

**REPUBLIC OF THE MARSHALL ISLANDS**  
Maritime Administrator

ANNUAL REPORT ON MARINE  
SAFETY INVESTIGATIONS  
2023

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## LIST OF ABBREVIATIONS AND ACRONYMS

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Administrator	Republic of the Marshall Islands Maritime Administrator
ASD	Able Seafarer Deck
Casualty Investigation Code	Code of the International Standards and Recommended Practices for a Safety Investigation into a Marine Casualty or Marine Incident
COLREGs	Convention on the International Regulations for Preventing Collisions at Sea
C/O	Chief Officer
COT	Cargo Only Tank
GHz	Gigahertz
IMO	International Maritime Organization
LSA	Life Saving Appliance
MARPOL	International Convention for the Prevention of Pollution from Ships
Maritime Act	Republic of the Marshall Islands Maritime Act 1990
Maritime Regulations	Republic of the Marshall Islands Maritime Regulations
m	Meters
MOB	Man Overboard
MODU	Mobile Offshore Drilling Unit
MOU	Mobile Offshore Unit
MSA	Marine Safety Advisory
N <sub>2</sub>	Nitrogen Gas
NM	Nautical Mile
No.	Number
O <sub>2</sub>	Oxygen
OOW	Officer of the Watch
OSV	Offshore Support Vessel
PPE	Personal Protective Equipment
RMI	Republic of the Marshall Islands
Rules for Marine Investigations	Republic of the Marshall Islands Rules for Marine Investigations and Administrative Proceedings
S	Starboard
SMS	Safety Management System
STS	Ship-to-Ship

## Message from the Administrator

**Hans Molver**

*Deputy Commissioner of Maritime Affairs*



Welcome to the Administrator’s Annual Report on Marine Safety Investigations 2023. Marine safety continues to be at the forefront of the Administrator’s priorities, driving standards and guiding stakeholders to ensure continuous improvement. The statistics provided in this report, along with the inclusion of very serious marine casualty summaries, should be utilized to raise the necessary awareness both on board and ashore. Recognizing that despite the best intentions to provide a safe working environment, incidents continue to occur and that through education and greater awareness, a reduction in the number of marine incidents may be experienced.

During 2023, the Administrator investigated 830 very serious marine casualties, marine casualties, marine incidents, and occurrences, an increase of 145 reported cases compared to 2022. The dedication of owners, managers, and crews of RMI-registered vessels to report and cooperate with the Administrator is a testament to the dedication of all those involved toward improving safety and protecting the marine environment.

The Administrator takes this opportunity to thank owners, managers, and crewmembers of RMI-registered vessels for maintaining the highest standards and working diligently to ensure crew welfare, marine safety, security, and the protection of the marine environment.

## Principles of Marine Safety Investigations

Marine safety investigations are conducted in accordance with the RMI Maritime Act, Maritime Regulations (Chapter 6), Rules for Marine Investigations, and the Casualty Investigation Code.

Under the Casualty Investigation Code, marine safety investigations are conducted to determine the causal factors of the casualty, with the objective of preventing similar casualties or incidents in the future, and to make safety recommendations, as necessary. Marine safety investigations do not seek to apportion blame or determine liability.

All reports to the Administrator are classified in accordance with the following:<sup>1</sup>

1. **Very serious marine casualties** are those involving loss of life, total loss of the ship, or significant environmental damage.
2. **Marine casualties** are events, or a sequence of events, directly in connection with the operation of the vessel, that have resulted in serious injury, loss or material damage to the vessel, grounding or disabling of the vessel, collision or allision, and severe damage to marine infrastructure or to the environment.
3. **Marine incidents** are events, or a sequence of events, other than a marine casualty, which have occurred directly in connection with the operation of the vessel, that endangered, or if not corrected, would endanger the safety of the vessel, its occupants, or the environment.
4. **Occurrences** are other conditions and events which are not marine casualties or marine incidents but require investigation by the Administrator.

Additionally, all reports are assigned a primary incident type based on information obtained during the marine safety investigation. The primary incident type details the nature of the incident which resulted in the very serious marine casualty, marine casualty, marine incident, or occurrence.

Accurate and timely reporting by Masters, owners, and operators in accordance with the Administrator's reporting requirements is vital to ensure an appropriate response and necessary support can be provided in order to identify safety critical factors and lessons learned. Further, the analysis conducted by the Administrator is used to identify trends which can then be shared with Masters, owners, and operators to improve safety.

This report excludes data pertaining to the investigation of reports of misconduct and other intentional acts by RMI-documented seafarers.

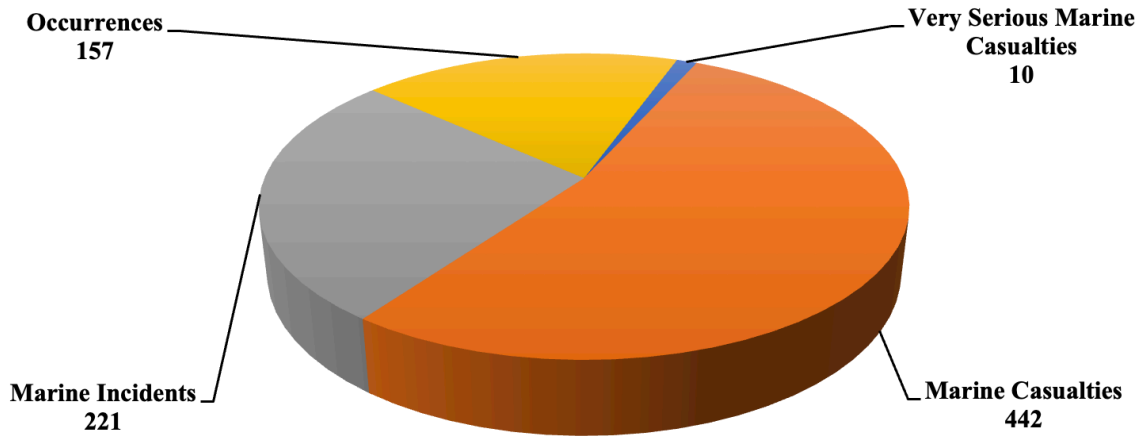
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<sup>1</sup> For complete definitions and additional information, refer to Rules for Marine Investigations..

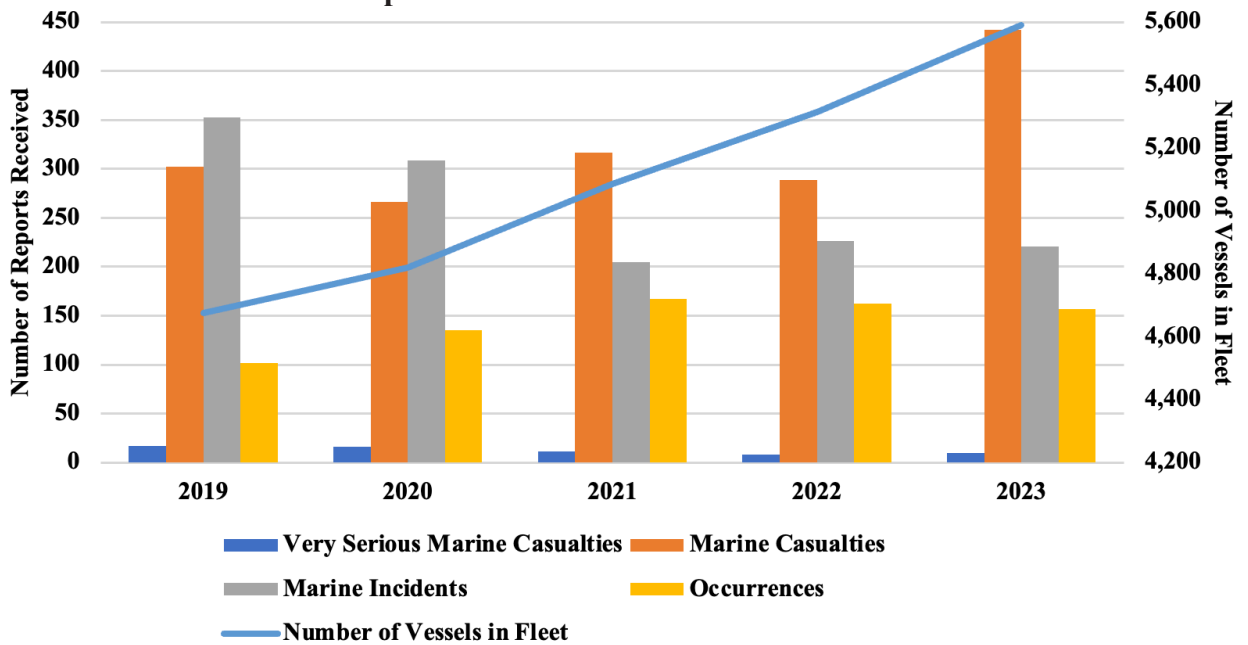
## Section 1: 2023 Year in Review

During 2023, there were 830 very serious marine casualties, marine casualties, marine incidents, and occurrences reported to the Administrator, 145 more than reported during 2022.

Reports to the Administrator 2023

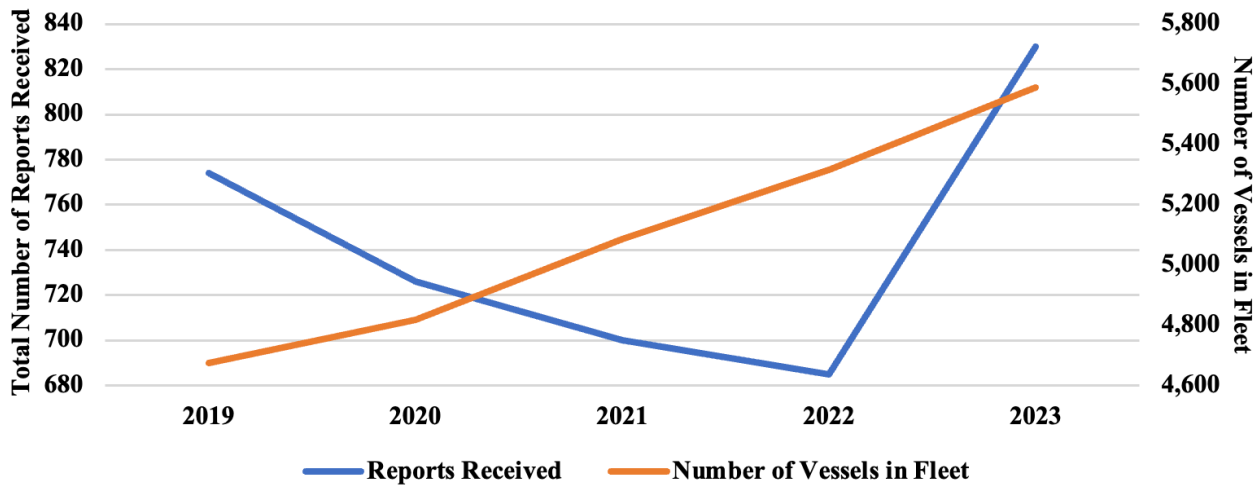


Reports to the Administrator 2019–2023



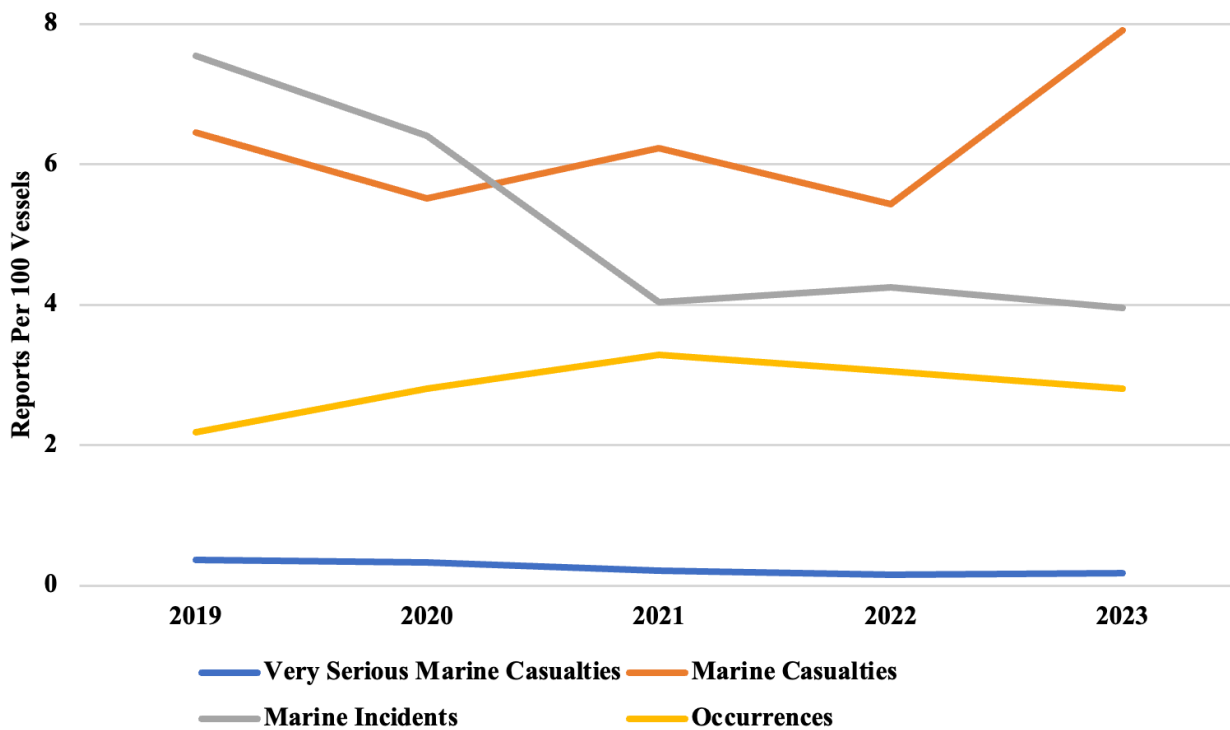


Reports Received 2019–2023

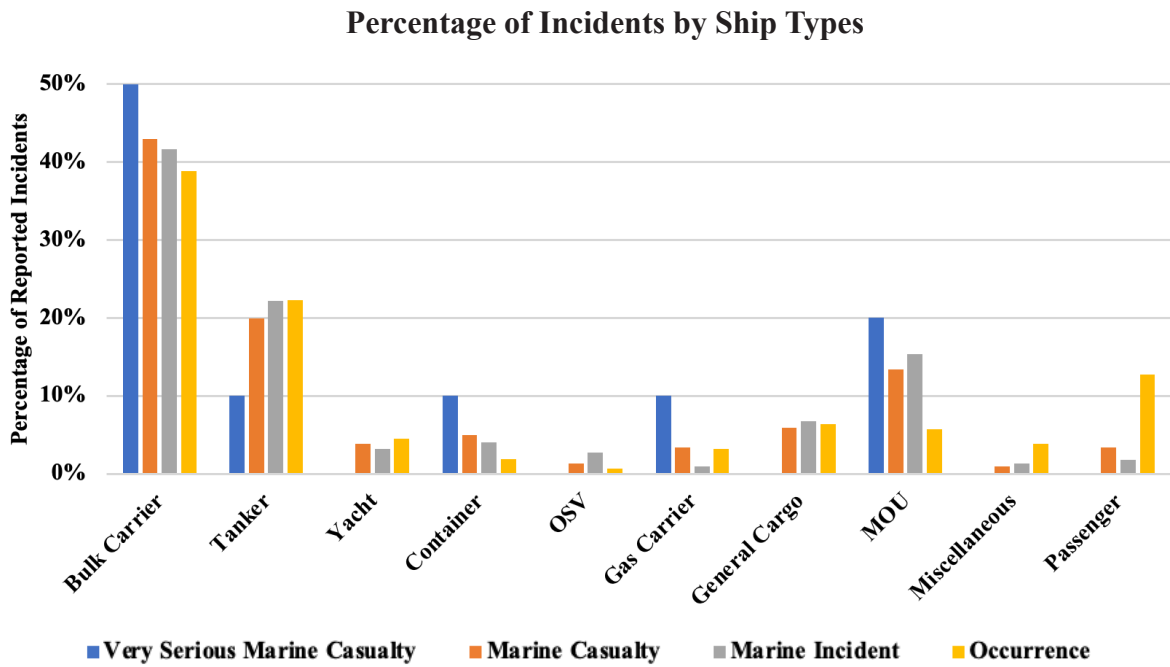


Throughout 2023, the data shows a steady increase in the number of reports received, particularly for marine casualties, which is a deviation from the preceding years. Despite this, the mean number of reports received across very serious marine casualties, marine casualties, marine incidents, and occurrences compared to the size of the fleet is below 3.8%,<sup>2</sup> which is a strong indication that the commitment to safety and protection of the marine environment by Masters, crewmembers, owners, and operators remains high.

Incident Rate 2019–2023



<sup>2</sup> Average number of incidents per 100 vessels.



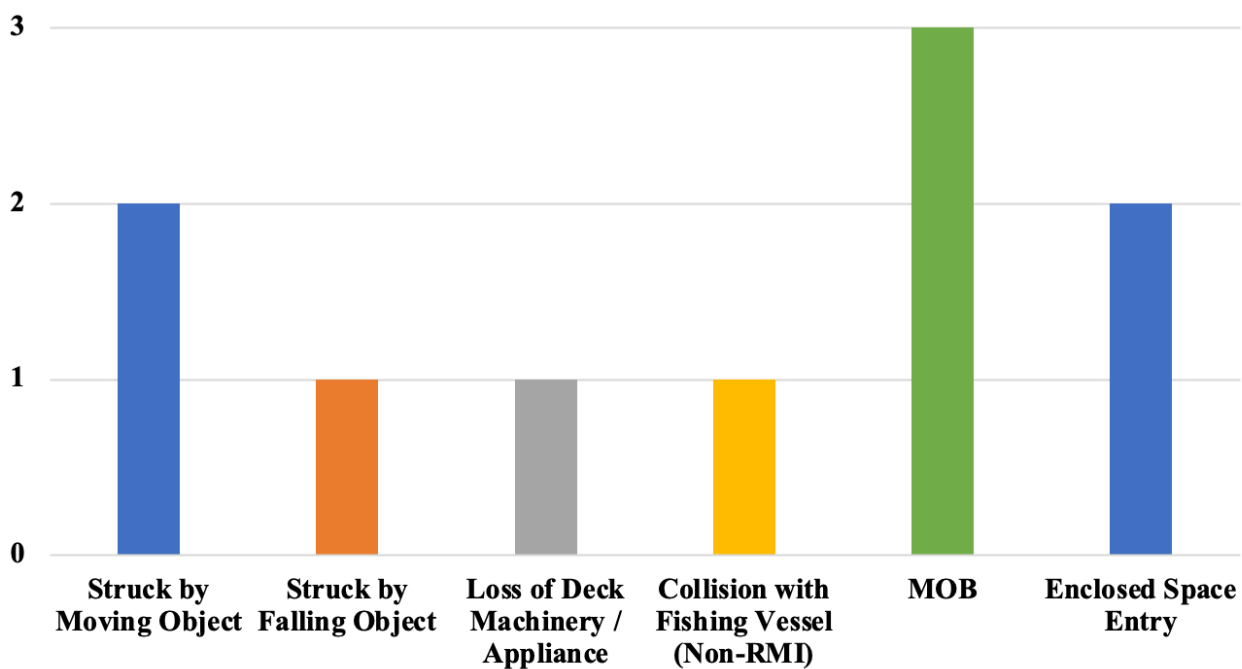
While the overall increase in the number of reports received is greater than the number received for the same period in 2022, there has been a decrease in the number of marine incidents and occurrences. Although the exact reason for the increase in the number of marine casualties reported cannot be explained, it does provide a strong indication that operators recognize the value in reporting and the benefit in sharing information to improve safety.

## Section 2: Reports by Incident Classification – 2023

### Very Serious Marine Casualties

During 2023, 10 very serious marine casualties were reported to the Administrator, compared to eight in 2022. Of these, three very serious marine casualties resulted in the loss of four lives following occupational accidents.<sup>3</sup> Two fisherman lost their lives during a collision between an RMI-registered vessel and a fishing vessel. Three separate accidents involving falls from pilot transfer arrangements resulted in one loss of life and two missing RMI-documented seafarers. Enclosed space entries were the leading cause of death during 2023, with five lives lost in two separate incidents.

Very Serious Marine Casualties – 2023

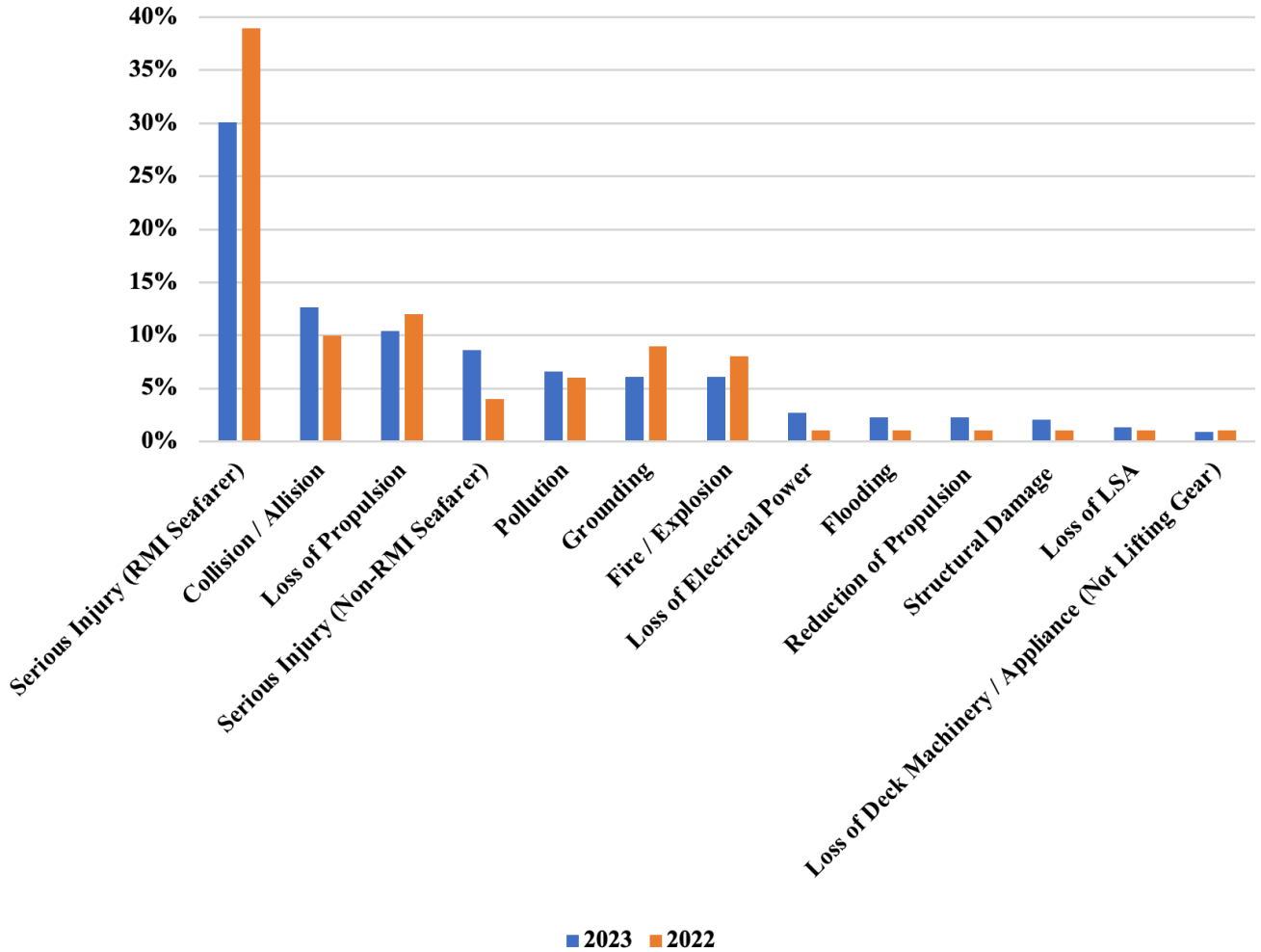


<sup>3</sup> Struck by moving object, struck by falling object, and loss of deck machinery / appliance resulting in the loss of four RMI-documented seafarers.

**Marine Casualties**

There were 442 marine casualties reported to the Administrator during 2023. These have been classified by the primary incident type and are shown on the chart below as a percentage of the total marine casualties reported during 2023. Additional details pertaining to marine casualties, marine incidents, and occurrences reported during the previous years can be found in Appendix 2.

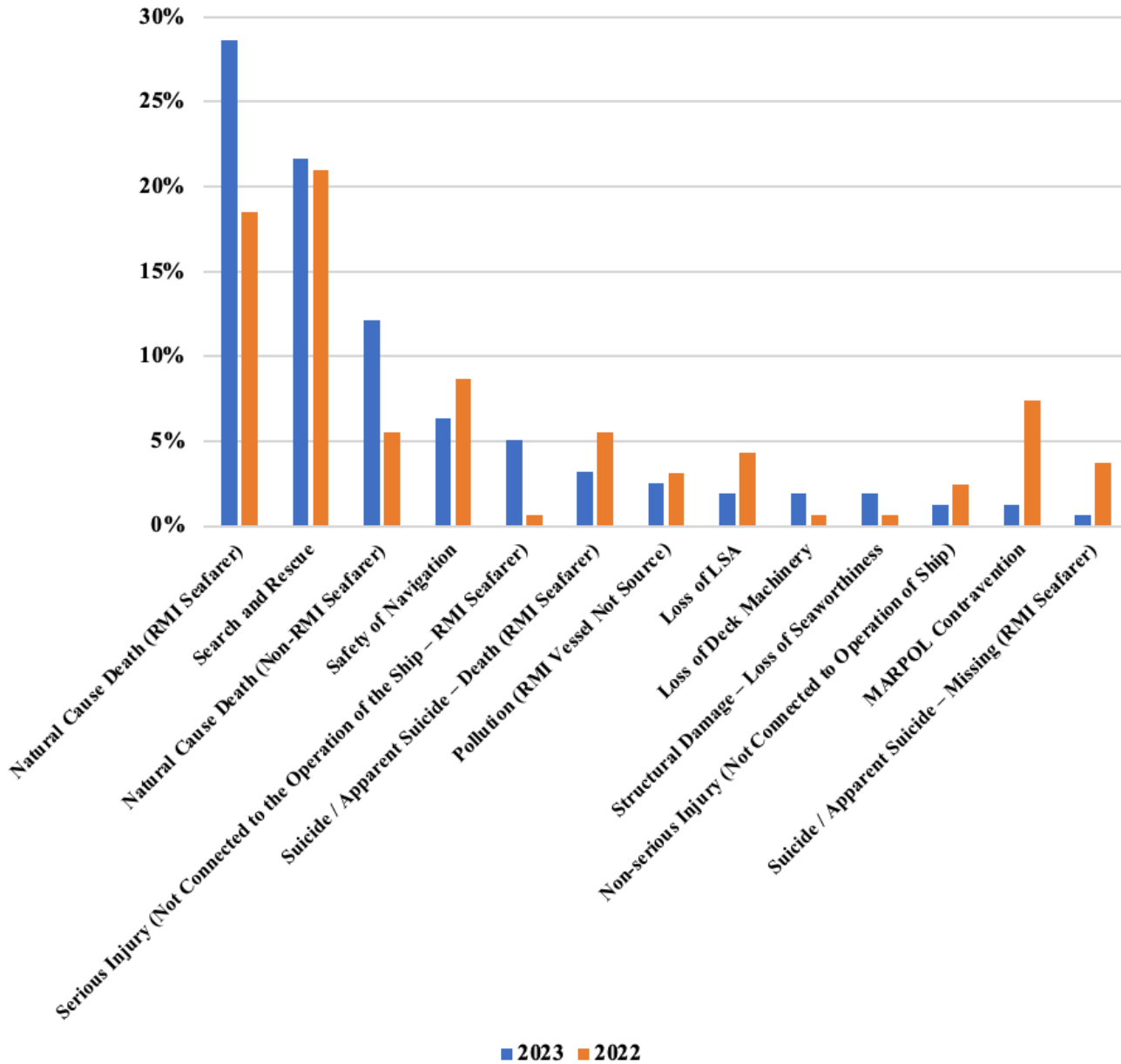
**Marine Casualty Primary Incident Types**



**Marine Incidents**

There were a total of 221 marine incidents reported to the Administrator during 2023. These have been classified by the primary incident type and are shown on the below chart as a percentage of the total marine incidents reported during 2023.<sup>4</sup>

**Marine Incidents Primary Incident Types**

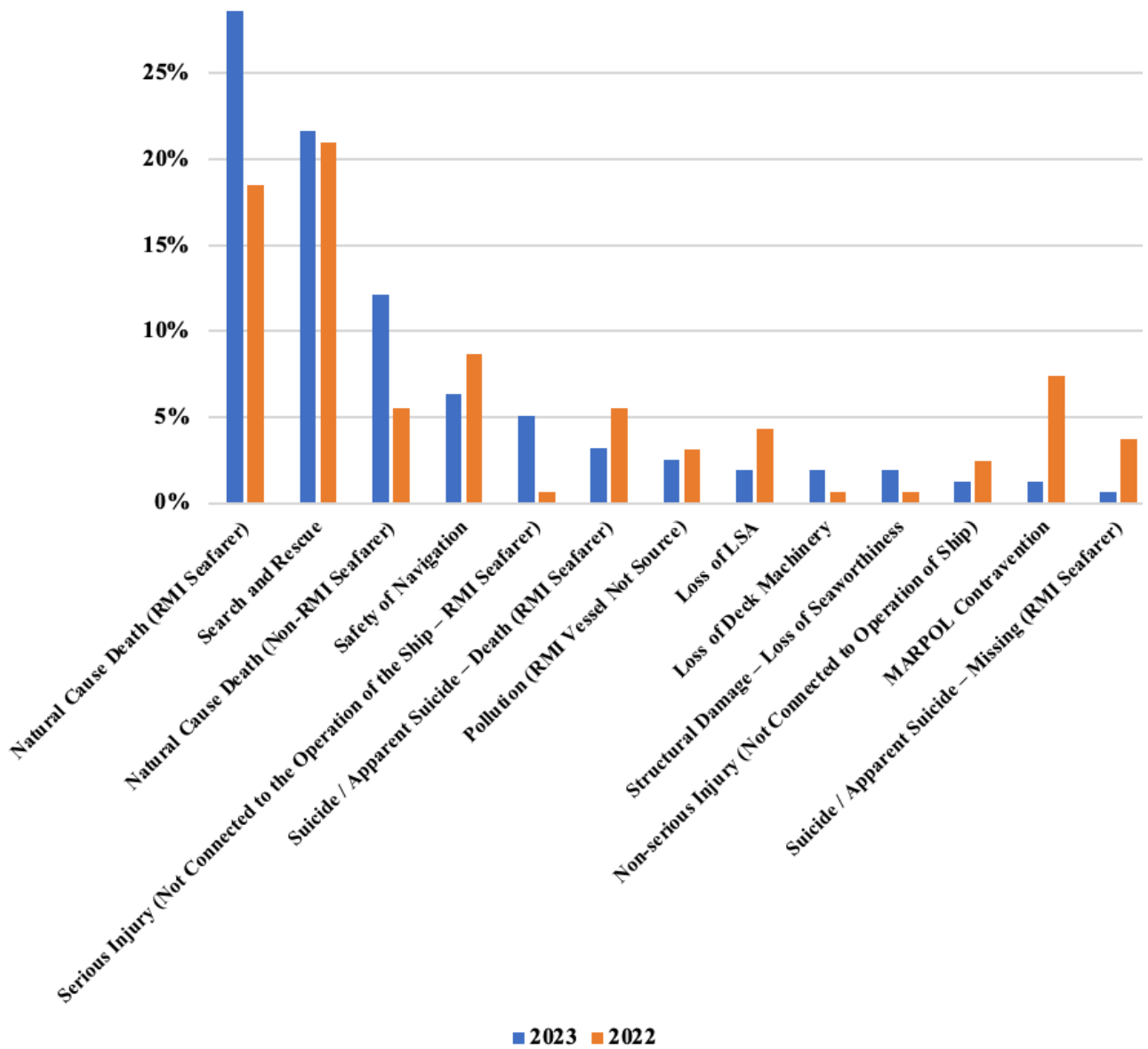


<sup>4</sup> Incident types which accounted for less than 1% of the reported marine incidents are excluded. Values are rounded to the nearest whole percent.

**Occurrences**

There were 157 occurrences reported to the Administrator during 2023. These have been classified by the primary incident type and are shown on the below chart as a percentage of the total occurrences reported during 2023. These include primary incident types which would normally be classified as marine casualties or marine incidents but have been classified as occurrences due to their specific nature and circumstances.

**Occurrences by Primary Incident Types**



## Section 3: Summary of Some Recent Very Serious Marine Casualties

### *Enclosed Space Entry*

An RMI-registered oil / chemical tanker was in ballast condition awaiting voyage and cargo orders. The Deck crew were conducting maintenance on various Butterworth hatches on selected cargo tanks which, at the time, were inerted with  $N_2$ . During the morning maintenance, a plastic bucket fell inside the COT No. 5S and the Bosun entered COT No. 5S to retrieve it. A short time later, an ASD sighted the Bosun inside COT No. 5S and noted that he was unresponsive. The ASD raised the alarm before entering COT No. 5S to render assistance to the Bosun. The onboard rescue team found the Bosun and ASD unconscious inside COT No. 5S and commenced to retrieve first the Bosun and then the ASD. The Bosun survived, however, a short time after being rescued, the ASD was declared deceased. The Administrator's marine safety investigation determined the following:

- Unauthorized entry into an enclosed space was an unsafe act which could have been influenced by a state of hypoxia.
- The Company documented control measures existed but were not followed on board. This resulted in inadequate hazard identification of the risk of exposure to  $N_2$  and the danger of an  $O_2$  deficient environment.
- The Stop Work Authority procedure was not robustly implemented and therefore did not prevent unauthorized access to an enclosed space. For Stop Work Authority to be effective as a means of identifying and stopping an unsafe act or correcting an unsafe condition, all crewmembers must be confident that they can exercise it without recrimination.
- Necessary implementation and adherence to procedures combined with adequate oversight of maintenance and working routines should be sufficient in ensuring the safety of crewmembers undertaking the task required of them.
- Enclosed Space Rescue procedures must be properly practiced and drilled as if it were a real emergency. If crewmembers are not familiar with Enclosed Space Rescue procedures, they stand to put themselves and their fellow crewmembers in danger.



Figure 1: Enclosed space entry location with warning.

*Collisions with Fishing Vessels*



Figure 2: Moments prior to the sinking of the fishing vessel.

During the early morning hours, an RMI-registered bulk carrier encountered a large concentration of fishing vessels while underway in the Mediterranean Sea. The weather was good with visibility in excess of 5 NM. After passing through the concentration of fishing vessels, the bulk carrier encountered two additional fishing vessels. The OOW of the bulk carrier initially determined the ship would pass between the two fishing vessels. As the bulk carrier approached the second fishing vessel from the west, the fishing vessel commenced maneuvering sporadically. Upon seeing this, the OOW decided it was necessary to change course and ordered the Helmsman to make two successive 5° turns to port. A collision between the bulk carrier and the fishing vessel occurred a short time later. The fishing vessel's hull was damaged and began flooding. All 10 of the fishing vessel's crewmembers who had been on board were rescued before the vessel sank approximately three hours after the collision.

The Administrator's marine safety investigation determined the following:

- The collision was the result of the ineffective application of navigation watchstanding principles on board the bulk carrier. The investigation also determined that the fishing vessel's Captain was not maintaining a safe navigational watch by concurrently conducting maneuvers to avoid collision and monitoring crewmembers' work on deck.
- The Administrator's investigation further determined that the white deck lights on board the fishing vessel interfered with the ability of the bulk carrier's bridge team to see the navigation lights that were exhibited by the fishing vessel.

An RMI-registered bulk carrier was underway in the Sulu Sea. The ship was proceeding on a southerly course dissecting a small group of islands when it encountered a fishing vessel. In the late afternoon, a fishing vessel with a crew of 20 passed down the starboard side of the bulk carrier before capsizing, resulting in the loss of seven crewmembers.



Figure 3: View from the center line of the Bridge from the bulk carrier.



The Administrator's marine safety investigation determined the following:

- Neither vessel maintained an adequate lookout. Ineffective navigational watchkeeping standards on board both vessels resulted in inadequate application of COLREGs. Further, the bulk carrier failed to recognize the necessity to use all available means to maintain a proper lookout while navigating in an area known to contain small conspicuous vessels.
- Repeated deviation from Company documented procedures that required a lookout to be on duty was normalized on board.
- The radars on board the bulk carrier were not utilized as required by both Company procedures or with the provisions of COLREGs. One radar was deliberately placed in standby mode resulting in a reduction of detection and collision avoidance information. Simultaneously, the S-Band (3 GHz) radar was inadequately configured and set to 12 NM range scale, preventing the OOW the opportunity to identify small conspicuous vessels.
- The OOW on board the bulk carrier limited his athwartship movement across the Bridge, denying him the opportunity to see clearly ahead of the vessel.
- The OOW on board the bulk carrier was distracted by the frequent use of a cellular telephone during his watch in contravention of the Company's Bridge Watchkeeping Policies, Procedures and Performance Standards.

### ***Fatal Fall from Height***

Late at night, an RMI-registered oil tanker, was anchored in an outer anchorage offshore awaiting orders. It was planned that two of the Company's Superintendents and three service technicians would embark while it was at anchor to repair one of the ship's anchor windlasses. Just after midnight, a tugboat arrived alongside and was made fast on the port side, in way of the pilot boarding station. The tugboat was reported to be rolling moderately after being made up alongside the ship. The first of the two Superintendents successfully embarked using the ship's accommodation ladder. Because the tug was rolling, the second Superintendent asked the ship's C/O, who was on deck supervising the transfer operation, to rig a combination pilot ladder. After the combination pilot ladder was rigged, the second Superintendent, who was wearing a backpack, successfully transferred from the tug to the pilot ladder and started climbing up. He stopped climbing and appeared to rest for a couple of seconds before falling 3.5-5 m onto the gunwale of the tug so that half of his body was inboard of the gunwale and the other half was over the side. Within minutes of the fall, the Superintendent had been brought on board the tug which then cast off to seek medical assistance.



Figure 4: Pilot ladder used to transfer personnel.

The Administrator's marine safety investigation determined the following:

- A lack of Company policies regarding fatigue and medical requirements for the Company's shore staff who may need to embark a ship in the Company-managed fleet as part of their assigned duties.

- The procedures in the Company’s SMS for embarking and disembarking personnel from launches did not address carrying backpacks while climbing ladders.
- Lifejackets were not considered within the Company procedures prior to climbing up or proceeding down a pilot ladder.

**Occupational Fatality**

In the early hours, the hydraulic anchor windlass motor on board an RMI-registered bulk carrier catastrophically failed when the anchor chain was running out unintentionally. The windlass clutch was engaged, but the winch drive was not operated. The windlass brake was closed.

The motor burst resulting in flying debris which struck and fatally wounded the Bosun who was standing nearby.

The Administrator’s marine safety investigation determined the following:

- That the movement of the ship in the existing sea conditions imposed dynamic loads on the anchor windlass and ground tackle that exceeded the combined brake capacity of the anchor windlass. This led to the parking brake slipping, followed by the unintended release of the anchor chain which resulted in the overspeed of the planetary gear and consequently a destroyed hydraulic motor.
- The windlass motor was not covered with a protection plate. The Bosun, who was standing in close proximity to the hydraulic windlass motor was struck by flying debris resulting in an open fracture with arterial bleeding.
- Windlass motors have operating limitations and can fail. The operating limitations should be understood by the operating crew.
- A suitable protection system around the hydraulic motor offers protection to the operator in case of structural failure of the motor.
- General wear and tear can impact the holding capacity of the windlass. A periodical service by a recognized service station is recommended to improve holding capacity reliability.

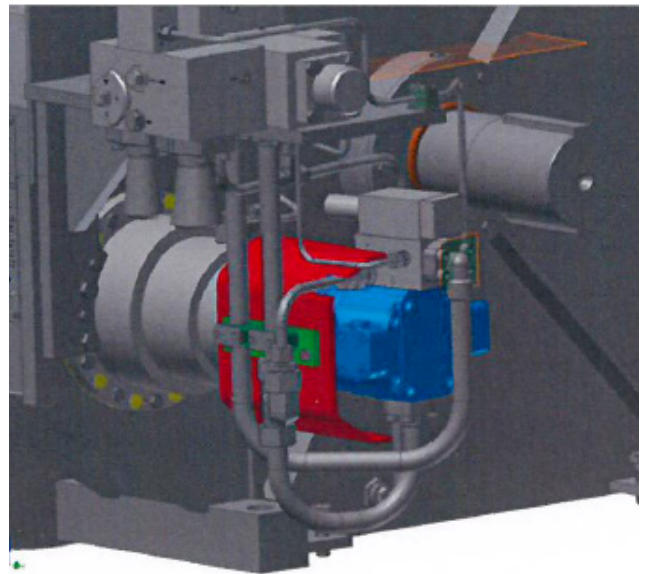


Figure 5: An example of a protection cover over the windlass motor shown in red.

## Section 4: MSAs Issued by the Administrator

During 2023, the following MSAs were issued in response to incidents reported to the Administrator:

MSA No.	Subject
03-23	Rescue Boat Lifting Arrangement Failure
14-23	Failed Bursting Discs in Carbon Dioxide Fire-extinguishing Systems
15-23	Laser Pointers and COLREGs Light Signals
16-23	Navigation Watchkeeping — Observations and Lessons Learned
17-23	New Circulars for Preventing Collisions in Coastal Waters of China

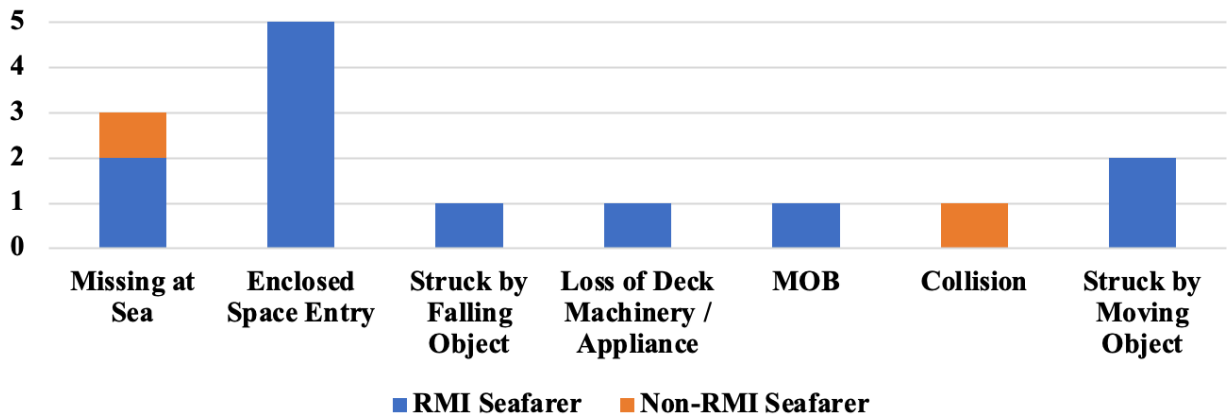
## Section 5: Looking Forward

This is the first year since 2018 that the number of reported marine casualties has exceeded 400. The number of reported marine incidents and occurrences continues to decline while the size of the RMI fleet continues to grow. Despite an increase in overall reported incidents, when compared to the size of a growing fleet, owners, managers, and crews of RMI-registered vessels should be commended for their transparency in accurately reporting incidents on board their ships. In order to continue this trend, the Administrator endeavors to uphold its obligation to investigate all very serious marine casualties, marine casualties, marine incidents, and occurrences. The information learned from these investigations will enable the Administrator to proactively drive improvements across the industry. In recognizing the importance of engagement both locally and regionally to ensure the recommendations, lessons learned, and observations receive the widest audience possible, the Administrator welcomes the opportunity to discuss and share findings in any forum.

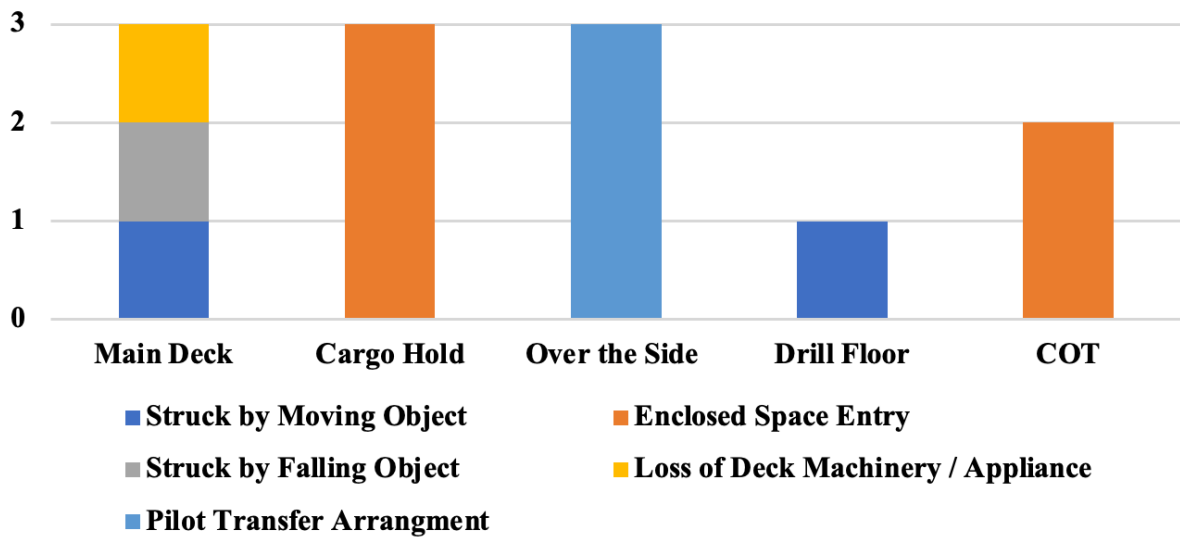
## Appendix 1: Very Serious Marine Casualties

During 2023, very serious marine casualties involving RMI-registered vessels resulted in 11 fatalities and three individuals missing at sea.<sup>5</sup>

Loss of Life – Primary Incident Type

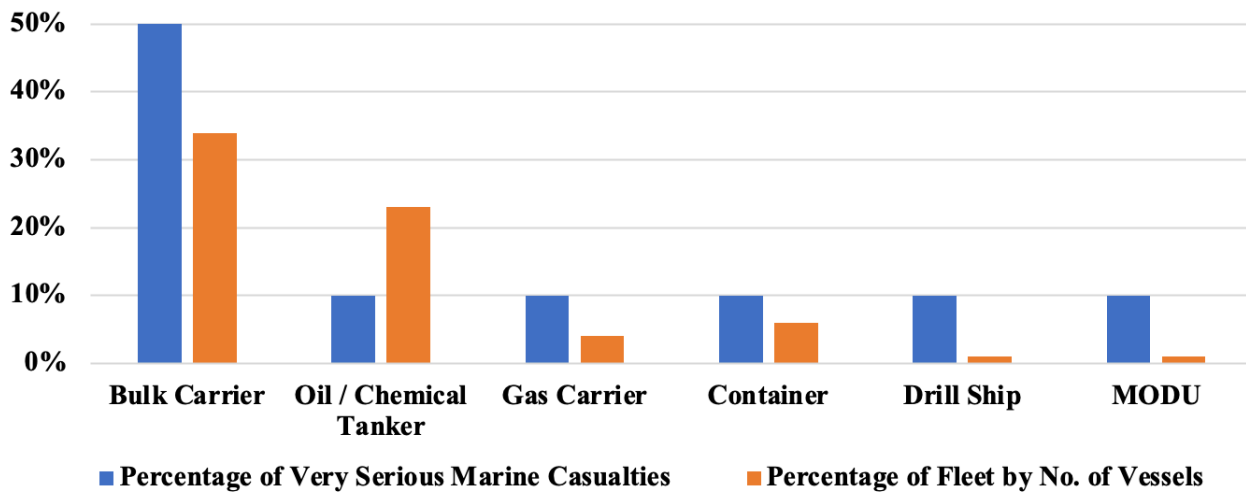


Loss of Life – Location on Board<sup>6</sup>



<sup>5</sup> One fisherman missing at sea following a collision with a non-RMI-registered fishing vessel. Two RMI-documented seafarers missing following an MOB.  
<sup>6</sup> Does not include location on board non-RMI registered vessels.

Very Serious Marine Casualties by Ship Type



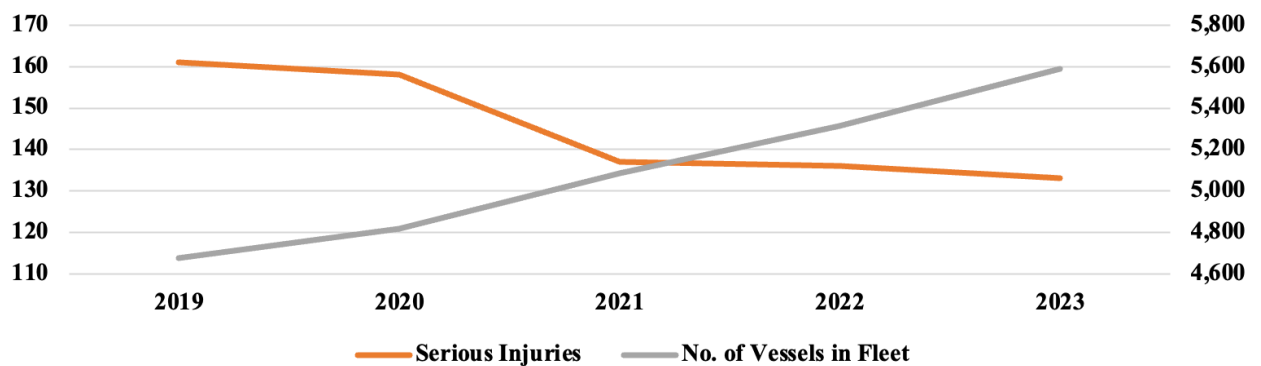
## Appendix 2: Marine Casualties, Marine Incidents, and Occurrences

The following information includes data obtained during 2023 for marine casualties, marine incidents, and occurrences.

### Serious Injuries

Serious injuries (those resulting in incapacitation for 72 hours or more) continue to be the leading marine casualty primary incident type reported to the Administrator during 2023. However, it is noted that the total number of serious injuries reported continued to decline while the fleet size has continued to grow.

Serious Injuries 2019–2023

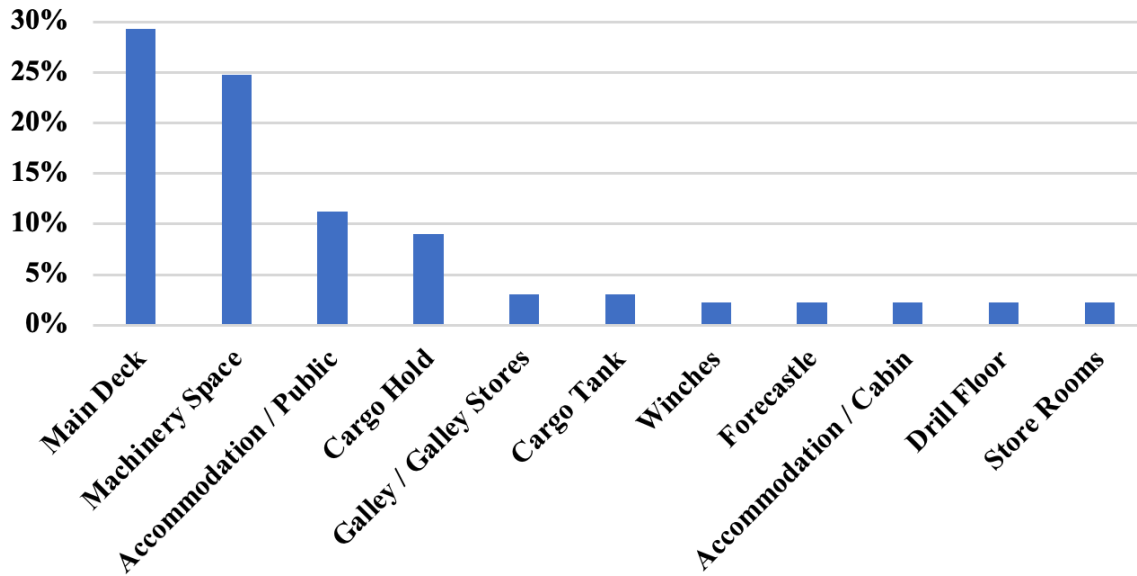


### Top 10 Causal Factors of Serious Injuries – 2023

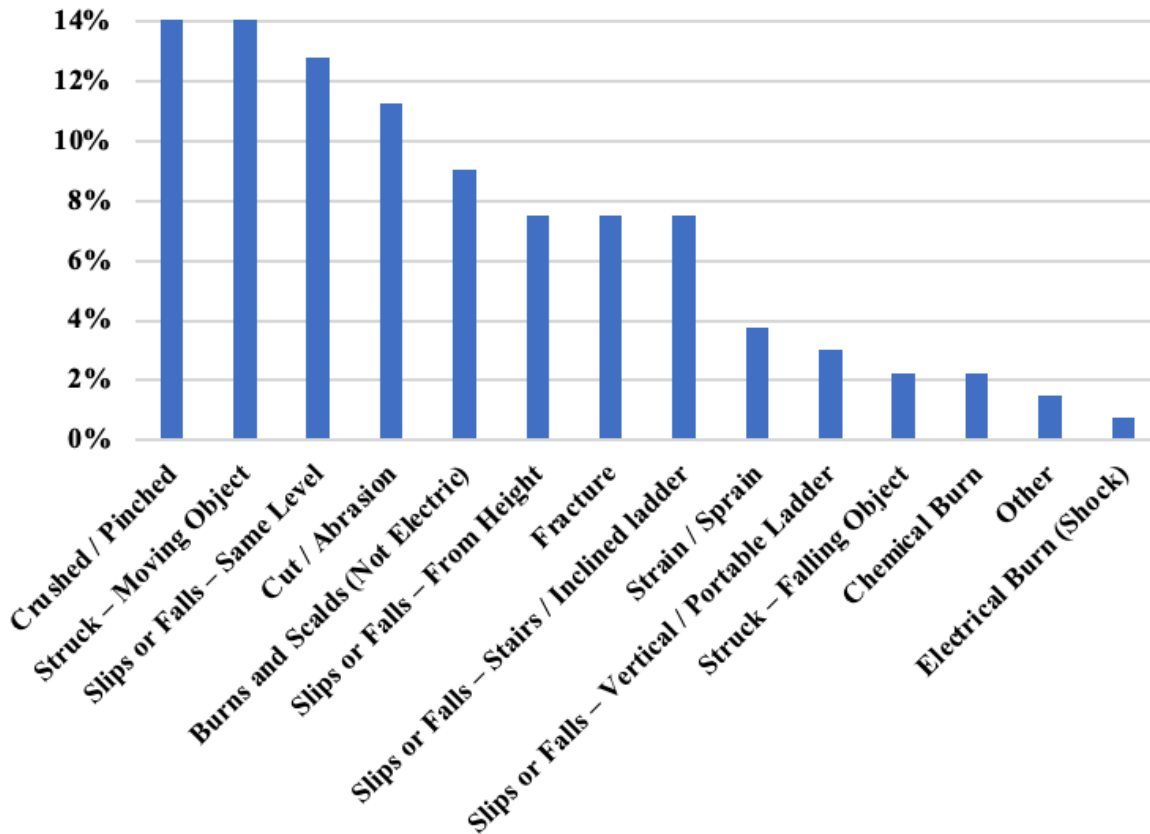
Causal Factor	Percentage of Incidents <sup>7</sup>
Failure to follow rules and regulations	19%
Improper position for task	19%
Inadequate work planning or programming	19%
Improper lifting, handling, or storage	17%
Inadequate identification and evaluation of loss exposures	16%
Routine, monotony, demand for uneventful vigilance	14%
Failure to use PPE properly	13%
Inadequate or incorrect performance feedback	11%
Failure to secure	10%
Poor judgment	10%

<sup>7</sup> Multiple causal factors can be associated with the same incident.

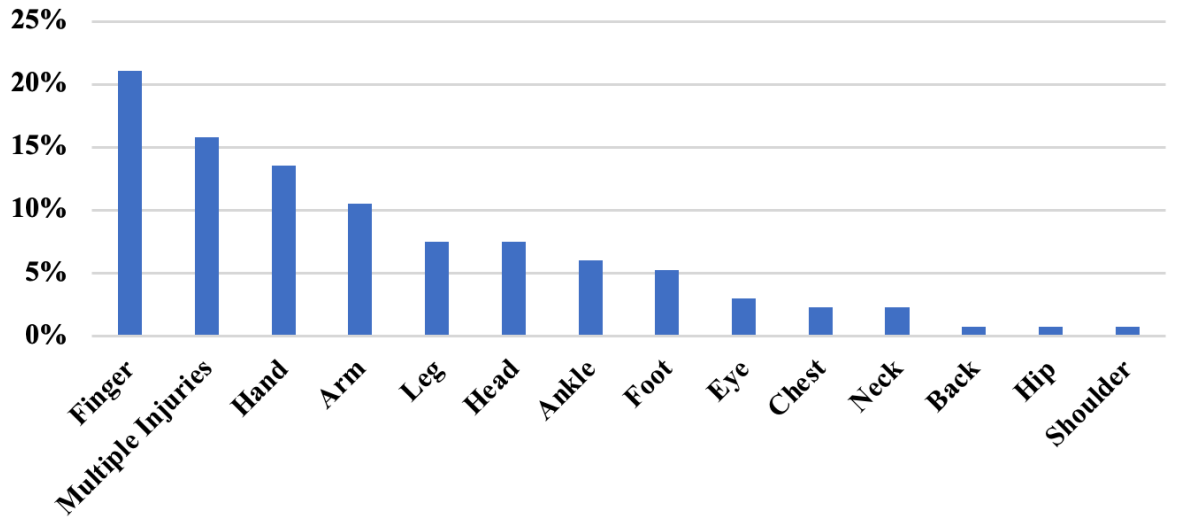
Serious Injury by Location



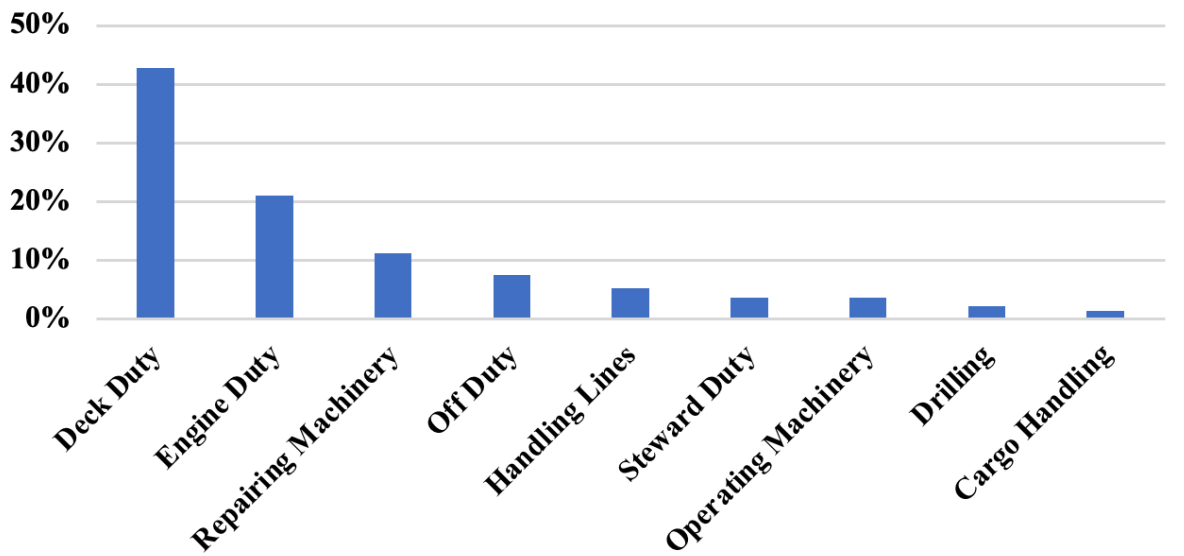
Serious Injuries by Injury Type – 2023



Serious Injuries by Body Part Injured – 2023

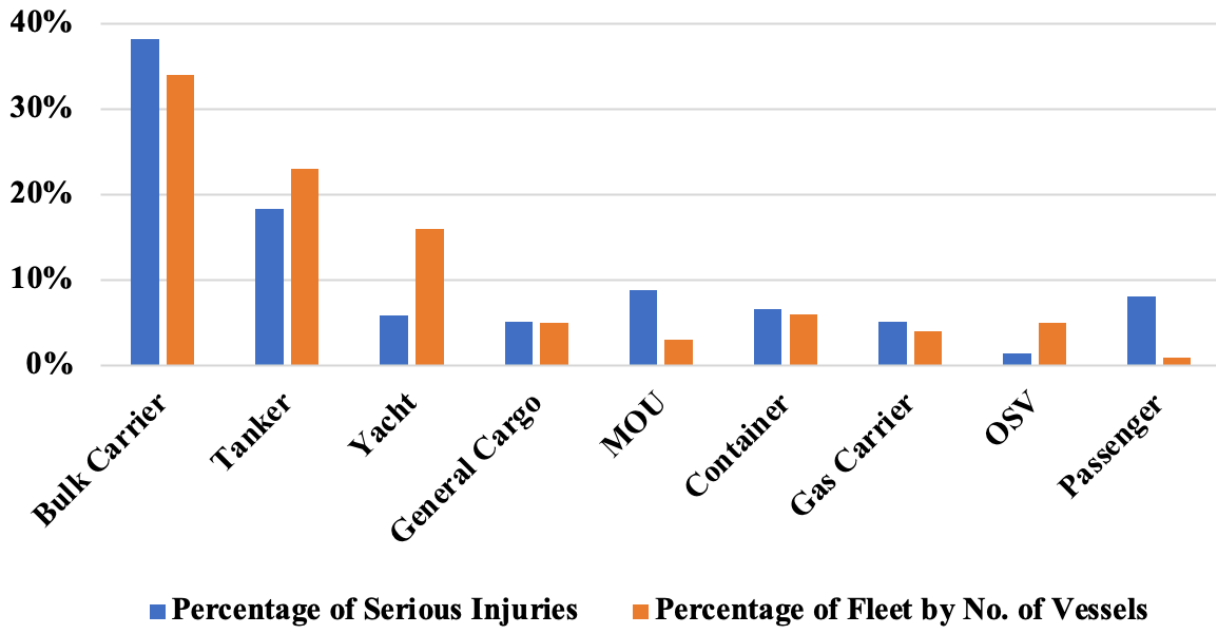


Serious Injuries by Activity – 2023

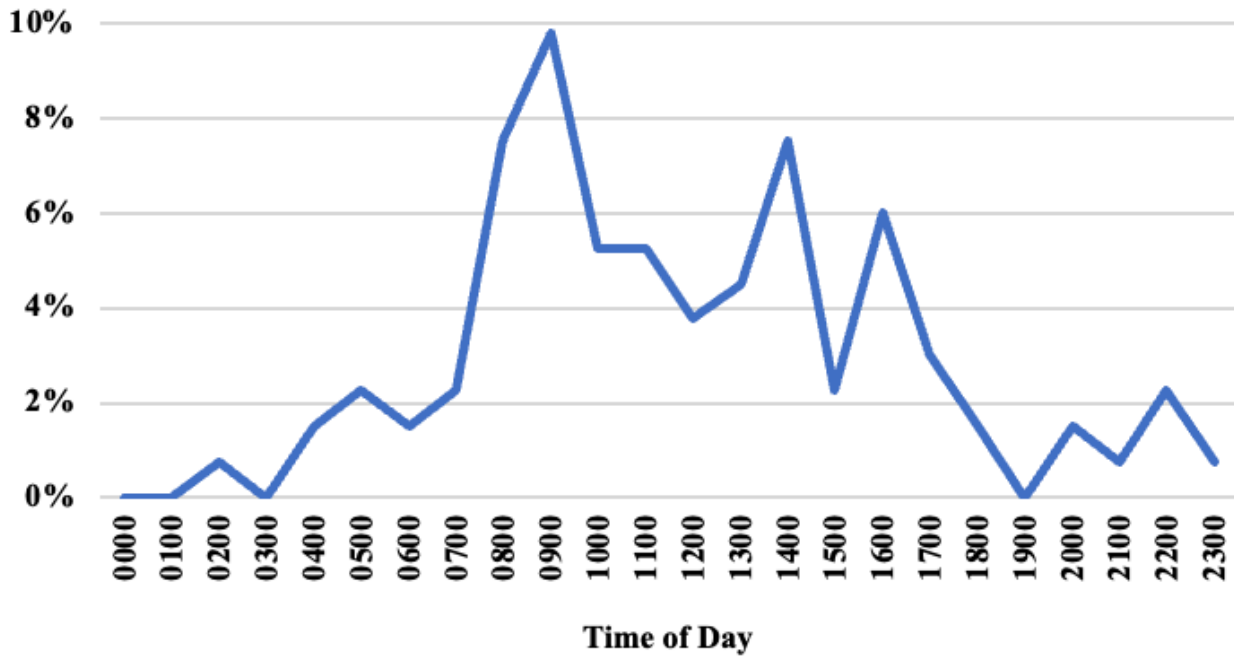




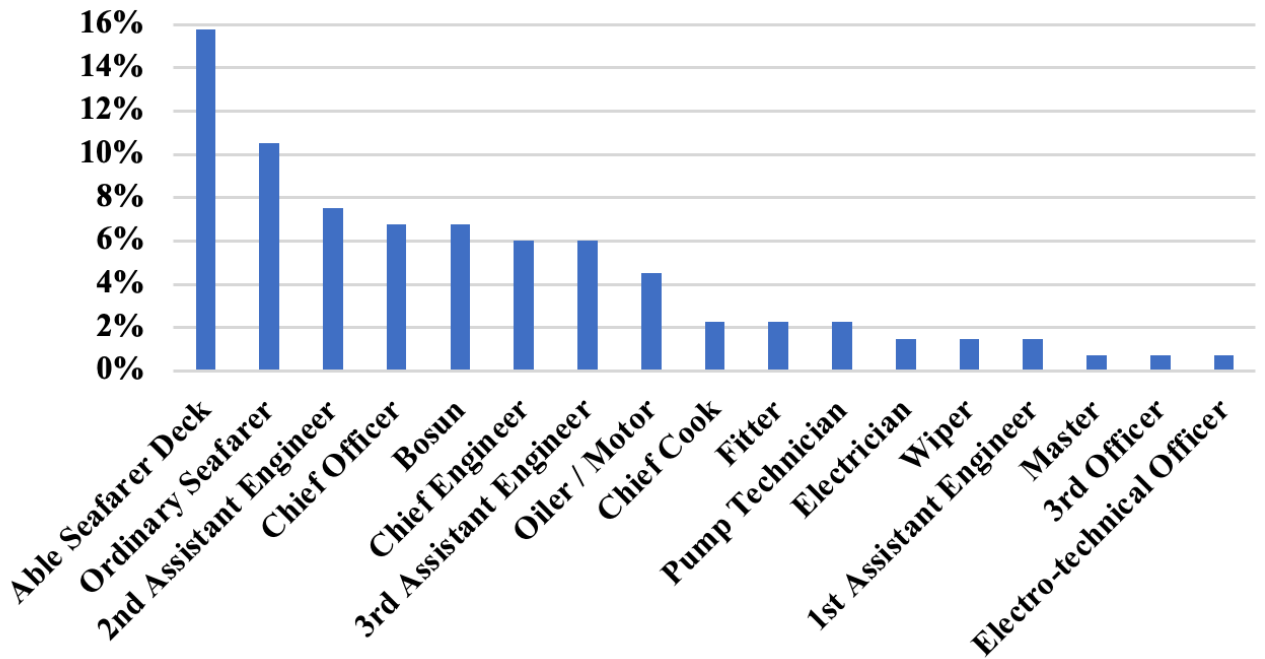
Serious Injuries by Ship Type



Serious Injuries by Time of Incident – 2023



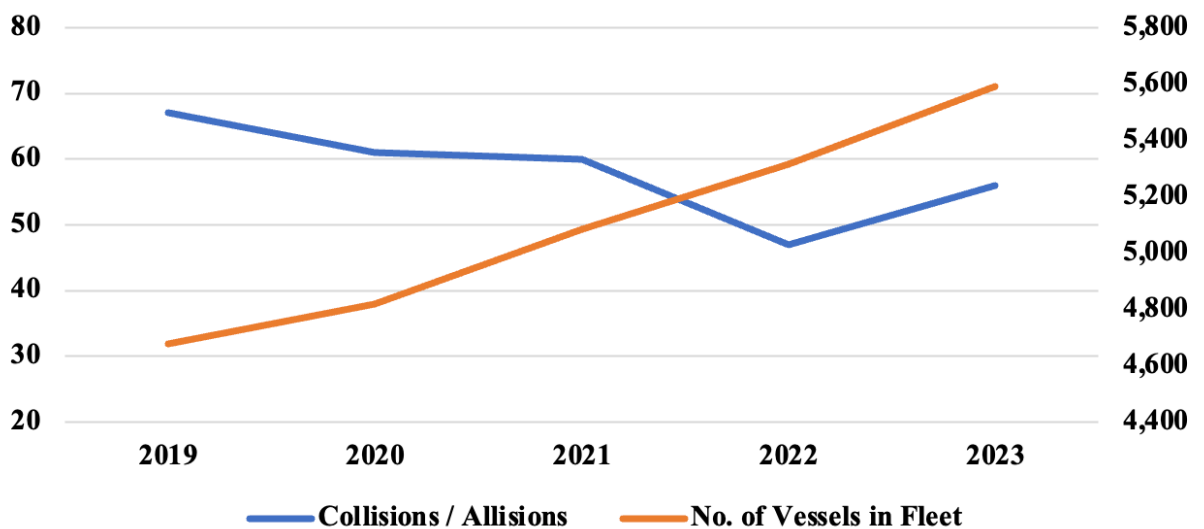
Serious Injuries by Position – 2023



Collisions and Allisions

During 2023, 56 collisions and allisions<sup>8</sup> were reported, compared to 46 in 2022; 21 of these incidents occurred with a pilot on board. The percentage of collisions and allisions that have occurred with a pilot on board has remained consistent over the past five years.

Collisions / Allisions 2019–2023

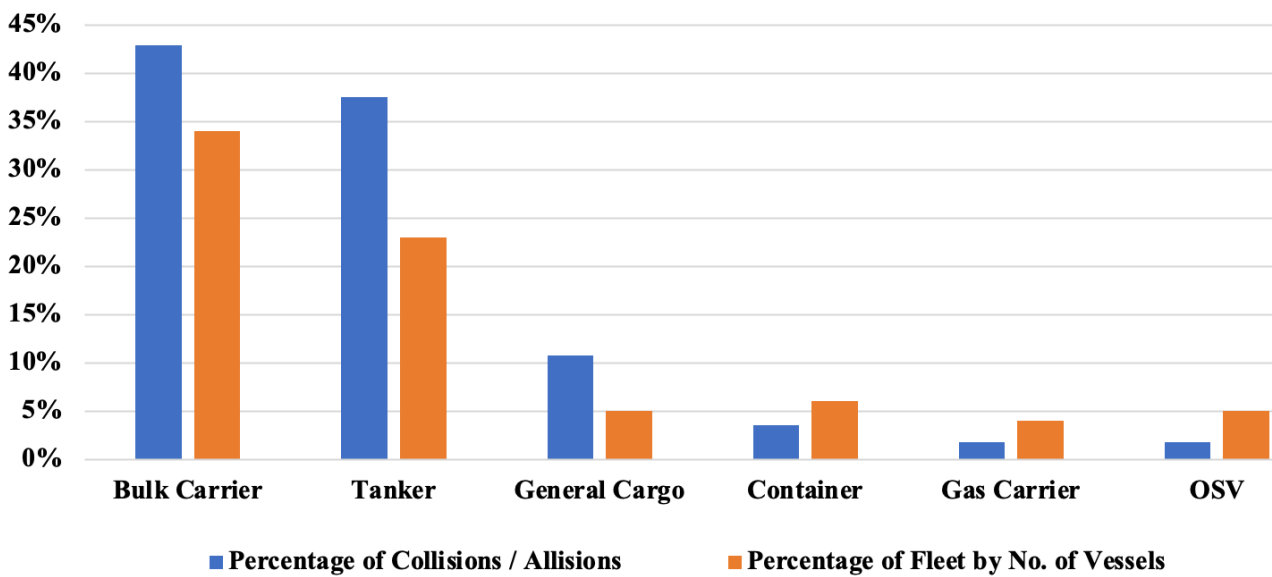


<sup>8</sup> These do not include allisions where the RMI-registered vessel was anchored or moored.

**Top 10 Causal Factors of Collisions / Allisions – 2023**

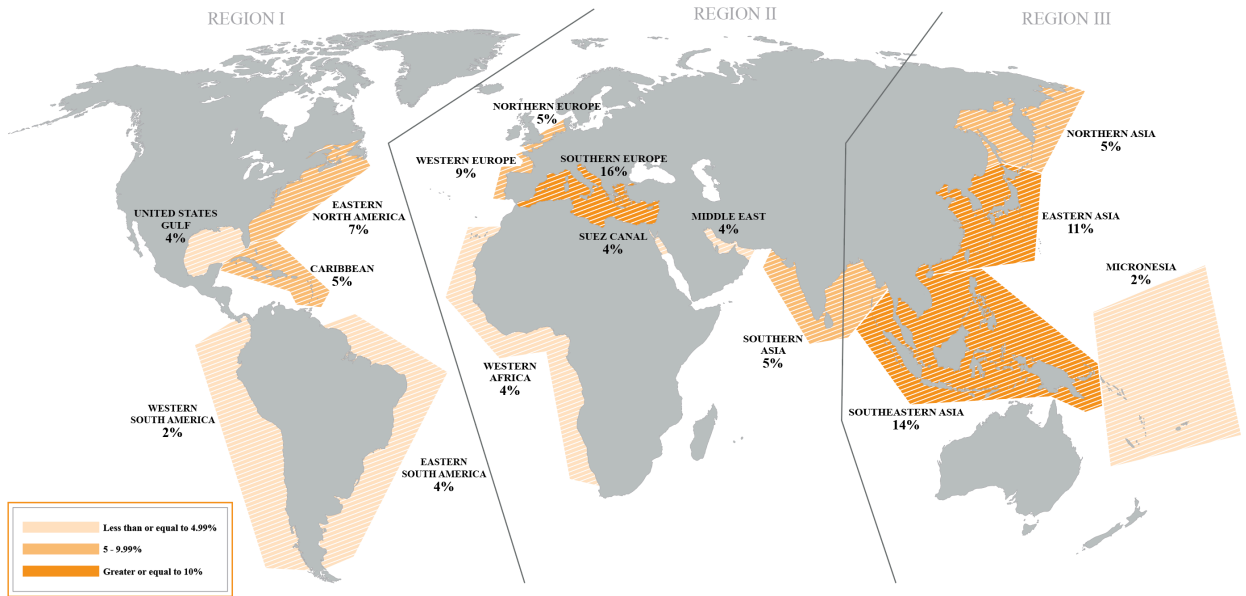
Causal Factor	Percentage of Incidents <sup>9</sup>
Incorrect navigation or ship handling	61%
Inadequate work planning or programming	27%
Failure to follow rules and regulations	21%
Inadequate or incorrect performance feedback	20%
Failure to warn	14%
Inadequate identification and evaluation of loss exposures	11%
Port and berthing facilities	9%
Improper or insufficient delegation	7%
Adverse weather conditions	7%
Formal initial shipboard loss control leadership training	7%

**Collisions / Allisions by Ship Type**



9 Multiple causal factors can be associated with the same incident. Improper or ineffective application of COLREGs is addressed by several of the identified causal factors.

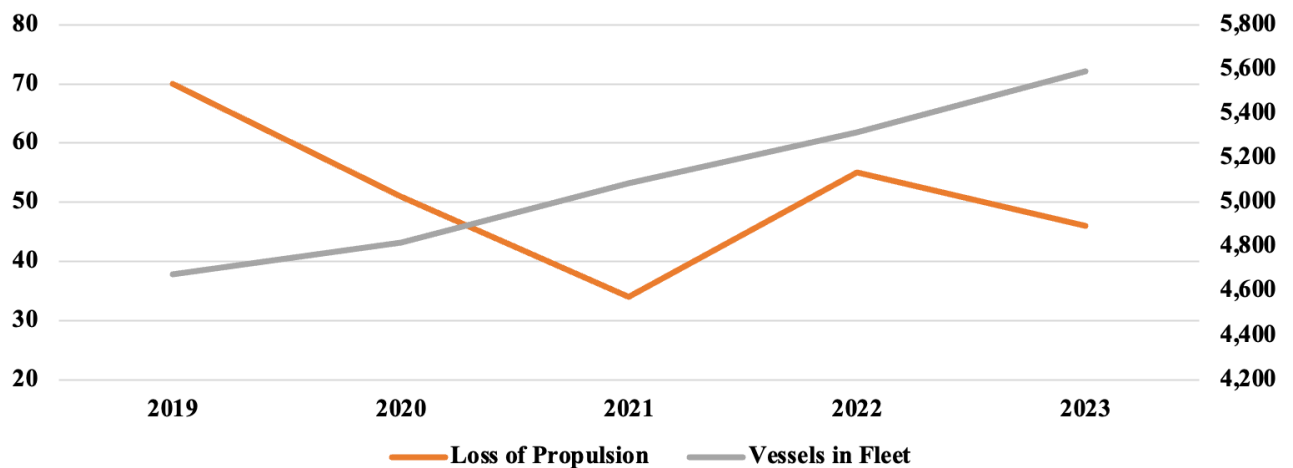
### Collisions / Allisions by Region – 2023



#### Loss of Propulsion

The Administrator received 46 reports of loss of propulsion during 2023, with 32 occurring in coastal seas, narrow and restricted waters, and port approaches with a pilot on board. The remaining 14 reports of the loss of propulsion occurred on the high seas, at anchor or alongside. Additionally, 10 of the 46 loss of propulsion incidents required towing of the vessel to a repair facility. As of the end of December 2023, the average age of the fleet<sup>10</sup> was 10.49 years. The majority of the fleet was between 0-14 years of age, accounting for 76.6% of RMI-registered vessels. While 28.9% of the fleet was aged between 10-14 years, 25.8% of vessels were between 0-5 years of age, and 21.9% between the ages of 6-9 years. The vast majority of loss of propulsion incidents occurred after a vessel's second renewal survey.

#### Loss of Propulsion 2019–2023

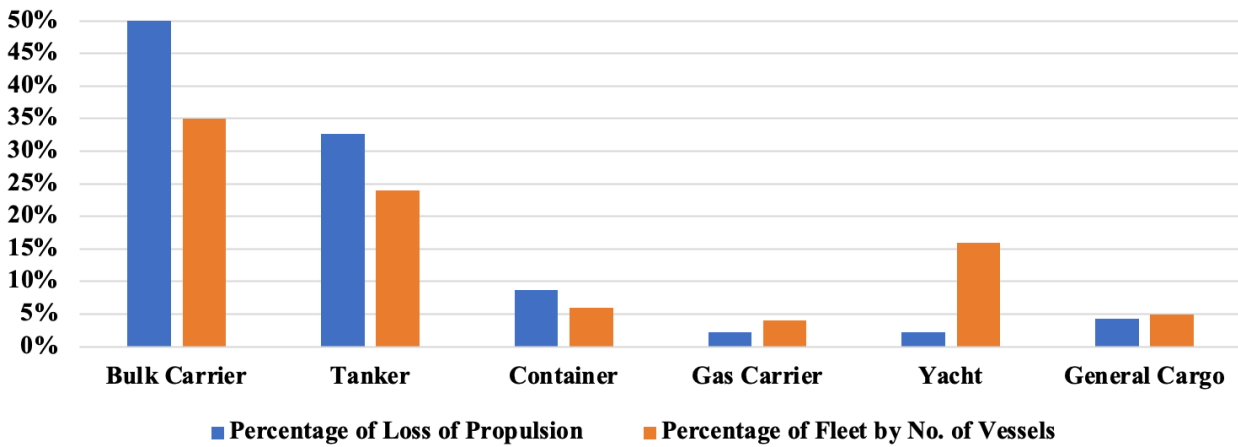


<sup>10</sup> MOUs have been excluded from this data.

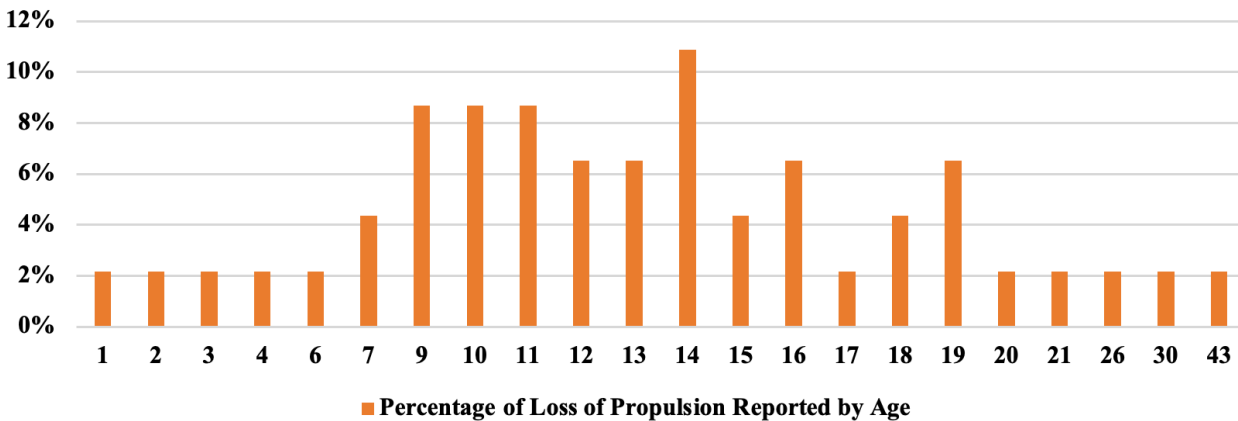
**Top 10 Causal Factors of Loss of Propulsion – 2023**

Causal Factor	Percentage of Incidents <sup>11</sup>
Defective equipment, machinery, or tools	41%
Bunkers and/or lube oils	13%
Inadequate maintenance	7%
Inadequate preventative maintenance	7%
Inadequate work planning or programming	7%
Critical systems, equipment, components, and parts/items	4%
Failure to follow repair / maintenance instructions	4%
Failure to follow rules and regulations	4%
Giving inadequate policy, procedure, practices, or guidelines	4%
Hazard identification and risk assessment	4%

**Loss of Propulsion by Ship Type – 2023**

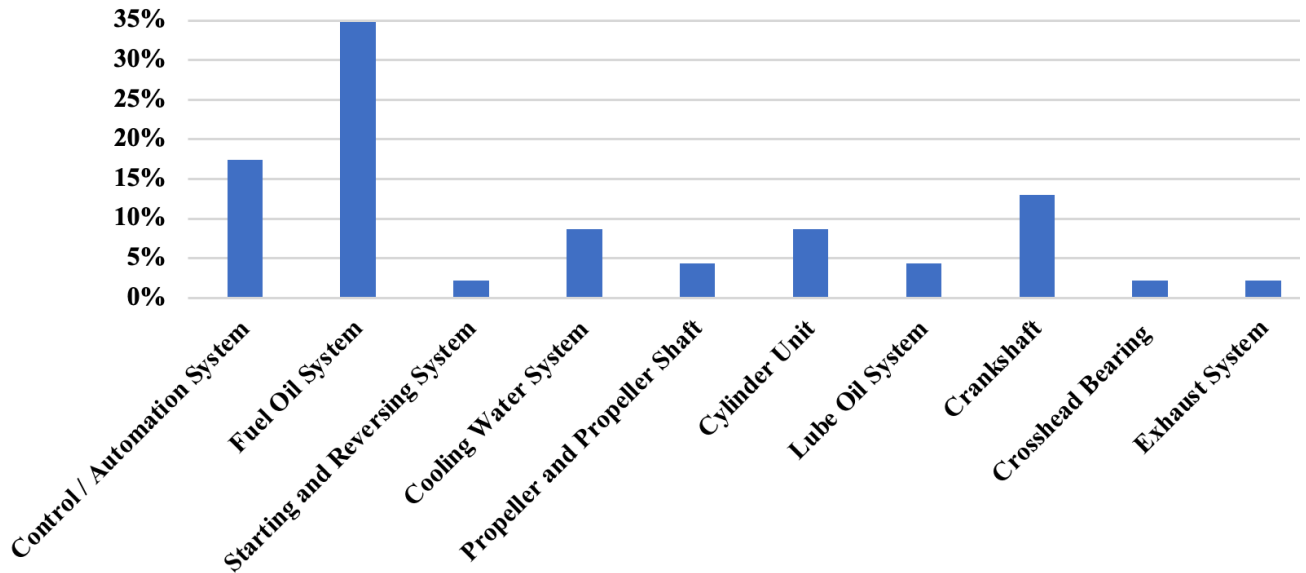


**Loss of Propulsion by Ship Age – 2023**

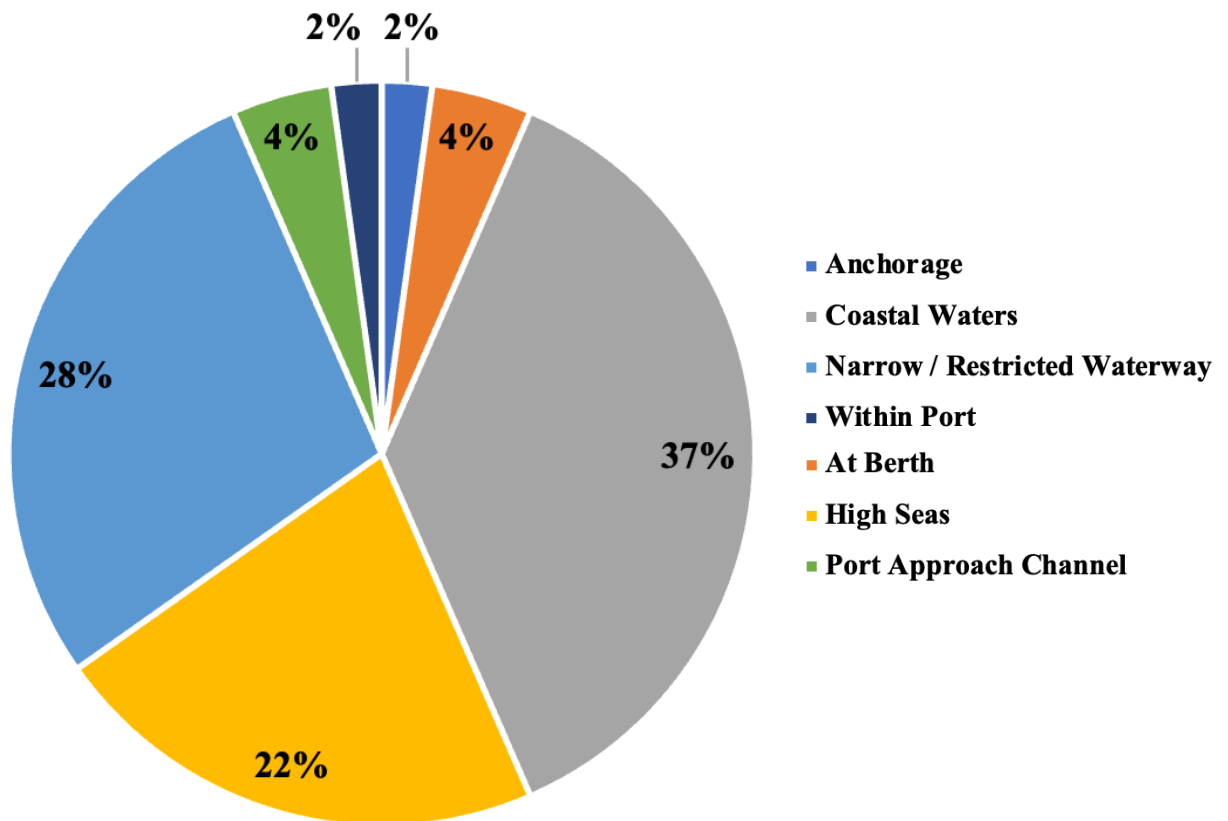


<sup>11</sup> Multiple causal factors can be associated with the same incident.

Loss of Propulsion by System



Loss of Propulsion by Activity



## Appendix 3: Most Common Marine Casualties by Ship Type

The below table lists, by ship type, the three most common incident types for all reports made to the Administrator in 2023.

Ship Type	First	Second	Third
Bulk Carrier	Serious Injury	Collision / Allision	Loss of Propulsion
Tanker	Serious Injury	Collision / Allision	Loss of Propulsion
Container	Serious Injury	Loss of Propulsion	Collision / Allision
OSV	Serious Injury	Collision / Allision	Loss of Cargo Containment or Segregation
Gas Carrier	Serious Injury	Fire / Explosion	Loss of Propulsion
General Cargo	Serious Injury	Collision / Allision	Fire / Explosion
MOU	Serious Injury	Pollution	Serious Injury (Non-RMI Seafarer)
Miscellaneous	Natural Cause Death	Pollution	Serious Injury
Passenger	Serious Injury (Non-RMI Seafarer)	Pollution	Serious Injury
Yacht	Serious Injury	Structural Damage	Loss of Propulsion