cargo/multi-purpose ship, wood-chip carrier, heavy load carrier, ro-ro cargo ship, refrigerated cargo vessel, combination carrier
Container	container ship
Passenger	passenger ship, commercial yacht
Special purpose	special purpose ship, livestock carrier, mobile offshore drilling unit or floating production storage and offloading unit
Other	other types of ship, tug, offshore service vessel

Australian Government
Australian Maritime Safety Authority

2019

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