



Bundesstelle für Seeunfalluntersuchung
Federal Bureau of Maritime Casualty Investigation



Annual Report 2023

June 2024

Dear Reader,

I will not forget the year 2023 in a hurry. And when you have read this annual report, especially the second chapter, I think you will understand me. The year was marked by a number of extraordinary accidents – some turned out well, others unfortunately very badly. As the head of the BSU, I have never had to contend with so much press work. However, one thing before the other.

The vulnerability of offshore wind farms – but also the resilience of individual turbines – became apparent back in spring when the freighter PETRA L sailed into one unchecked. That the master managed to manoeuvre the heavily damaged ship into the next port is bordering on a miracle, as is the fact that the actual turbine only suffered scratches here and there.

Keeping the coastal area on tenterhooks for days, the next accident was not the responsibility of the BSU at all – although this was more by pure coincidence. The car carrier FREMANTLE HIGHWAY caught fire in the Dutch EEZ while sailing from Bremerhaven to Suez shortly after leaving Germany's territorial waters. Despite the immediate firefighting operation using all available means it was not possible to gain control of the flames. All but one crew member, who later succumbed to his injuries, were rescued. The ship was allowed to burn out and the outer walls were continuously cooled to maintain stability. Until the very end, it was feared the ship would break up, causing indescribable pollution to the Wadden Sea in the process. This was prevented thanks to fortune and skill and the burned out ship was later towed to Eemshaven. I would therefore like to take this opportunity to commend our Dutch colleagues, who managed to prevent a disaster through enormous professionalism and composure.

You may also remember the many reports about the terrible collision between the freighter VERITY and bulker POLESIE. The two ships collided during the night so unfortunately that the VERITY sank within only a few minutes. An impressively organised rescue mission was immediately launched, during which it was even possible to rescue two of the VERITY's seven crew members from the water alive. Unfortunately, the other five are still missing despite the extensive SAR operation. But here, too, I would like to pay tribute to the rescue personnel and everyone else involved, who – not least at great personal cost – managed to save lives despite the adverse conditions.

Although these are just three examples from the past year, they demonstrate that despite all the technology available today, seafaring is a hazardous occupation and that errors can cost lives. Let us work together to minimise this risk.

Warm regards,

Ulf Kaspera

Amendments

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Abbreviations

'000	Thousand
BAV	Federal Agency for Administrative Services
Bft	Beaufort
BG Verkehr	German Social Accident Insurance Institution for Commercial Transport, Postal Logistics and Telecommunication
BMDV	Federal Ministry for Digital and Transport
BP	Federal police boat
BSH	Federal Maritime and Hydrographic Agency
BSU	Federal Bureau of Maritime Casualty Investigation
CCME	German Central Command for Maritime Emergencies
cons.	Consecutive
e.g.	For example
EEZ	Exclusive Economic Zone
EMAIF	European Marine Accident Investigators' International Forum
EMCIP	European Marine Casualty Information Platform
EU/EC	European Union/European Community
I	Incident
IMO	International Maritime Organization
LL	Lessons learned
LSMC	Less serious marine casualty
m	Metre
MAIIF	Marine Accident Investigators' International Forum
MRCC	Maritime Rescue Co-ordination Centre
MSC	Maritime Safety Committee
nm	Nautical mile
No	Number
NOK	Kiel Canal
OCI	Other casualty or incident
PCF	Permanent Cooperation Framework
SAR	Search And Rescue
SMC	Serious marine casualty
SNK	Rescue cruiser
SUG	German Maritime Safety Investigation Law
UK	United Kingdom
VO	Regulation or ordinance [Verordnung]
VTS	Vessel traffic service
TSS	Traffic separation scheme
WT	Wind turbine

Marine casualty investigation¹

The Federal Bureau of Maritime Casualty Investigation ([BSU](#)) is a federal higher authority based in Hamburg. Its staff currently comprises 13 people working on a full- and part-time basis, as well as one person working on a temporary basis, making it Germany's smallest federal higher authority. Moreover, it has a single-stage administrative structure. The BSU is subordinated to the Federal Ministry for Digital and Transport ([BMDV](#)), where it operates under the supervisory control of Division WS 26 (Maritime Shipping Law, BSU).



Figure 1: Headquarters of the BSU²

1.1 Fundamentals

Both national and international legislation defines the work of marine safety investigating authorities as '*marine safety investigation*'. This clearly demonstrates that an investigation into a marine casualty is not intended to clarify issues of fault or liability but is solely for the purpose of improving maritime safety. However, this term has not become a part of everyday language. The more common term '*marine casualty investigation*' is used in German-speaking countries. A marine casualty investigation aims to deliver a comprehensive account and analysis of the course of events leading up to and during an accident so as to prevent future accidents. It should consider any direct and indirect causes, facilitating factors, as well as the overall circumstances including possible rescue operations and safety systems. The law provides that the BSU be guided by a no blame approach within the framework of a safety partnership. The BSU does not make findings on culpability, claims or liability. Investigation reports

¹ The heavily damaged PETRA L is shown in the port of Emden in the cover picture. She had sailed into a wind turbine at night; see point 2.2 of this annual report. Source: BSU.

² Source: Fotolia.

and the findings therein are not for use in judicial proceedings. The courts have to form their own picture of the accident and this may differ from that of the BSU.

The German Maritime Safety Investigation Law (SUG) constitutes the primary legal framework for the work of the BSU. The SUG transposes international rules and regulations such as the international Casualty Investigation Code, IMO³ Resolution MSC.255(84) and the European Directive 2009/18/EC into the German judicial system. Other provisions that apply under German law include Regulation (EU) No 1286/2011 and IMO Resolution A.1075(28), which harmonise the methodology and implementation of casualty investigations internationally.

According to the SUG, the BSU is responsible for investigating incidents and marine casualties involving seagoing ships of any flag

- within German territorial waters;
- on German navigable maritime waterways, as well as to, from, and in ports connected to them;
- outside territorial waters but within the German Exclusive Economic Zone (EEZ) only in the event of very serious marine casualties, provided that the special rights assigned to Germany there are affected.

Outside the areas referred to above, the BSU only investigates marine casualties on or involving seagoing ships flying the German flag or if the Federal Republic of Germany has a substantial interest in the investigation of a marine casualty abroad (if German nationals are killed or seriously injured, for example).

The SUG also addresses those cases in which the BSU does not take action. The BSU is not responsible for marine casualties involving only

- ships of war, troop ships and other ships owned or operated by Germany's federal or state governments and used only on government non-commercial service;
- ships not propelled by mechanical means, wooden ships of primitive build, pleasure yachts and pleasure craft not engaged in trade, unless they have prescribed manning and carry more than 12 passengers;
- fishing vessels of less than 15 m in length;
- fixed offshore drilling units.

This has practical relevance in the recreational boating sector, in particular. The SUG does not cover privately used recreational craft (unlike those used commercially), meaning the BSU's statutory mandate does not extend to investigating accidents involving recreational craft. This applies regardless of damage. However, in (rare) exceptional cases, it is still possible for the BSU to investigate such accidents, but only if they occur in German territorial waters and concern recreational craft that are built, suitable and used for seafaring. Open rowing or sailing boats and personal watercraft, etc. do not belong to this category.

³ International Maritime Organization, London, UK.

The SUG distinguishes between four categories of marine casualty: incident, less serious marine casualty, serious marine casualty and very serious marine casualty and in the case of the latter requires that the BSU always conduct an investigation.⁴ In all the other cases, the BSU conducts a preliminary investigation, which is sometimes more, sometimes less complex.

1.2 The investigation procedure

After an accident notification is received, the BSU's director (or the deputy director in his absence) decides on the initiation of an investigation and usually assigns the subsequent processing of the accident to a team of two to three people. The BSU is free from instructions in this decision and in all other aspects of the investigation through to the preparation of the investigation report.⁵ If an accident does not have to be investigated by law, i.e. it is not a very serious marine casualty, then the BSU has a margin of discretion. Various factors such as the consequences, potential gaps in safety or an increased public interest play a role when deciding whether to investigate an accident.

The BSU has extensive rights and powers of intervention when investigating the course of events leading up to and during an accident, including in respect of access to the scene of the accident, preservation and analysis of evidence, questioning witnesses and the engagement of experts. These rights are not limited to parties directly involved in the accident (the ship, her crew and possibly pilots), but can also be exercised in respect of third parties (e.g. shipping companies, shipyards or classification societies) or public authorities (e.g. the Federal Waterways and Shipping Administration or the German Social Accident Insurance Institution for Commercial Transport, Postal Logistics and Telecommunication (BG Verkehr)).

An important cornerstone of the work of the BSU is cooperation with European and non-European investigating bodies. Based on European and international principles, the BSU conducts investigations in international cooperation. These can be limited to merely supporting the other investigating body or may extend to a full joint investigation and joint final report.

⁴ On the subject of marine casualties, see in particular the explanatory notes in Chapter 6.1.

⁵ See also Section 12(3) SUG.

1.3 Investigation reports and safety recommendations

The investigation report, which is made available to the public, is the product of a marine casualty investigation. Before publication, the draft report is made available to all parties involved in the accident, as well as to the addressees of a safety recommendation and they are given the opportunity to submit comments, which the BSU examines and then adopts if necessary. The BSU's investigation reports follow a certain pattern, which is provided by Directive 2009/18/EC. In addition to the required indication of the purpose of the investigation, notably, the prevention of future accidents and malfunctions, but not the determination of blame, liability or claims, each report contains

- a summary of the accident;
- factual information, including but not limited to ship and voyage particulars;
- a detailed account of the course of the accident and investigation;
- an analysis of the investigation;
- ensuing conclusions;
- action already taken, and
- safety recommendations (if necessary).

Safety recommendations constitute the key element and conclusion of an investigation report. A safety recommendation is directed at a specific addressee and points to an identified gap in safety. It is intended to help to avoid or at least reduce the impact of future situations similar to the one that led to the accident. A marine safety investigation by the BSU focuses not only on events on board, but also looks at organisation ashore or the safety system where appropriate, which also includes the post-accident emergency management. In short, any factors that may have facilitated the accident are investigated and evaluated. Consequently, in addition to the crew, addressees of safety recommendations could include pilots, shipping companies, shipyards, manufacturers of equipment, the Maritime Administration, the legislator or other parties and institutions. Safety recommendations can also be directed at several addressees, but their wording should be sufficiently specific. Addressees should be able to clearly discern what is being recommended to them. Accordingly, recommendations of a general nature should be avoided.

The BSU may also issue an early alert in the form of preliminary safety recommendations before the publication of an investigation report. This is to prevent accidents if it has been found that a safety risk exists for which notification must be given as quickly as possible, i.e. before publication of the final report.

However, safety recommendations are not issued with every investigation report. This can be for a variety of reasons, e.g. that no specific deficiencies were apparent or that the potential addressees had already closed a gap in safety identified by the BSU through their own action while the investigation was ongoing ('Action taken').

If no safety recommendations are published, the law grants the BSU the option to produce a **summary (or simplified) investigation report** when it investigates incidents or less marine serious casualties.⁶ The summary report is intended to facilitate the work of investigating bodies and to reduce the time needed for preparation. Strict procedural rules such as the statutory period of 30 days for parties involved to submit comments do not apply, for example. The summary investigation report is still a fully-fledged investigation report, however.

The publication of **interim investigation reports** is also required for serious or very serious marine casualties if it is not possible to prepare a final report within one year of the date of an accident. Cases not investigated further after the BSU has conducted a preliminary investigation, e.g. due to a lack of sufficient data, are usually closed with an internal note.

The BSU published a total of 15 investigation reports in 2023, including eight interim reports and three summary reports.

The BSU issued a total of 16 safety recommendations in three reports. Safety recommendation addressees included (number of recommendations in brackets):

- Federal Ministry for Digital and Transport (3);
- shipping companies/vessel operators/owners (5);
- manufacturers/shipyards (2);
- German Maritime Search and Rescue Service (2);
- Ship Safety Division (BG Verkehr) (3).

An investigation concludes with the publication of the report. A case may only be reopened within ten years of the conclusion of an investigation if new material evidence comes to light. However, this has never happened in the history of the BSU.

1.4 Reports of foreign investigating authorities

In addition to carrying out its own investigations, the BSU often cooperates with foreign counterparts. In particular, this applies to marine casualties on German territory involving only vessels flying a foreign flag. Under international law, the flag State has the first right of access. If it is agreed that the flag State will lead the investigation of an accident, then the BSU will support the foreign investigating authority with expertise and/or human resources. Such support ranges from the simple establishment of contacts to the independent assumption of entire focal points of an investigation and can demand the same amount of work as one of the BSU's own investigations. For investigations in which support was especially exhaustive, the BSU arranges for the translation of the foreign investigating authority's investigation report into German and then – as with its own reports – publishes it on its website.

⁶ A summary report is not available for serious or very serious marine casualties, however (see Section 27(5) SUG in conjunction with Article 14 Directive 2009/18/EC).

1.5 Lessons learned

Unlike safety recommendations, lessons learned are directed at a broader group of addressees, e.g. ship crews, shipping companies or water sports enthusiasts. Lessons learned generalise the findings of an investigation and draw attention to existing gaps in general safety or hazards of particular relevance. However, not all investigations lend themselves to the translation of findings into general lessons learned. Unlike safety recommendations, lessons learned can also be derived from investigations concluded with a summary investigation report. In 2023, lessons learned were published on the basis of two investigation reports.

Main investigations

This section deals with accidents that occurred in 2023 and are currently the subject of a main investigation. In principle, investigations should be completed after one year. However, this is not possible in the majority of cases. The reasons for this are as varied as the actual accidents are. The rule is that the length of an investigation rises with the degree of complexity of the events surrounding the accident and number of parties involved. However, delays also have other causes that are not connected with the accident, such as human resources, absences due to illness, or other commitments. Of course, the BSU makes every effort to analyse accidents quickly and publish the final report without undue delay.

I would like to briefly outline some of the accidents from the previous year on the pages below. A general overview of the accidents currently under investigation by the BSU can be found on our website under '[Current investigations](#)'.

2.1 SUPREME ACE



Figure 2: The SUPREME ACE on the River Elbe⁷

The first accident to be reported on here occurred back in January. The pilot engaged on the car carrier SUPREME ACE had steered the ship from the port of Emden through the Ems estuary and was planning to disembark again at about 0500. The pilot boat BORKUM came to collect him.

⁷ Source: Port of Hamburg Marketing/ Peter Löffler.



Figure 3: Pilot tender BORKUM⁸

Since the weather was extremely harsh with wind forces of 7 Bft, they decided to execute the manoeuvre earlier than usual. The pilot boat came alongside and the pilot descended via the pilot ladder. While crossing over to the BORKUM, she suddenly and unexpectedly dropped into a wave trough. The pilot stepped into the void, lost his footing and fell into the water.

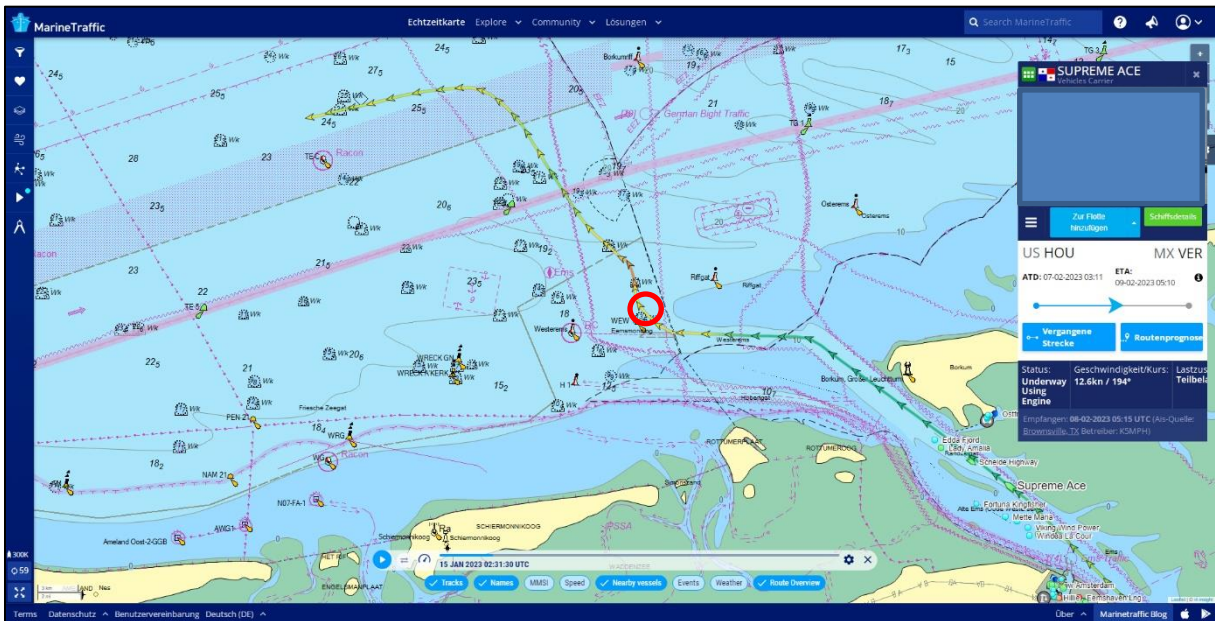


Figure 4: The SUPREME ACE's route with the scene of the accident⁹

⁸ Source Hasenpusch Photo-Productions.

⁹ Source: MarineTraffic.

Despite the prevailing darkness at that time, it was possible to quickly locate the casualty in the water and pull him back on board with huge personal effort on the part of the tender's crew. Appropriate distress calls were made. The SNK HAMBURG had arrived at the scene in the meantime but since it was not possible to transfer the casualty to her due to a wave height of up to 5 m, a helicopter from the Dutch coastguard winched him up and took him to a hospital in Emden. He suffered only minor injuries and was able to leave the hospital three days later.

A similar incident occurred in German waters shortly after, which prompted the BSU to investigate the general hazards during a transfer in greater detail.¹⁰

2.2 PETRA L



Figure 5: The undamaged PETRA L¹¹

One accident that attracted enormous media attention occurred in April of this year. At about 2000 in the evening, the general cargo vessel PETRA L, sailing under the flag of Antigua and Barbuda, sailed into a wind turbine belonging to the Godewind 1 wind farm at full speed in the German Bight. While the wind turbine sustained only relatively minor damage, the PETRA L was severely damaged. The starboard side of the bow was torn open and pushed in – including below the waterline, which inevitably led to water ingress. Fortunately, the bulkheads held and the vessel therefore remained afloat. There were no casualties.

¹⁰ The BSU investigated this issue again in 2020 in the MARFAAM case and published [Investigation Report 19_19.pdf \(bsu-bund.de\)](#).

¹¹ Source: Hasenpusch Photo-Productions.

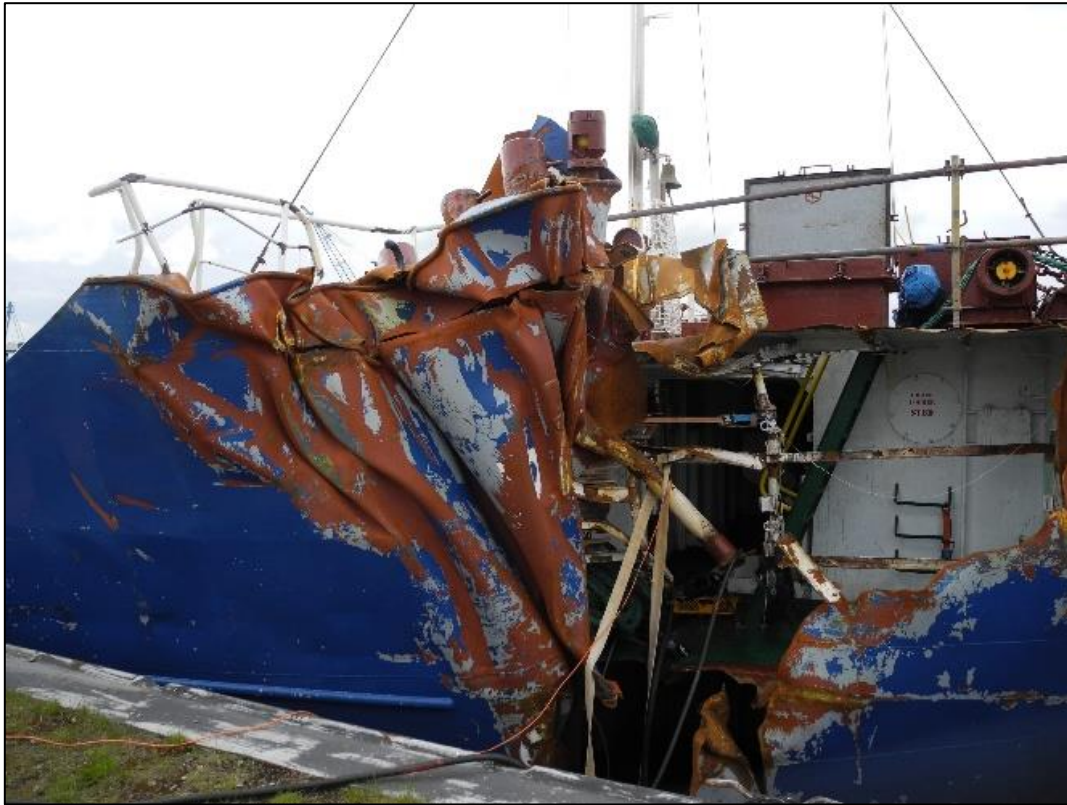


Figure 6: Torn open side of the PETRA L¹²

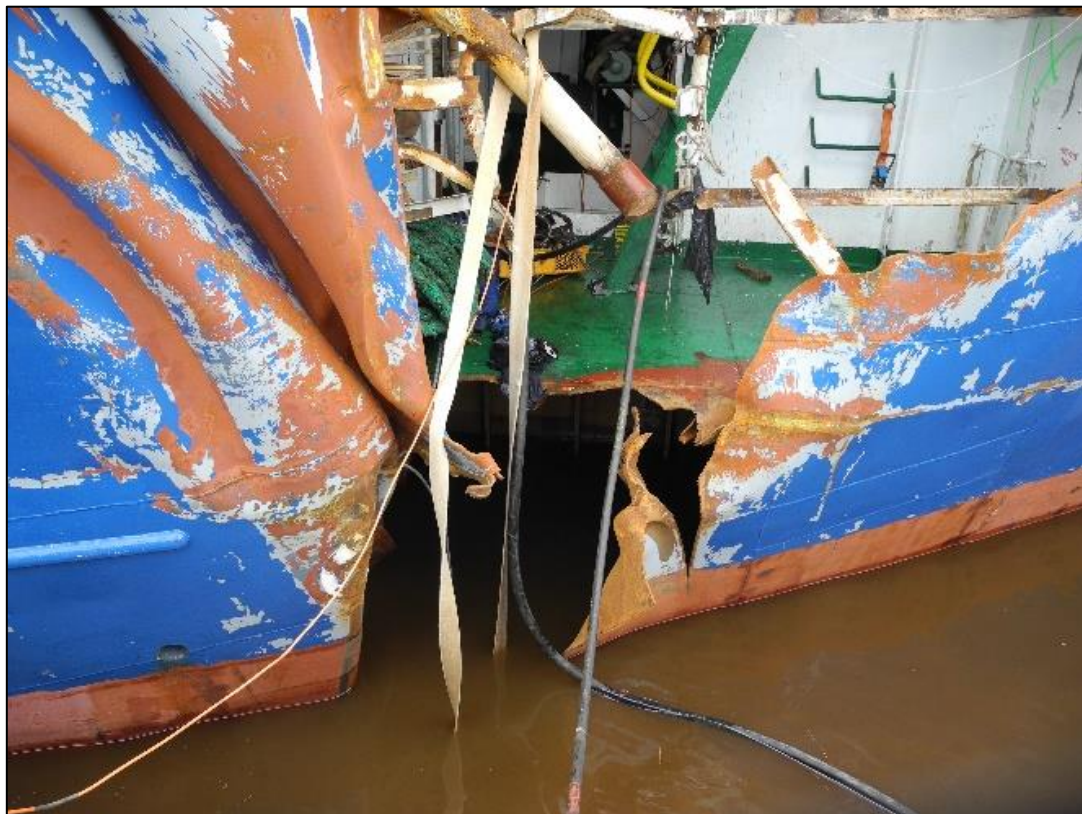


Figure 7: Damage below the waterline¹³

¹² Source: BSU.

¹³ Source: BSU.

Since the engine was still running, members of the crew decided to make for Emden, which was 70 nm away, despite the enormous damage. The fact that the ship survived this voyage despite wind forces of 6 Bft and wave heights of 2-3 m can only be explained by exceptionally good fortune. The vessel reached the lock at the port of Emden at about 0830.



Figure 8: Base of the wind turbine with which the allision occurred¹⁴

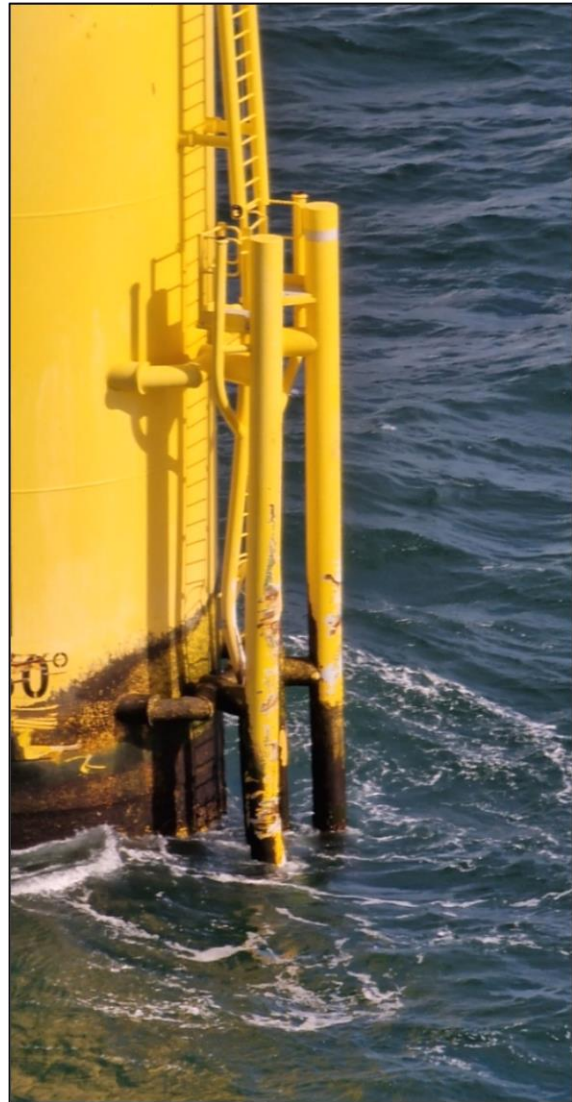


Figure 9: Only minor dents and chipped paint on the deflector¹⁵

The exceptional nature of the incident and considerable damage to the ship prompted enormous media interest on the very next morning. The BSU answered numerous enquiries from the press. The decision to investigate the case was made on the same day.

¹⁴ Source: Operator.

¹⁵ Source: Operator.

2.3 SEAHAKE

The third accident that we have looked at in more detail here occurred in June on the German-flagged tanker SEAHAKE off Piraeus in Greece. A rescue boat manned by three people was to be lowered into the water by means of a crane during a routine emergency drill. A person sitting in the boat operated the crane's winch manually using a rope hoist.



Figure 10: The tanker SEAHAKE in the roadstead off Piraeus¹⁶

The winch suddenly failed after the boat had been swung over the railing and lowering had started. The boat plunged almost unchecked from a height of about 8 m onto the surface of the water and hit it hard. The three occupants of the boat were thrown around on impact and suffered serious injuries in the process. After the crew had administered first aid on board, they were taken to a hospital.

The BSU along with an expert boarded soon after to investigate the cause of the winch failure in greater detail. It was only possible to make a cursory inspection on board the actual vessel. However, no malfunction could be detected. Accordingly, they decided to dismantle and ship the winch to the manufacturer in Germany so that further detailed investigations could be carried out there. These have now been completed.

¹⁶ Source: BSU.



Figure 11: The crane and rescue boat involved in the accident¹⁷



Figure 12: The dismantled cable winch before it was disassembled¹⁸

¹⁷ Source: BSU.

¹⁸ Source: BSU.

2.4 WOTAN



Figure 13: The burning WOTAN¹⁹

A very serious marine casualty occurred off Büsum in August. A fire broke out in the engine room of the German-flagged fishing vessel WOTAN in the middle of the night. It initially spread across the entire engine room unnoticed.

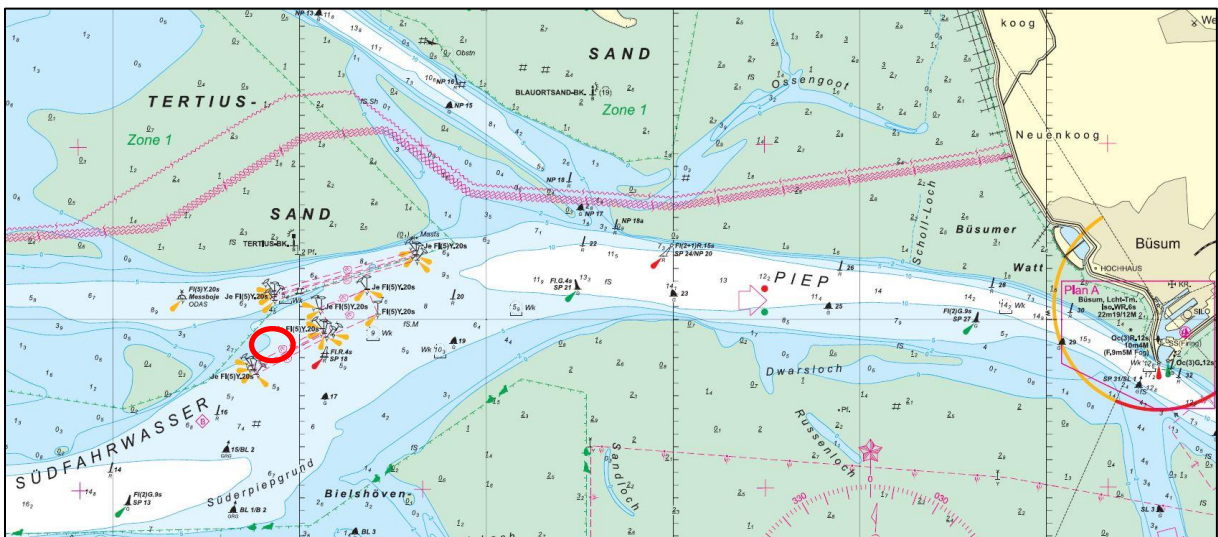


Figure 14: Scene of the accident outlined in red²⁰

The vessel was anchored and the crew (the skipper and a deckhand) asleep when the fire broke out. The fire was only discovered by chance when flames were already coming out of the engine room's companionway. The crew members were no longer

¹⁹ Source: German Central Command for Maritime Emergencies.

²⁰ Source: BSH, extract from Chart 1360 'Norderpiep und Süderpieb, Meldorfer Bucht'.

able to extinguish the fire. They had just enough time to try to send a distress call, launch the liferaft and move away from the burning vessel.

Despite difficulties in making the distress call, VTS Cuxhaven managed to understand that the WOTAN's crew had boarded a liferaft and alerted MRCC Bremen. The VTS was initially unsure as to why they had evacuated. Following that, SNK THEODOR STORM sailed out of Büsum and made for the last known position. The firefighting operation began shortly after under the direction of the German Central Command for Maritime Emergencies. The SNK succeeded in taking the two crew members on board about 40 minutes later. They were virtually unharmed.



Figure 15: The WOTAN foundered after she had burned out²¹

Upon request from the German Central Command for Maritime Emergencies, two maritime incident response groups (MIRG)²² – First Response and Fire Fighting – were dispatched by helicopter from Nordholz to the scene of the accident in succession. Fighting the fire on the fishing vessel proved difficult and ultimately it was impossible to save her. Despite the active support of the MIRGs, BP 84 NEUSTADT and SNK HERMANN MARWEDE, the fishing vessel foundered due to the fire and the extinguishing works. Fuel and hydraulic oil escaped, which the service vessel TRISCHEN initially contained using absorbent material. However, the diesel fuel soon dispersed and was no longer detectable on the following day.

²¹ Source: German Central Command for Maritime Emergencies.

²² Team of five to six firefighters and emergency physicians trained and equipped for operations at sea, in particular. For more information, please visit: <https://deutscher-marinebund.de/berichtetmb/neue-maritime-incident-response-group/> (14/09/2023).

The wreck of the fishing vessel was raised six days later by the crane vessel ENAK, placed on a pontoon and transported to Cuxhaven, where she was inspected by the BSU and experts immediately. It quickly became clear that the fire had been 'extremely thorough'. The engine room and stern of the vessel were almost gutted.



Figure 16: The raised wreck of the WOTAN²³

2.5 VERITY and POLESIE

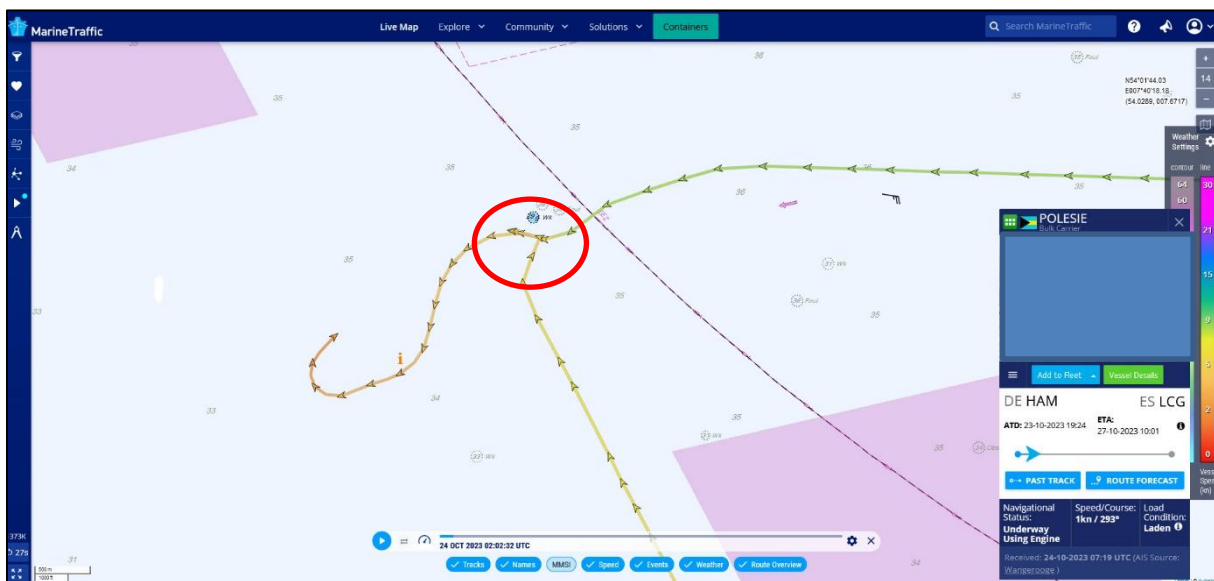
The last accident to be discussed in greater detail in this annual report is the one that attracted the most media and political attention. This is entirely understandable and justified, as there has (fortunately) not been an accident with such serious consequences on the German coast for many years.

In October, there was a serious ship collision in the German Bight in the early hours of the morning at about 0500. The almost 100 m long multi-purpose vessel VERITY, flying the UK flag (Isle of Man), was sailing on a northerly course down the Weser and en route from Bremerhaven to Immingham in the UK. The almost 200 m long bulk carrier POLESIE, flying the flag of the Bahamas, was sailing westward toward TSS Terschelling-German Bight. The vessel came from Hamburg and was en route to A Coruña.

²³ Source: BSU.

Figure 17: The POLESIE²⁴Figure 18: The VERITY²⁵

The ships collided with each other in the TSS Jade Approach crossing area. The VERITY suffered so much damage in the process that she listed and foundered within a very short period of time. Three of the seven crew members were found in the water, two of whom were alive. The remaining four are missing.

Figure 19: Route of each ship; scene of the accident outlined in red²⁶

After the VTS was no longer able to establish radio contact with the VERITY, the German Central Command for Maritime Emergencies was immediately informed and requested to coordinate the operation. The CCME complied with this request and coordinated the SAR operation for the missing people together with MRCC Bremen. It quickly became clear that the VERITY must have foundered, meaning that every minute counted for the survivors. At times up to 18 emergency vessels, the navy's DO 228 surveillance aircraft, various helicopters, as well as other civilian vessels took part in the rescue mission. A large area was systematically searched for survivors, taking particular account of the drift caused by tidal currents and wind.

²⁴ Source: German Central Command for Maritime Emergencies.

²⁵ Source: Hasenpusch Photo-Productions.

²⁶ Source: MarineTraffic.

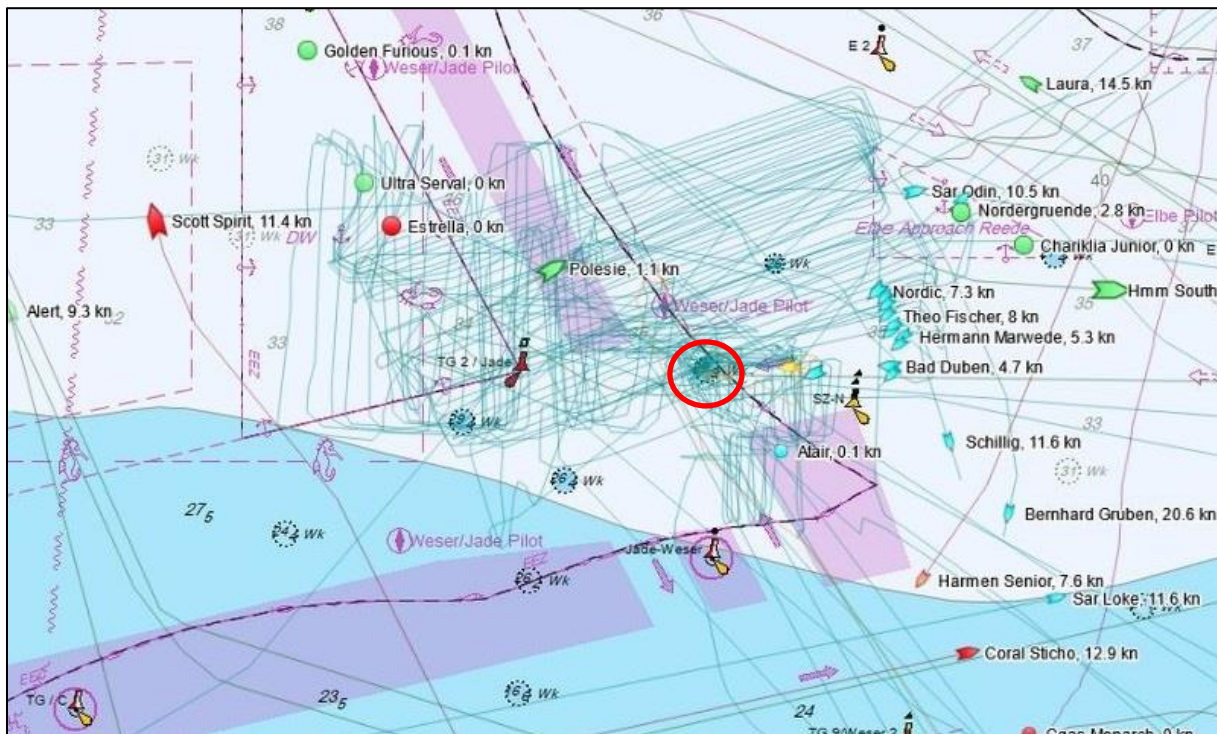


Figure 20: The SAR operation's search pattern around the scene of the accident²⁷

The POLESIE rescued one person from the water alive about an hour after the collision and the NORDIC was only able to retrieve a second crew member dead after about another hour. Almost two hours after the collision, a SAR helicopter managed to rescue another person from the water alive. The two survivors were taken to a hospital. They only had minor injuries and were hypothermic.

The rescue mission lasted the entire day, as it was not known how many people were able to escape from the foundered ship. The rescue services were unable to locate anyone apart from the three people mentioned, however. The search was called off at about 2300 because there was no longer any likelihood of success.

Subsequent dives on the wreck, which the BSH ship ATAIR had already located at a depth of 35 m at midday on the day of the accident, revealed a gaping hole both above and below the waterline on the starboard side in front of the superstructure, meaning that a large amount of water could flow into the full-length cargo hold within a very short period of time, causing the ship to quickly founder.

The investigation started on the same day. All three affected countries (the flag States of the UK and Bahamas, as well as the coastal State of Germany) declared a substantial interest in the investigation. It was quickly agreed that a joint investigation led by the UK would be conducted in accordance with international provisions. All three countries are working on the investigation with divided responsibilities.

²⁷ Source: MarineTraffic. The scene of the accident is outlined in red.

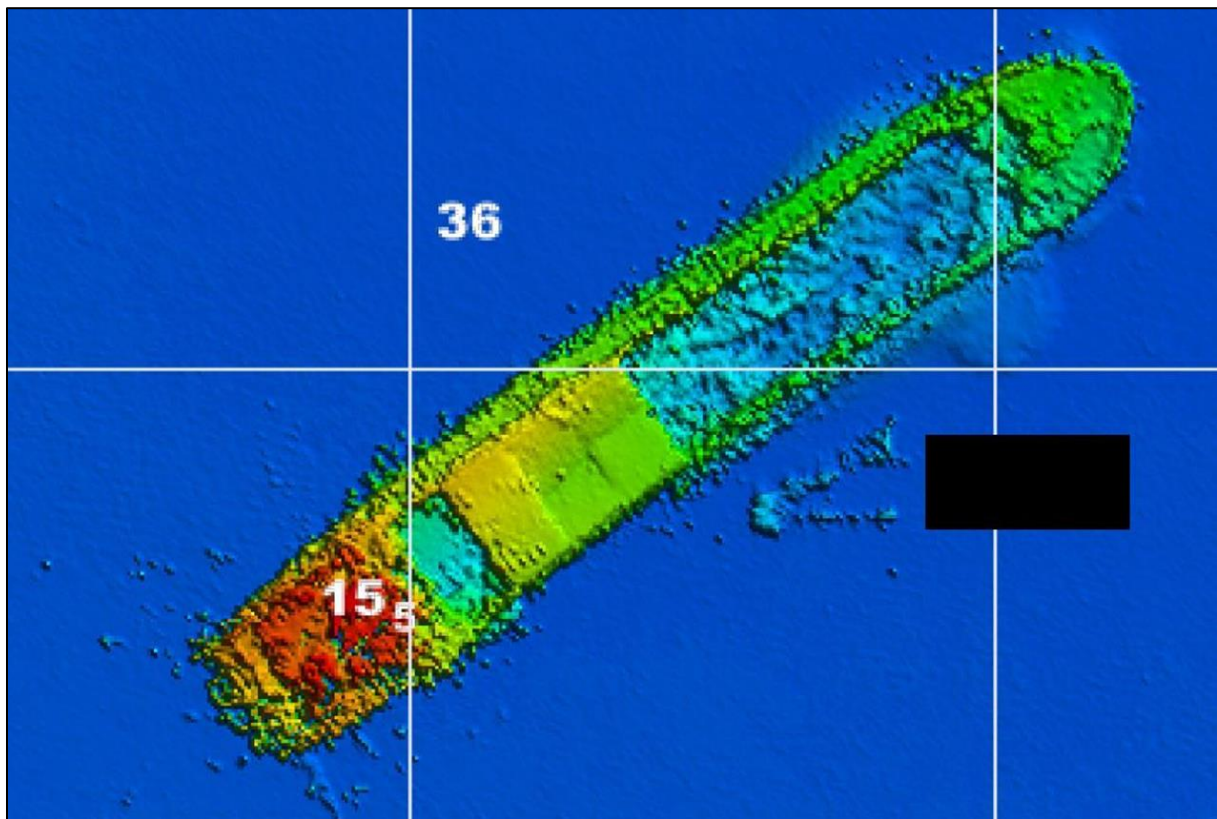


Figure 21: Sonar image of the foundered VERITY²⁸

This tragic accident brings the current chapter to a close. Of course, other accidents that were perhaps no less important also occurred, but not all of them can be discussed here. This is reserved for the investigation reports awaiting publication.

²⁸ Source: BSH, taken by the ATAIR. The white numbers are depth information.

What has been going on in the Administration?

3.1 Personnel and organisational matters

The BSU's structural and procedural organisation has not been adapted to meet prevailing circumstances since it was founded in 2002. Over the past 21 years, new and changing statutory requirements and the ensuing increase in our range of duties have led to far-reaching changes in the way duties are performed in all areas of the BSU. This inevitably gives rise to different staffing requirements or a reassessment of the scope of the duties to be performed.

The heads and Administrations of the three investigating authorities and the German Central Command for Maritime Emergencies meet once a year. All authorities share the aforementioned problem of having a relatively small workforce. However, the tasks assigned to them from outside that do not relate to technical activities, i.e. occupational health and safety, data protection, corruption prevention, etc., have to be dealt with in the same way as in large authorities. The major difference is that larger authorities are able to assign staff specifically for this – unfortunately, such a solution is not realistic for small authorities. The result is that available staff have to deal with particular duties. For example, almost every member of the BSU's staff is responsible for at least one of the other duties we are charged with in addition to their technical activities. Since experience from recent years suggests that there is still some way to go, the four 'small' authorities are liaising closely and working together to find solutions.

The BSU has hardly changed in terms of organisation and staffing since 2002, as can be seen from a comparison of the organisational charts from the BSU's first annual report and that of today. There has also only been one change in terms of personnel in the entire period since the BSU was founded. This is probably unique in the Federal Administration.

This situation should not continue. An organisational review was therefore initiated in the summer of 2023, which will initially begin by documenting the activities performed in 2023. This also includes documenting duties that could not be performed fully or at all. This will be followed by an appraisal of the purpose and duties and following on from that definition of the desired situation and determination of the personnel requirements for the coming years. The government department's own BAV²⁹ in Aurich, with which the BSU enjoys a trusting working relationship, has been engaged as a partner for the organisational review. We expect the organisational review to be completed in the summer of 2024 and are confident we will be able to report on the outcome next year.

²⁹ Federal Agency for Administrative Services, also subordinated to the BMDV.

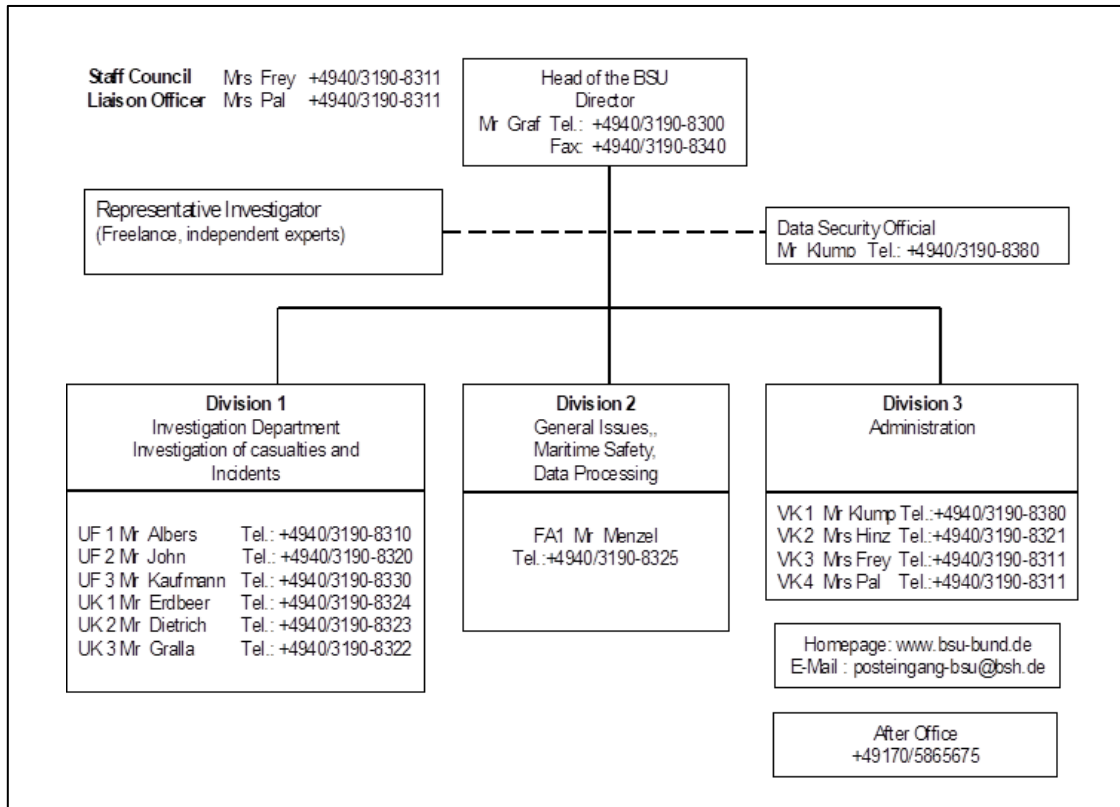


Figure 22: The BSU's 2003 organisational chart

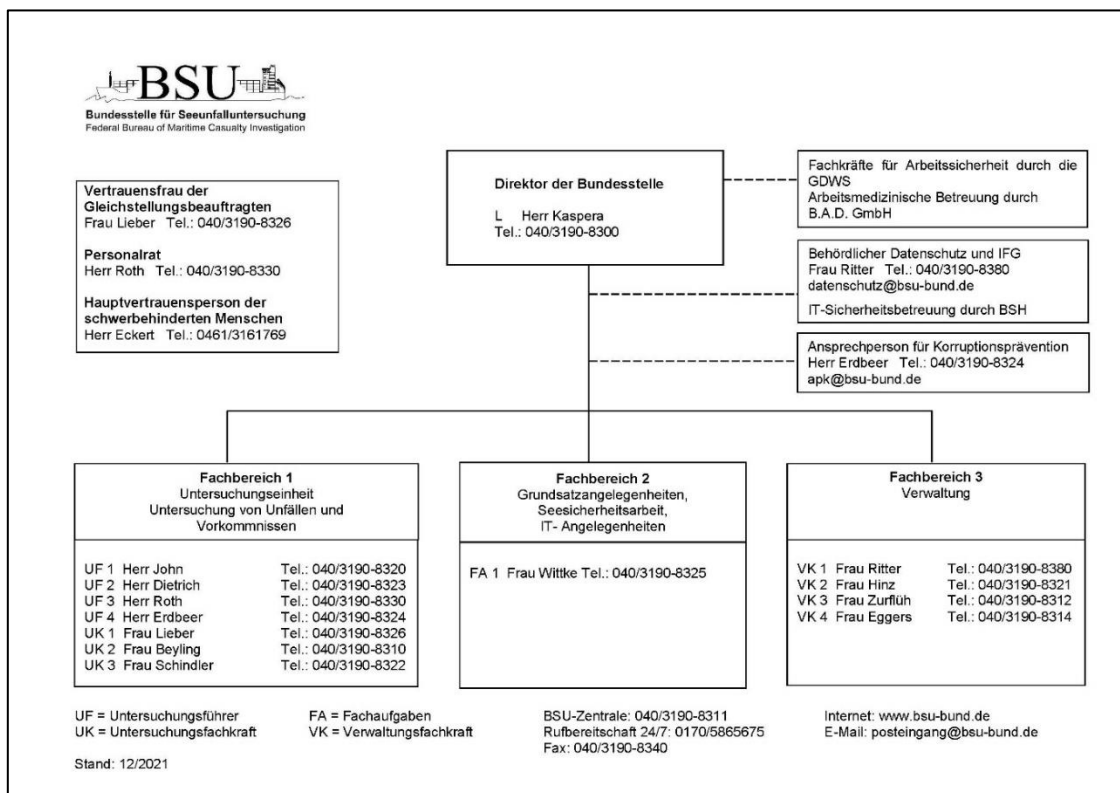


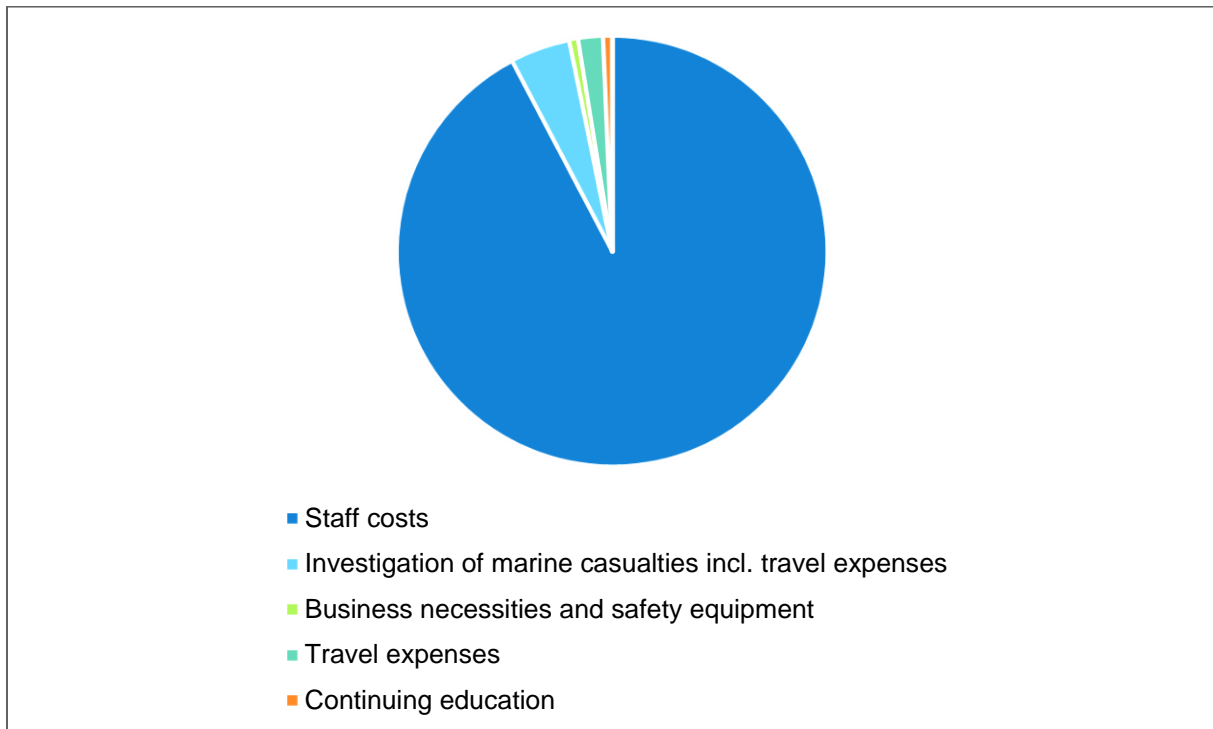
Figure 23: The BSU's latest organisational chart

3.2 Finances

The budgetary resources available to the BSU were at their usual level. The largest item was once more the staffing budget. Expenditure on investigations and related official journeys rose again in 2023, as the travel restrictions of earlier years due to the coronavirus pandemic had been discontinued.

In particular, to fulfil all our duties in the field of marine casualty investigation, to cover HR, travel and continuing vocational training costs, as well as to be able to pay for business supplies and other purchases such as personal protective equipment, the BSU continued to have a budget of EUR 1,266,000 at its disposal in 2023. Expenditure on staffing accounted for about EUR 981,000 and on investigations EUR 48,200. Expenditure on business supplies and personal protective equipment stood at EUR 7,300. On the other hand, EUR 19,500 was needed for travel expenses. Expenditure on continuing vocational training for all the BSU's staff members (together with the individual support) amounted to about EUR 6,700 in 2023.

Graph 1: Allocation of the BSU's budgetary resources



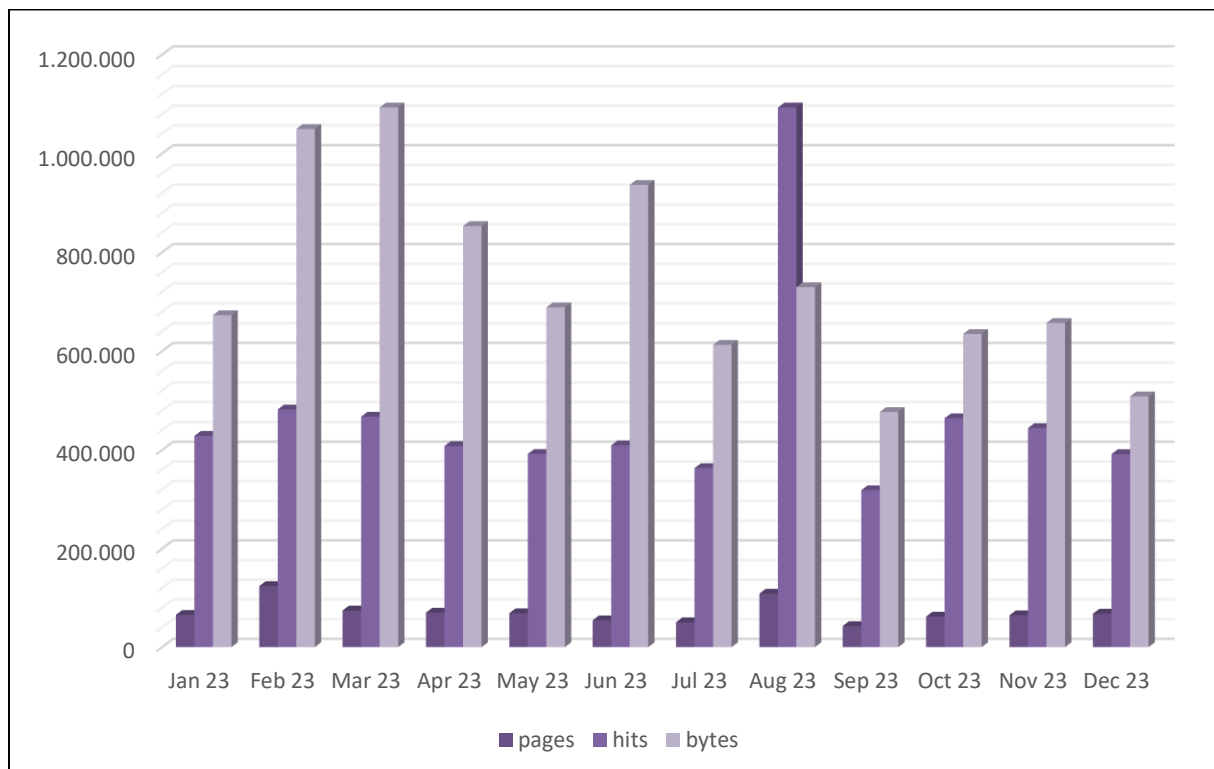
Public relations

4.1 The BSU's website

The [BSU's website](#) offers information on the duties and structure, the historical development of marine casualty investigation, as well as the statutory framework. You will also find [all the reports published](#) by the BSU – from 2002 to the present day. Accordingly, you are warmly invited to take a brief foray into the world of marine casualty investigation.

The web statistics for the previous year are shown in the graph below.

Graph 2: Web statistics for 2023 by month



Most of the hits occurred in August this time, while most of the downloads (bytes) were in the first half of the year. One of the reasons for this is that these were the periods in which investigation reports of particular importance were published, such as that concerning the SPEEDY GO³⁰, which met with great interest in sailing circles in particular. A rational explanation to the high number of hits in August is difficult to give. No investigation report was published on a particularly high-profile accident, nor did one occur. Whatever the reason, the BSU is pleased when keen interest is displayed in its work.

On the whole, a comparison of the number of hits on the BSU's website with those of previous years reveals that they were relatively stable. Having said that, 2023 was especially pleasing with by far the most hits in recent years. This is due not least to the BSU's strong presence in conventional media in 2023, as well as our LinkedIn profile set up in 2023.

³⁰ [Investigation Report 138/22](#), published on 1 June 2023.

Table 1: Number of hits in the last eight years

Year	2016	2017	2018	2019	2020	2021	2022	2023
Hits ('000)	4,048	4,343	4,098	4,496	5,235	4,496	4,598	5,665

The hits on the website provide information on where public interest in the BSU's accident reports predominantly lies, as this varies greatly. Not every accident receives the same amount of attention. In principle, those reports whose underlying accidents have been met with broad public interest are at the top, while reports on other, less prominent accidents tend to be appreciated by a purely specialist audience. Accident reports concerning recreational craft always generate considerable interest, too. The readership is large and such reports are swept up quickly. This is shown by a brief overview of the three most frequently downloaded reports in 2023.

Table 2: The top three hits on investigation reports

Pos.	Name	Type	Ref.	Hits	Language
1	Person over board resulting in fatality on board the sailing yacht SPEEDY GO on the Flensburg Firth on 8 April 2022	Interim investigation report	138/22	18,075	DE
2	Person over board resulting in fatality on board the sailing yacht SPEEDY GO on the Flensburg Firth on 8 April 2022	Investigation report	138/22	17,649	DE
3	Foundering of the sailing boat SILJA and death of a crew member in the Accumer Ee tidal inlet on 26 August 2021	Investigation report	276/21	11,902	DE

Since all three reports come from the 'Sailing' interest group, a large target group is obviously addressed. We have been informed on several occasions subsequently that sailing schools or associations incorporate the relevant findings from the reports into their lessons, which, after all, is exactly what we want to achieve. Unfortunately, the BSU's resources do not allow us to deal with recreational boating more frequently, as accidents involving commercial vessels take precedence according to the statutory regulations.

Compared to last year, the hits on the BSU's lessons learned is encouraging. Similar to the investigation reports, we could attribute most hits to lessons learned that are of particular interest to operators of recreational craft.

Table 3: The top three hits on lessons learned

Pos.	Name	Cons. number	Hits	Language
1	Death of the skipper of a sailing yacht after falling overboard	15	5,066	DE
2	Foundering of a recreational craft and death of a crew member	13	3,442	DE
3	Death of a crew member after falling from a height in the cargo hold companionway	14	1,498	DE

4.2 Lectures and events

The BSU was actively involved in various fora and events again in 2023. Active public relations work is important because maintaining a high profile and the widest possible readership vis-à-vis reports and recommendations is also critical for the BSU. Accordingly, staff members once more gave numerous presentations, e.g. at the universities of applied sciences in Münster and Rostock, at the WSP training school in Hamburg, at the Maritime Institute, as well as to students at the World Maritime University. The BSU could also be heard again – in journalist Bärbel Fening's [NORDSEE Podcast](#)³¹.

4.3 Social media

I believe the profile we set up on [LinkedIn](#) the year before last has been a success. The BSU now has almost 2,000 followers. Although this figure cannot compete with the big names in show business, the steadily rising number of interested parties and comments demonstrates that we made the right move here, too, especially in the light of the different target audience. We consciously refrained from presenting the BSU on other channels, too. We simply do not have the human resources needed for this. It is for this reason that making contact or holding discussions via the social media account is not possible, either. Accordingly, anyone who wishes to contact the BSU is advised to do so in the usual way by [email](#).

³¹ The 23 November 2023 episode of the podcast looks at the collision between the VERITY and POLESIE.

International

5.1 EMAIF and MAIF³²

Representatives of the investigating authorities meet regularly once a year at international level. The purpose of these meetings is to:

- exchange information on current cases and assist each other;
- present completed investigations;
- identify general gaps in safety and determine the focus of investigations, and
- monitor international developments or trends.

The 2023 meeting of the European investigating authorities (EMAIF) was held in Denmark. The Danish MAIB had to postpone the event for three years due to the coronavirus pandemic before Copenhagen could be presented as a worthy host in May.

This year's international meeting was organised by the United Kingdom and took place in London in the autumn as usual.

5.2 Permanent Cooperation Framework (PCF)

This meeting of the investigating bodies of the EU and associated countries is not for the purpose of sharing experience, but rather to agree on new procedures and guidelines within the EU, to define the use of the EMCIP database, as well as to revise training programmes and courses for investigators, etc. Specifically, this concerns the harmonisation of European procedures and standardisation of definitions.

5.3 International Maritime Organization

The BSU participates on behalf of the BMDV in the Third Subcommittee of the IMO (Implementation of IMO Instruments), where a permanent working group called 'Casualty Analysis' deals with investigations that may necessitate the creation, amendment or adaptation of IMO regulations. The event is held annually at the IMO's headquarters in London. The main topics this year were:

- accidents involving fishing vessels;
- the quality of investigation reports, and
- a review of the Casualty Investigation Code.

All three topics will continue to occupy the BSU.

5.4 Revision of Directive 2009/18/EC

International work this year was marked by the BSU's technical involvement in the revision of the European Directive on marine casualty investigation. Starting back in 2021, this extremely extensive project entered its critical phase in 2023. The final drafts were prepared and discussed in the second half of the year at several Council Working Group meetings chaired by Spain. The BSU was called upon to deliver relevant technical contributions from a German perspective and evaluate as well as comment

³² (European) Marine Accident Investigators' International Forum.

on contributions from other countries. The Council Working Group discussions were finalised at the end of the year and transferred for the so-called trilogue. This is an informal interinstitutional negotiation attended by representatives of the European Parliament, the Council of the European Union and the European Commission. The aim of a trilogue is to reach a provisional agreement on a legislative proposal that is acceptable to both the Parliament and the Council (the co-legislators). This provisional agreement must then be adopted by each of those institutions' formal procedures. To come straight to the point, an agreement was reached in the spring of 2024, meaning it is likely that the new Directive can be adopted by all parties before the end of the year and then introduced.

The BSU and other parties involved must adapt to the following substantive changes, *inter alia*:

- inclusion of small fishing vessels in the scope of application;
- elimination of the serious marine casualty;
- change in the reporting procedure;
- voluntary introduction of a quality management system;
- elimination of a separate European investigation methodology and move toward international requirements (Regulation (EU) No 1286/2011 repealed).

Participating Member States must then transpose the new Directive into national law. The BSU is expected to act in an advisory capacity here, too. We wait in anticipation.

Statistics

6.1 General information and explanatory notes

As usual, a few explanatory notes precede the statistics presented here to make them easier to understand.

Section 1a SUG defines the term 'marine casualty' as being any event caused by or in connection with the operation of a ship that has at least one of the following consequences:

- the death or serious injury³³ of a person;
- the disappearance of a person from aboard a ship;
- the loss, presumed loss or abandonment of a ship;
- [substantial] material damage to a ship;
- the grounding or constructive total loss of a ship or the involvement of a ship in a collision;
- [substantial] material damage;
- environmental damage resulting from damage to at least one ship,

and any event caused by or in connection with the operation of a ship that poses a risk to a ship or a person or the consequences of which could cause serious damage to a ship, an offshore structure or the environment (incident, Section 1b SUG).

Depending on the consequences, German law states that the generic term 'marine casualty' must be further divided into:

Very serious marine casualty (VSMC):

A very serious marine casualty is one resulting in loss of human life, constructive total loss of a ship or substantial environmental pollution.

Serious marine casualty (SMC):

A serious marine casualty is one that cannot be classified as a VSMC but which additionally involves

- the failure of the main engine;
- substantial damage to the accommodation spaces;
- serious damage to the ship's structure;
- damage to the underwater shell plating with which the ship becomes unseaworthy;
- pollution, regardless of the volume of pollutants released, and/or
- an accident that necessitates towing or shore-based assistance.

³³ Assumed in the case of incapacity to work for at least 72 hours.

The IMO has actually discontinued use of the term 'serious marine casualty', but it continues to apply at European and German level and is still legally relevant. Therefore, the summaries continue to follow the usual pattern under the hitherto usual designation 'Marine casualties according to the IMO Code'.

Less serious marine casualty (LSMC):

Any marine casualty according to the above definition that cannot be classified as a VSMC, SMC or incident is classified as a less serious marine casualty. This sometimes leads to classifications that are difficult to understand in terms of wording. While the grounding and subsequent tug-assisted re-floating of a commercially used sailing yacht must be classified as a serious marine casualty by law, an occupational accident resulting in the paralysis of a crew member is initially 'only' a less serious marine casualty, even though the consequences are far more severe. This 'imbalance' has already been resolved internationally by removing the distinction between serious and less serious marine casualties through the complete elimination of the serious marine casualty. The adopted revision of the European Directive is now consistent with the IMO. It still has to be transposed into German law.

Incident (I) (as defined above). This also includes minor accidents or malfunctions which have not caused significant damage and therefore cannot be classified as an LSMC, but which did endanger a ship, her crew or the surrounding area (environment/traffic). Since incidents are not categorised as a marine casualty according to the IMO Code³⁴, they are shown separately in the statistics section.

Other casualties or incidents (OCI) are all other cases that were reported to the BSU's but outside its statutory responsibility. By definition, this also includes the cases defined in Section 1(4) in conjunction with points 2 and 3 of Section 1(3) SUG, i.e. accidents involving only recreational craft used privately or small fishing vessels. Such accidents are not marine casualties under international law but the BSU may still investigate them when certain conditions are met.³⁵ However, the corresponding classification as an OCI remains.

Since the BSU does not investigate accidents involving privately used recreational craft on the basis of international rules but rather only in exceptional, duly substantiated cases, these and other accidents classified as an OCI are not recorded in the database. Accordingly, the statistics section only provides information on such accidents in exceptional cases.

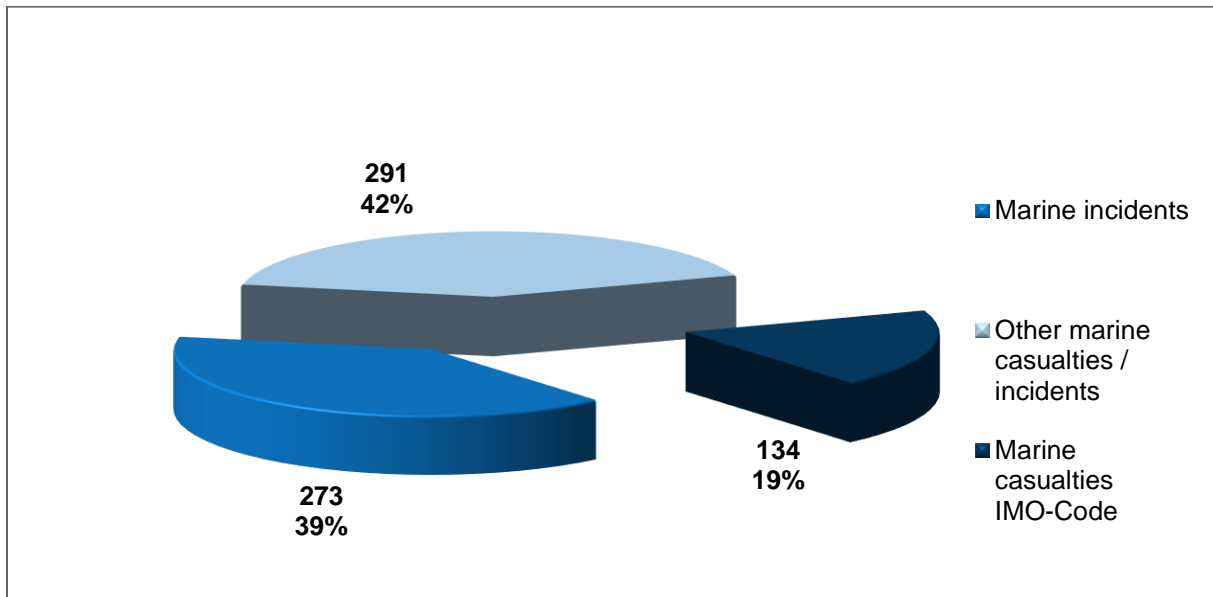
6.2 Notifications received

It must be stated here that all incidents reported to the BSU by official bodies that could at least potentially pose a threat to maritime traffic are considered in these statistics, regardless of whether or not the BSU is responsible.

³⁴ IMO Resolution MSC.255(84), the Casualty Investigation Code.

³⁵ See also the explanatory notes at point 1 of this annual report.

Graph 3: Global reporting 2023



The total number of notifications has risen sharply year-on-year: 698 in 2023 compared to 659 in 2022. This represents an increase of almost 6%. Slight year-on-year fluctuations can be seen in the two 'main categories'. In the case of marine casualties according to the IMO Code, there was a significant increase of more than 10% (120 to 134) and in the case of incidents, a slight reduction (294 to 273). However, the increase in global reporting is mainly due to the rise in the number of OCIs reported, i.e. cases for which the BSU is not responsible or that do not constitute an accident (237 to 291). This alone includes 20 notifications concerning vessels that could not be reached on the local radio channel 80. The total number of actual accidents has remained almost identical: 414 in the previous year to 407 in 2023.

The development of global reporting to the BSU is as follows:

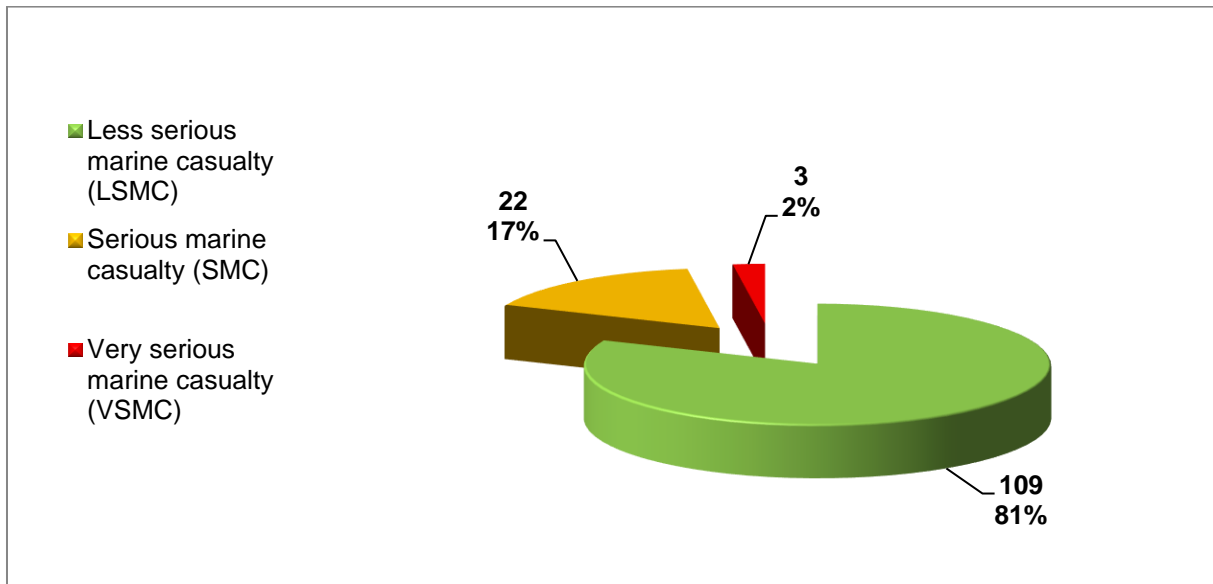
Table 4: Global reporting since 2018

	2018	2019	2020	2021	2022	2023
OCI/NC	191	219	249	247	237	291
Incidents	274	250	244	280	294	273
Marine casualties	112	112	109	132	120	134
Total	577	581	602	659	651	698

6.3 Marine casualties

Let us begin with the differentiation within the 'Marine casualty' category. The following statistics concern all the cases which fall within the BSU's area of responsibility, i.e. not only the German-flagged seagoing ships.

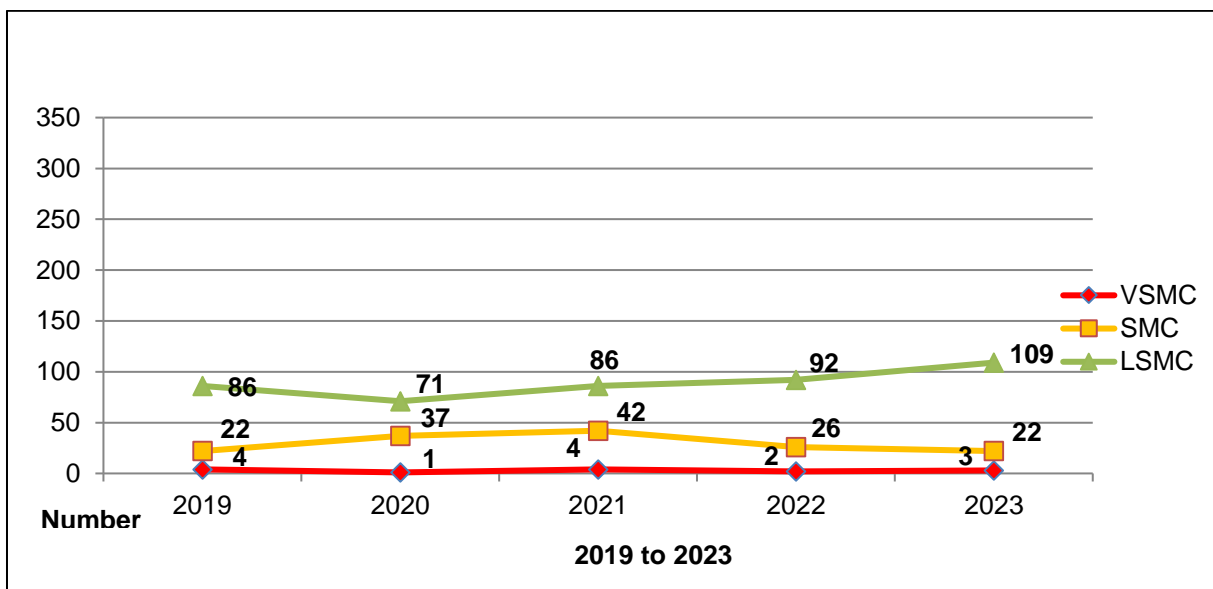
Graph 4: Marine casualties according to the IMO Code in 2023



There were changes here compared to the previous year. LSMCs have increased from 92 to 109 cases, SMCs have dropped from 26 to 22 cases and VSMCs have increased from two to three cases.

The following graph shows the trend over the past five years.

Graph 5: Comparison of marine casualties from 2019 to 2023



The figures for 2023 as compared to those for earlier years demonstrate that it was a relatively busy year for accidents. Although the figures regularly fluctuate a little, such a significant increase was not expected.

The number of fatalities and missing persons on **commercial vessels** has risen sharply compared to previous years. However, this is only based on two accidents – with the VERITY and POLESIE collision alone accounting for five seafarers. The number of people injured has once more increased. A total of 40 people were reported injured in marine casualties.

In contrast, the number of fatalities in **recreational boating** has fallen again. For example, there were two fatalities in 2020 and one in 2021. There were three in the previous year, which means that the number is as high as in earlier years, with the exception of last year.

Table 5: Number of deceased/missing and injured people from 2016 to 2023

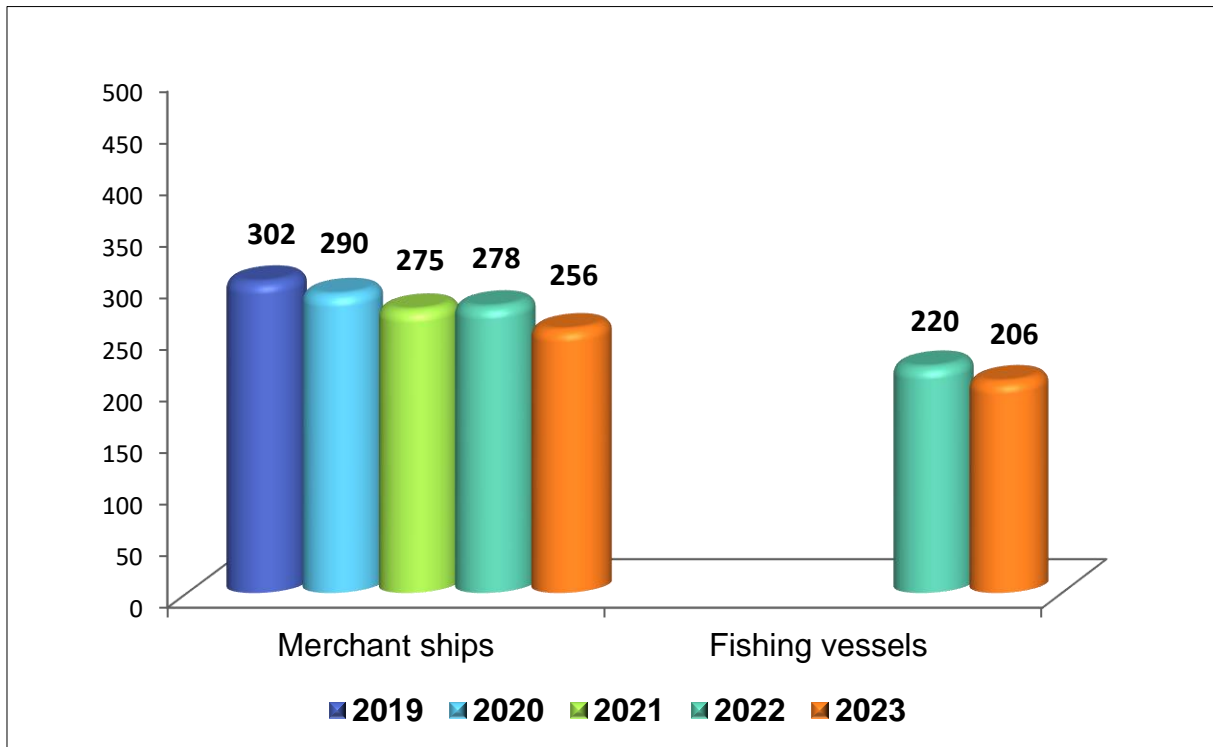
	2016	2017	2018	2019	2020	2021	2022	2023
Deceased/ missing	5	4	2	2	1	2	2	6
Injured	60	51	31	36	24	21	33	40
Deceased/ missing (recreational craft)	4	2	1	4	2	1	8	3

6.4 Ships flying the German flag³⁶

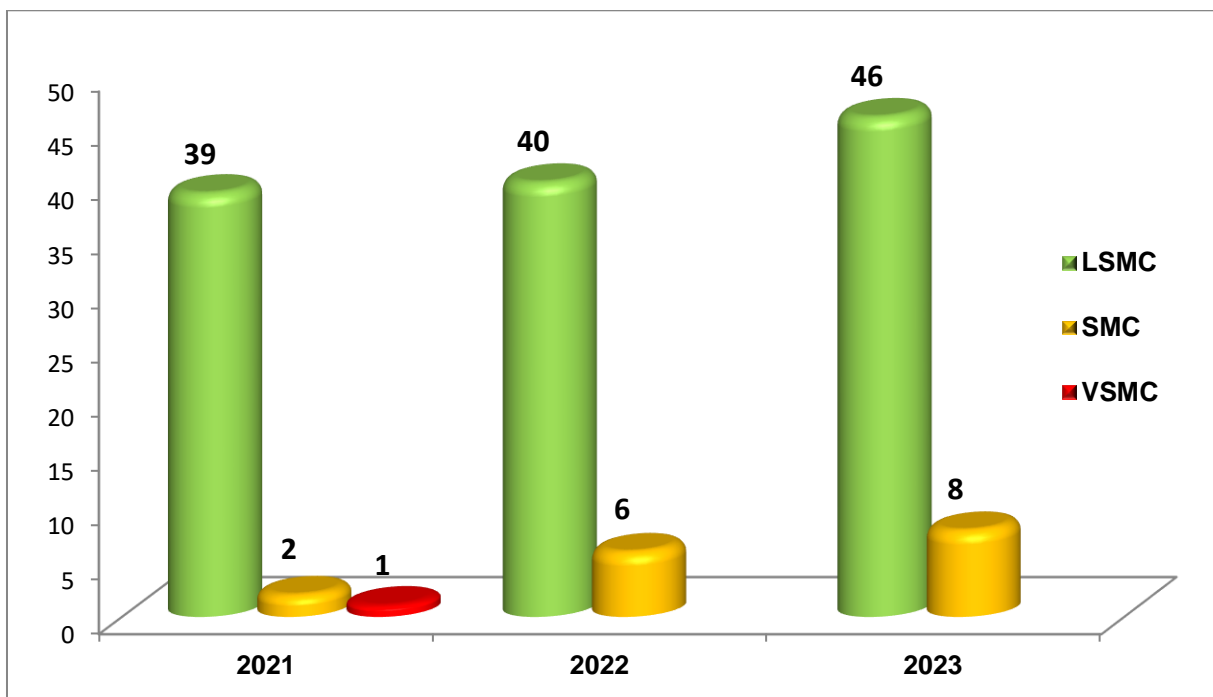
The number of commercial vessels registered under the German flag has once more contracted and now stands at 256, which is 22 units (or about 9%) fewer than in the previous year. The number of seagoing fishing vessels also fell by a similar amount from 220 in the previous year to 206 in 2023.

³⁶ Source (commercial vessels): Federal Maritime and Hydrographic Agency. Source (fishing vessels): Federal Office for Agriculture and Food.

Graph 6: Development of ships flying the German flag



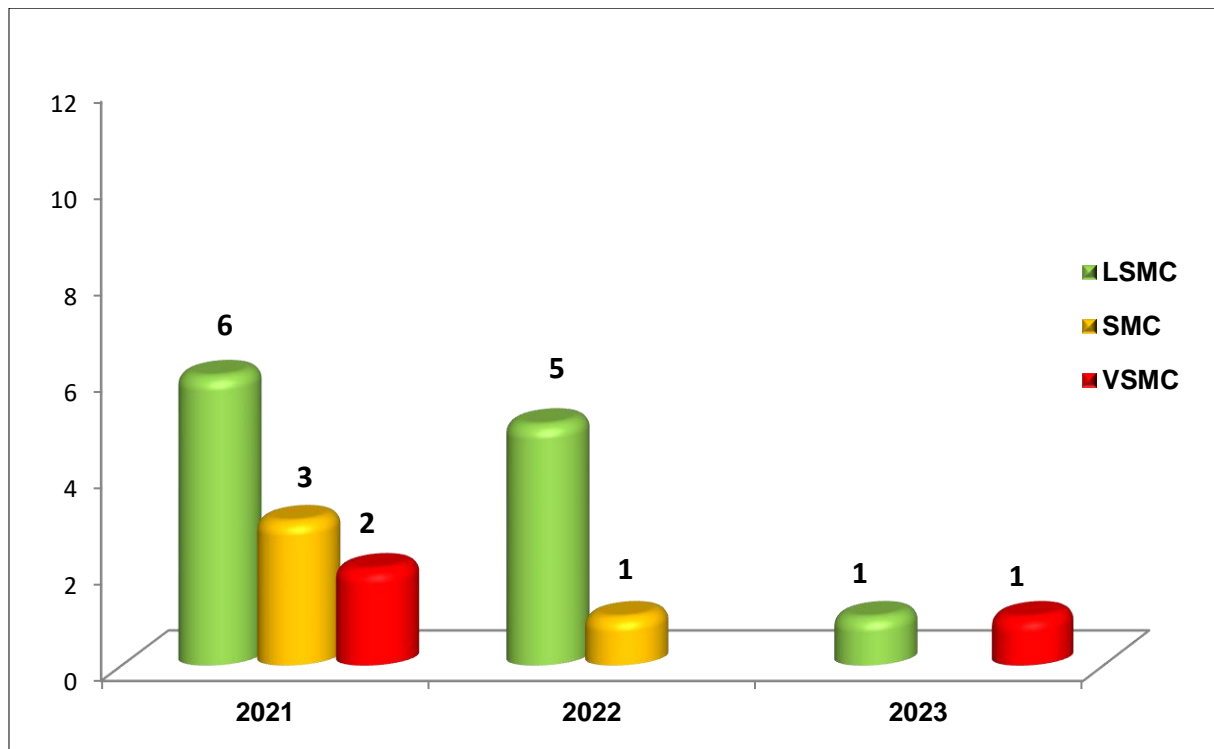
Graph 7: Marine casualties on commercial vessels flying the German flag



A total of eight more marine casualties occurred on commercial vessels flying the German flag in 2023 than in the previous year and 12 more than in 2021. Although there were no very serious marine casualties on German-flagged commercial vessels

last year, the trend does seem to be rising, which is not really consistent with a contracting German merchant fleet.

Graph 8: Marine casualties involving German seagoing fishing vessels



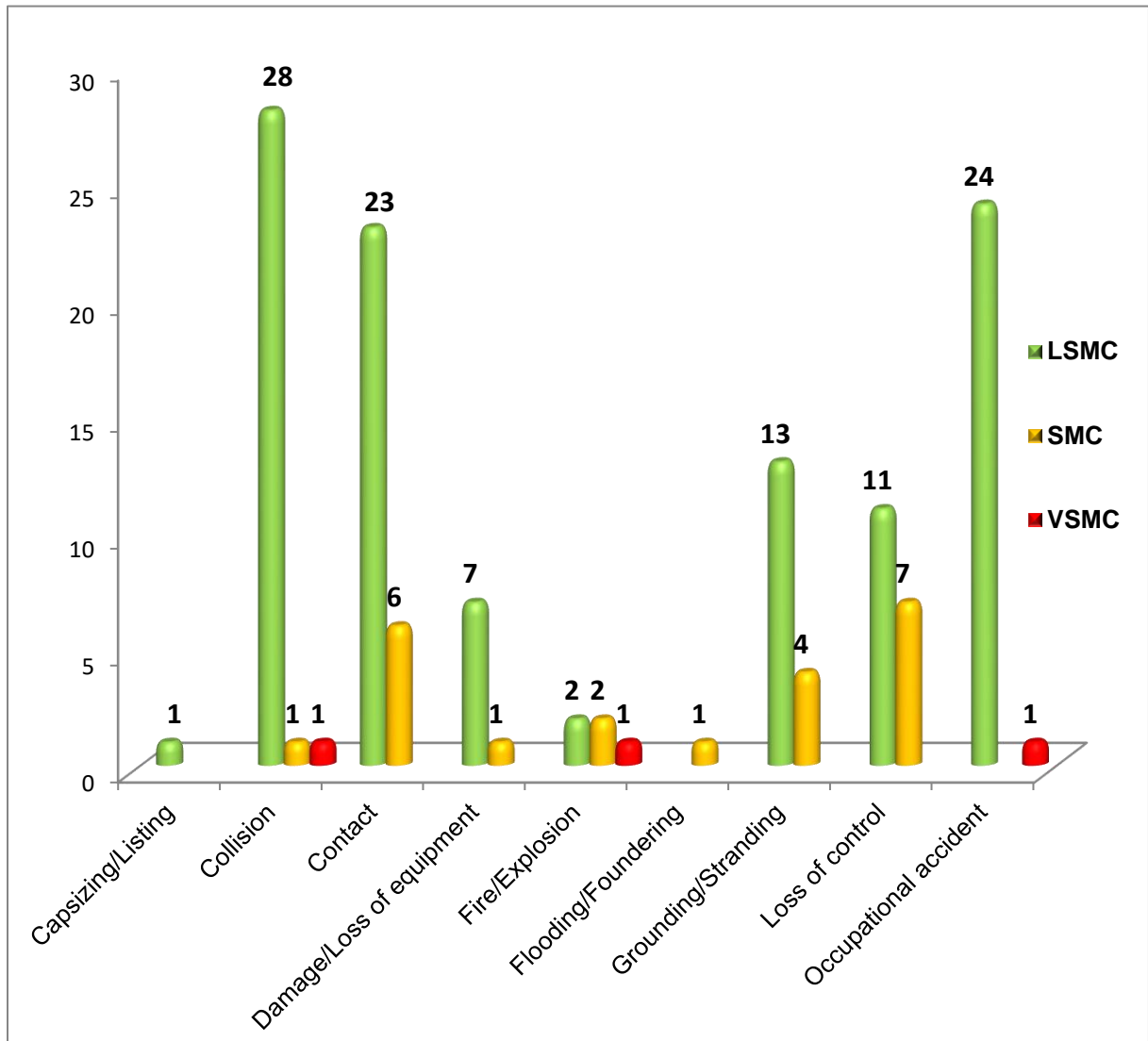
Fishing vessels have seen changes for the better. Although there was another very serious accident in 2023, the foundering of the WOTAN, the figures are at a historically low level overall, with only two accidents. For comparison, there were 11 accidents two years ago. Long may it continue.

6.5 Distribution by kind of accident and type of ship

Collisions, allisions and accidents involving people were once more the most common kinds of accident in 2023. The three serious marine casualties are spread across three different categories – no main focus can be identified here. In the case of serious marine casualties, engine damage leads the way. This is usually because the ship is subsequently in distress and requires active support from external bodies. Allisions are in second place. Classification as a serious marine casualty is usually the result of considerable material damage combined with e.g. water ingress – as in the case of the PETRA L³⁷.

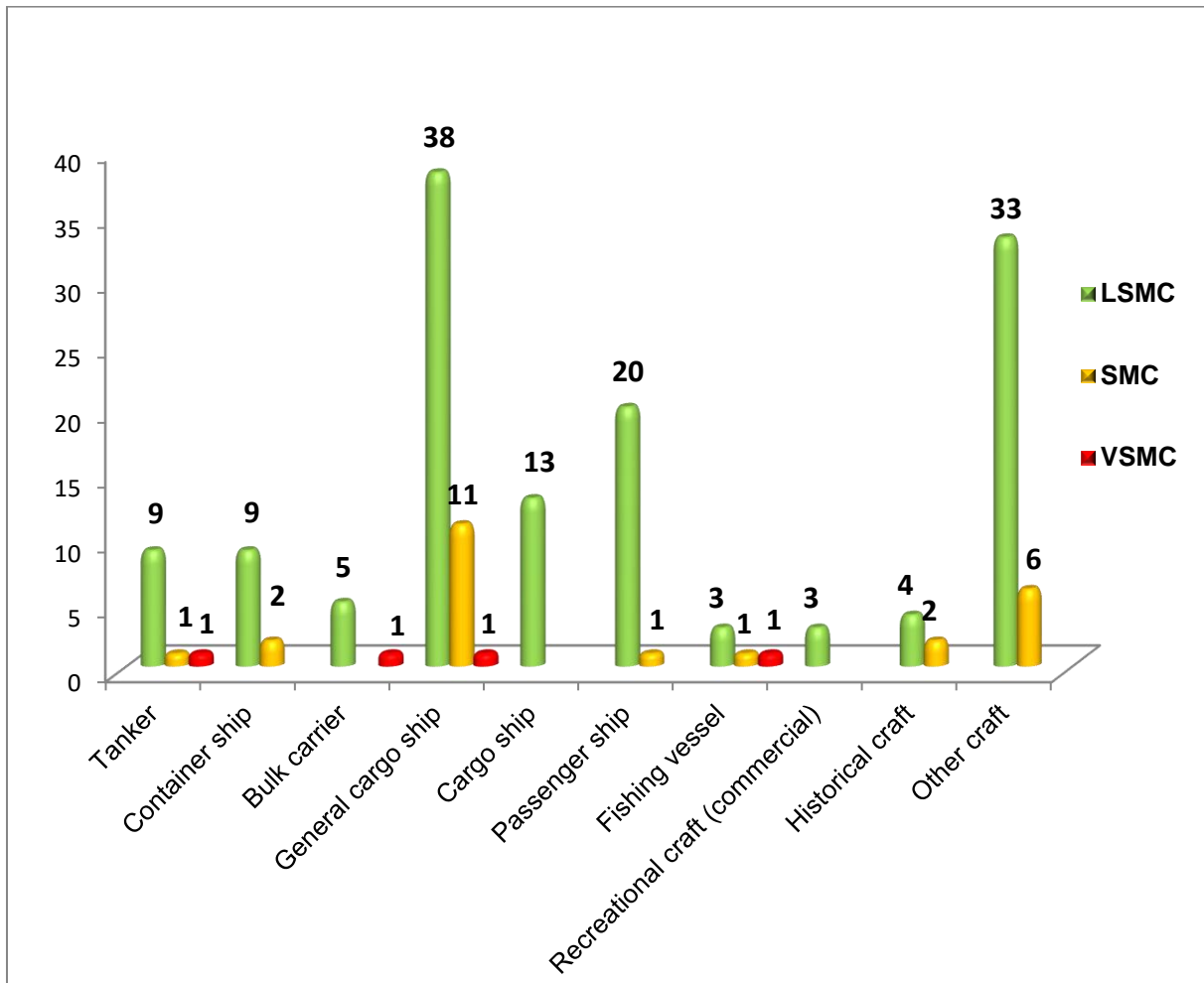
³⁷ See point 2.2 of this annual report.

Graph 9: Distribution by the various kinds of accident



In the following overview of the distribution by type of ship, the figures do not correspond to the accident figures. This is because the affected ships are counted here. For example, a collision is only one accident but at least two ships are involved in it. This becomes clear in the case of very serious accidents. Here, four ships appear at once. However, in the case of the VERITY/POLESIE collision, both ships receive a corresponding entry. Once as a bulk carrier (POLESIE) and once as a general cargo vessel (VERITY). Accordingly, please do not be surprised if the following figures appear higher than the previous ones – because they actually are.

Graph 10: Distribution of accidents between the different types of ship



General cargo vessels once more lead the way in distribution by type of ship. Moreover, the figures are almost the same as in the previous year (48 to 49). This is followed by other vessels. There was a considerable increase in the figures here (21 to 39). 'Others' are the ship types covered by the SUG that have yet to be mentioned, such as tugs, pilot boats, offshore supply vessels, etc. The number and traffic have increased significantly here, especially in the offshore sector, which also has an impact on accident frequency. 'Cargo ships' are those ships that cannot be classified under the previously mentioned container, bulk or general cargo ship categories, such as ro-ro cargo ships or car carriers, for example.

6.6 Causes of the marine casualties

We now move on to the causes. The BSU does not classify every accident only according to LSMC, SMC or VSMC, but also decides according to cause. The following categories are available to the BSU for cause assignment:

Table 6: Technical causes

No	Occurrence / technical – T –
1	Damage to / breakdown of main engine ³⁸
1.1	Damage to / breakdown of auxiliary machinery
1.2	Damage to / breakdown of electrical equipment
1.3	Damage / breakdown due to fuel / bunker issues
2	Damage to / breakdown of rudder or steering gear
2.1	Damage to / breakdown of rudder or steering gear due to failure of auxiliary machinery
2.2	Damage to / breakdown of rudder or steering gear due to failure of electrical equipment
3	Damage to equipment
4	Defective nautical equipment
5	Overall condition of the ship
6	Other technical causes
7	Failure of/defective lifesaving appliance(s)

Table 7: Human causes

No	Occurrence / human factor – HF –
1	Error in judgement
2	Improper ³⁹ communication
3	Simple navigational error
4	Poor navigation
5	Misjudgement of right of way
6	Misjudgement of pilot/VTS
7	Under the influence of alcohol
8	Insufficient occupational safety
9	Improper speed
10	Fatigue
11	Operating error
12	Other human causes

Table 8: Caused by hazardous material

No	Occurrence / hazardous material ⁴⁰ – HM –
1	Leaking gas / smoke
2	Damage to a transport unit
3	Spontaneous ignition of a (dangerous) cargo

Table 9: Cause other agents

No	Occurrence / other agent or vessel – AV –
1	Bad weather (as main cause)
2	Swell caused by passing ship

³⁸ If the cause cannot be classified under 1.1-1.3, then the entry is made in 1.

³⁹ Improper also means unsuitable, omitted communication or similar, for example.

⁴⁰ No dangerous material within the meaning of the IMDG Code.

3	Restricted visibility, weather-related or shore-based
4	Ammunition finding

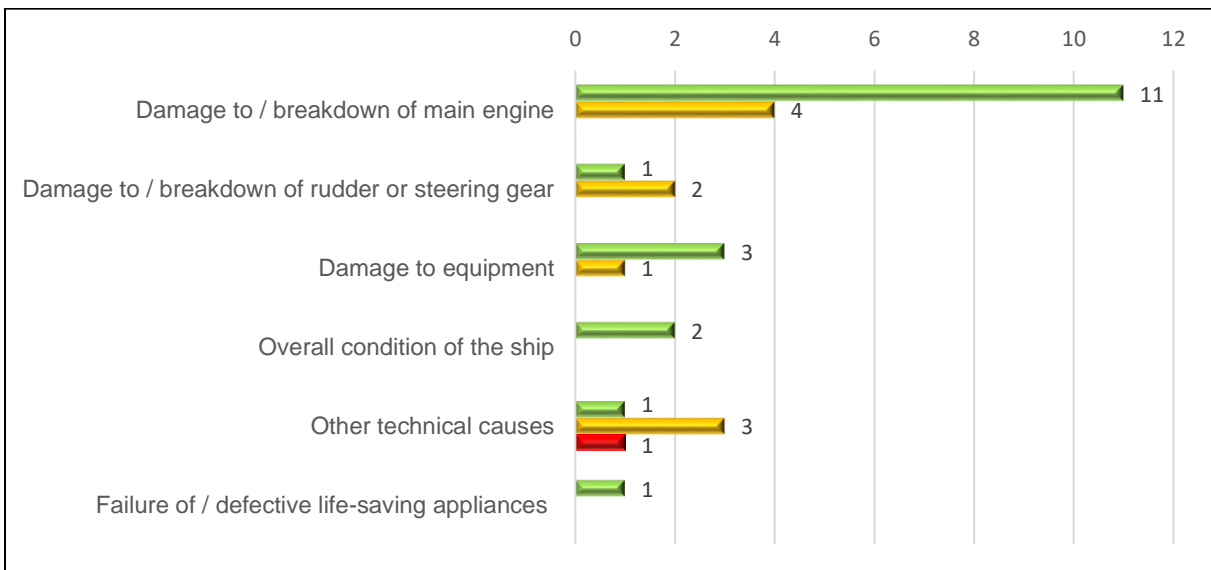
Table 10: Cause unknown

No	Occurrence / unknown cause – U –
1	Floating debris (unknown origin)
2	Other

As can be seen in the following graphs, human causes (so-called human factors or elements) are predominant in marine casualties according to the IMO Code, whereas technical causes are predominant in incidents. This can be explained by the fact that in the event of a technical error, people receive warnings from the system and can often take countermeasures to avert or at least mitigate damage. Of course, this is usually no longer possible in the case of a human error, as it takes a certain amount of time before people recognise they have made an error as such and then initiate necessary countermeasures. In this context, it seems all the more important to have well-developed communication and the principle of multiple control on board.

Specifically, the causes of **marine casualties according to the IMO Code** can be shown as follows⁴¹:

Graph 11: Technical causes

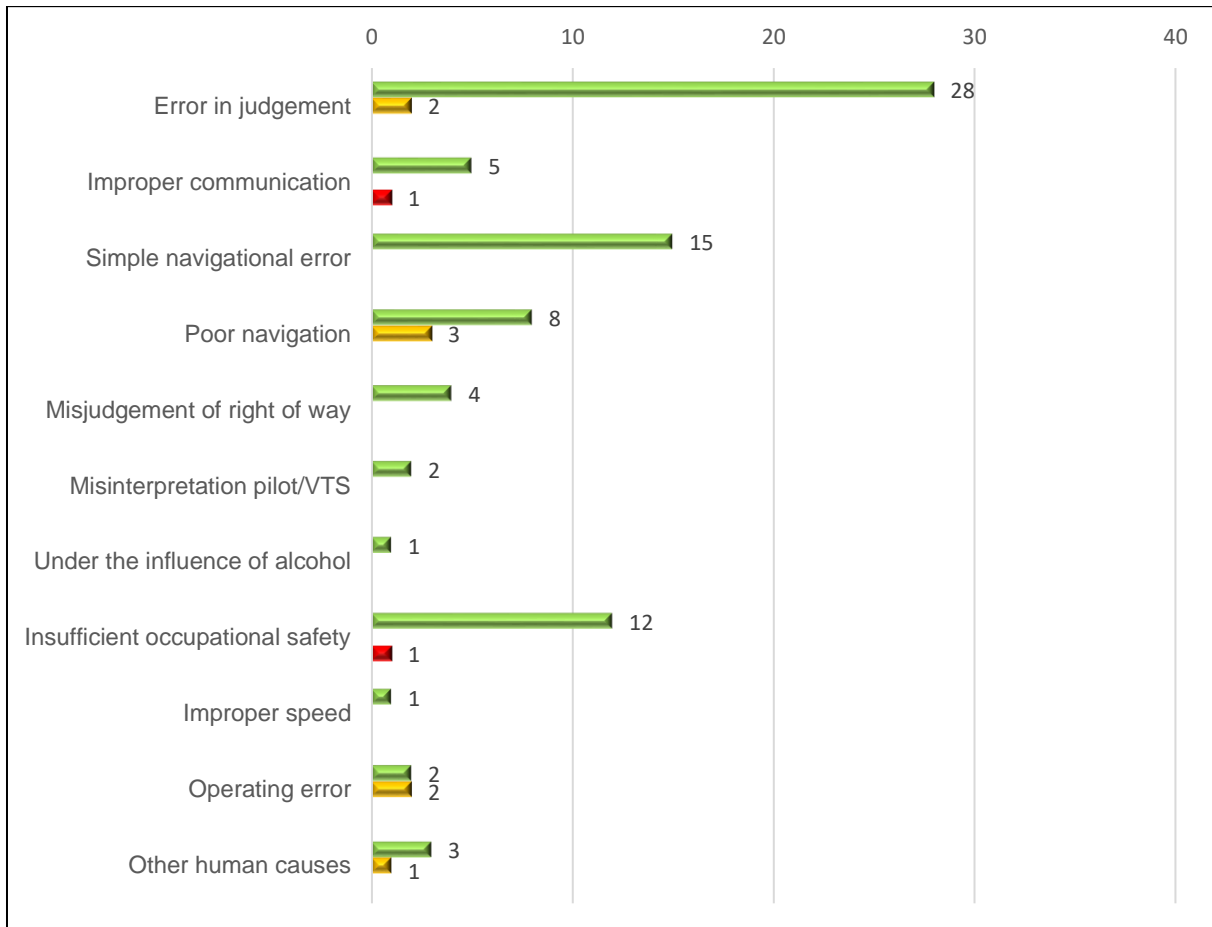


As is the case every year, the most common technical cause is damage to the main engine. Damage to the main engine or also to the rudder is often the cause of a serious marine casualty for purely statutory reasons and although this usually goes unnoticed by the general public and is without consequences, it is anything but harmless. The most common example here is a breakdown of the main engine causes a ship to run aground, a tug tows the ship back into the fairway and after repairs her voyage continues. Sounds harmless, and in most cases it is – but the potential danger can be extremely high if the ship cannot be towed free immediately, for example. Damage to

⁴¹ No reference means number = 0; the colour scheme is based on the one previously used (green = LSMC, yellow = SMC and red = VSMC).

the main engine and rudder was not differentiated further due to the low number of cases.

Graph 12: Human causes

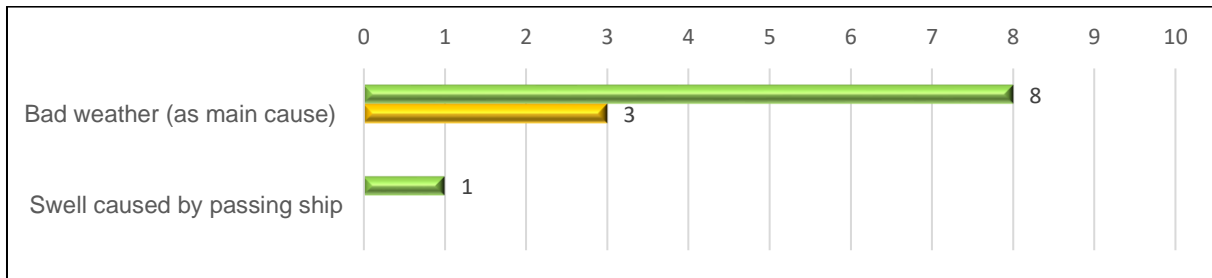


The accident causes attributable to human error in 2023 were once more predominantly 'Error in judgement' and 'Simple navigational error'. The former is often the typical misjudgement or momentary lapse, while the second cause speaks for itself. Accidents due to a lack of occupational safety are also extremely common again, in most cases 'only' resulting in injury, but in one case with fatal consequences. We regret to say that fatalities due to non-compliance with health and safety regulations are a regular occurrence every year.

With regard to the other accident causes, only 'bad weather' is relevant. Having said that, bad weather actually led to three serious accidents⁴².

⁴² Other causes have not been presented here further because of insufficient case numbers.

Graph 13: Other agent or vessel

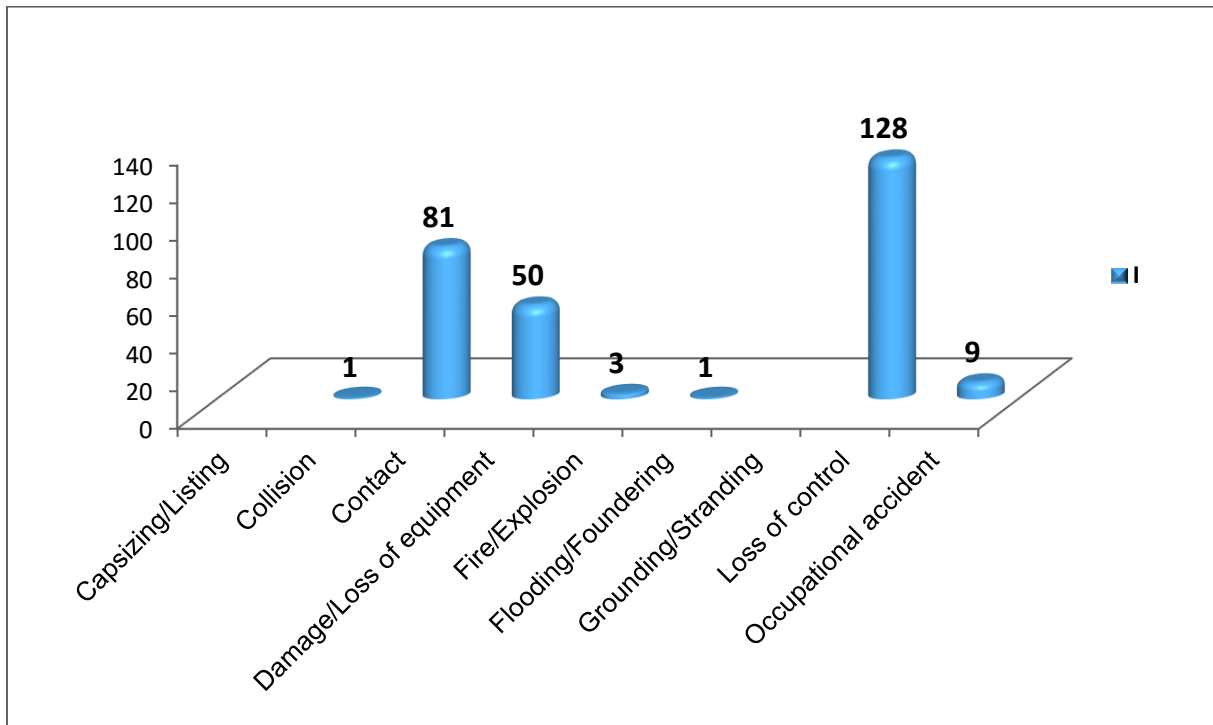


6.7 Incidents

Although it is inherent in incidents that their consequences are not serious, they also pose a threat to safety. They are the cases that appear in the BSU's reporting list by far the most frequently. There were 273 incidents in the past year, i.e. more than twice as many as all the other marine casualties combined. Incidents account for about 40% of all reports, while marine casualties account for just short of 20%. With regard to incidents, a high number of unreported cases must also be assumed. We are talking about near-misses. These near-misses, which should actually be reported by law, are in the vast majority of cases not reported at all – neither to the ship's command nor by the ship's command to shore-based authorities like the WSP or BSU. The person involved in the near-miss thinks: "That was lucky!" or "Nobody saw it." Near-misses are unknown to the BSU and therefore not included in these statistics. Yet there are many lessons to be learned from these very situations. Accordingly, I can only urge you to report such events, too.

As usual, damage to the main engine or to the rudder, which normally has no consequences and, by definition, is therefore not a marine casualty according to international regulations, is the most common kind of event. The same applies to allisions, i.e. contacts or other minor damage, which are also strongly represented. The loss of or damage to equipment is also not insignificant. The figures here have almost doubled. Other kinds of event are negligible because they are, by definition, mainly a marine casualty or substantial damage – which 'upgrades' the incident to a marine casualty – has been caused.

Graph 14: Distribution of incidents by kind of event



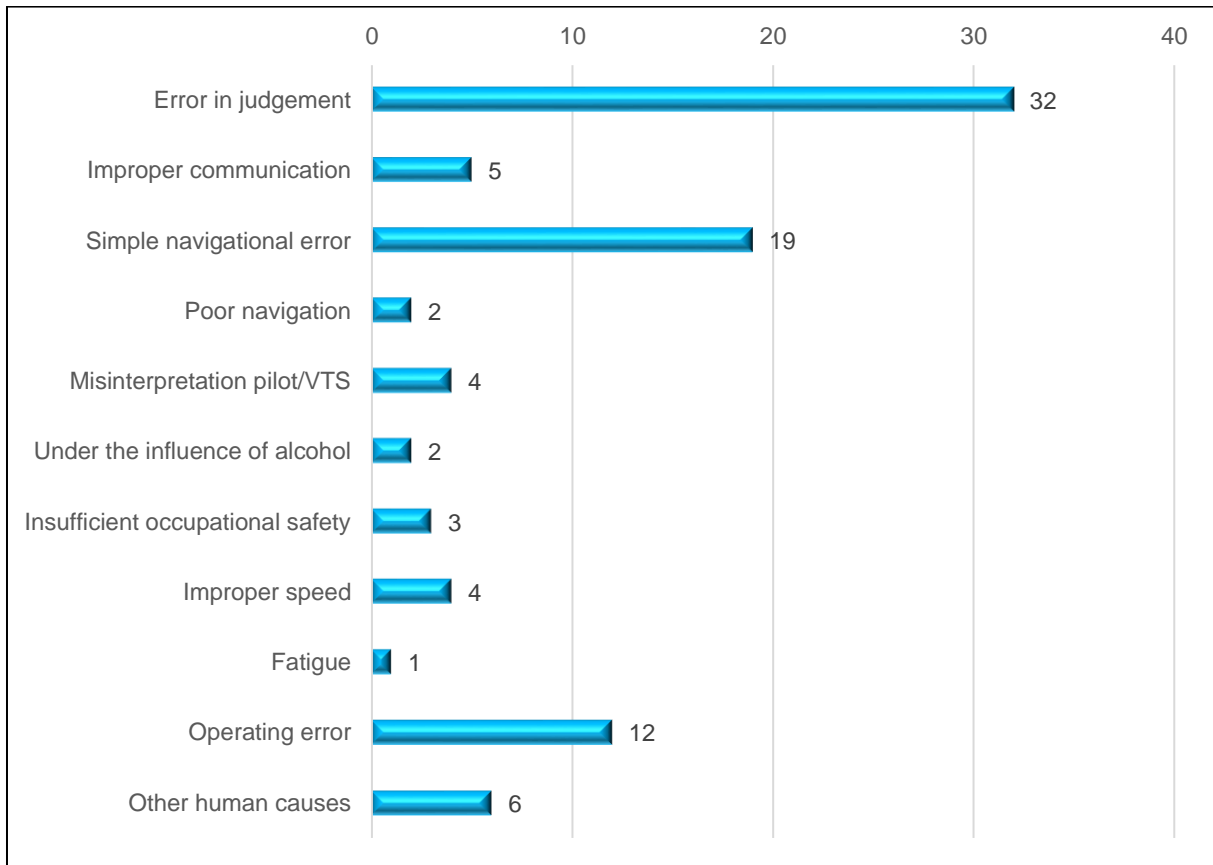
As with accidents, the BSU distinguishes between technical and human in the causes of an incident. However, they differ significantly from those of marine casualties because it is the technical causes that are predominant, as the below summaries will show. Breakdowns of the main engine or of the rudder, blackouts or misfires (108⁴³ cases or 40% of all incidents) are the predominant causes. The damage can usually be quickly repaired while the ship is anchored in a roadstead or drifting and the voyage then continues. Overall, the ratio between the human and the technical causes is almost one to two for incidents (153 to 90). Added to this are the 'Other' causes (especially bad weather, swell, or the intrinsically dangerous ammunition finding), however.

Incident causes can be summarised as follows⁴⁴:

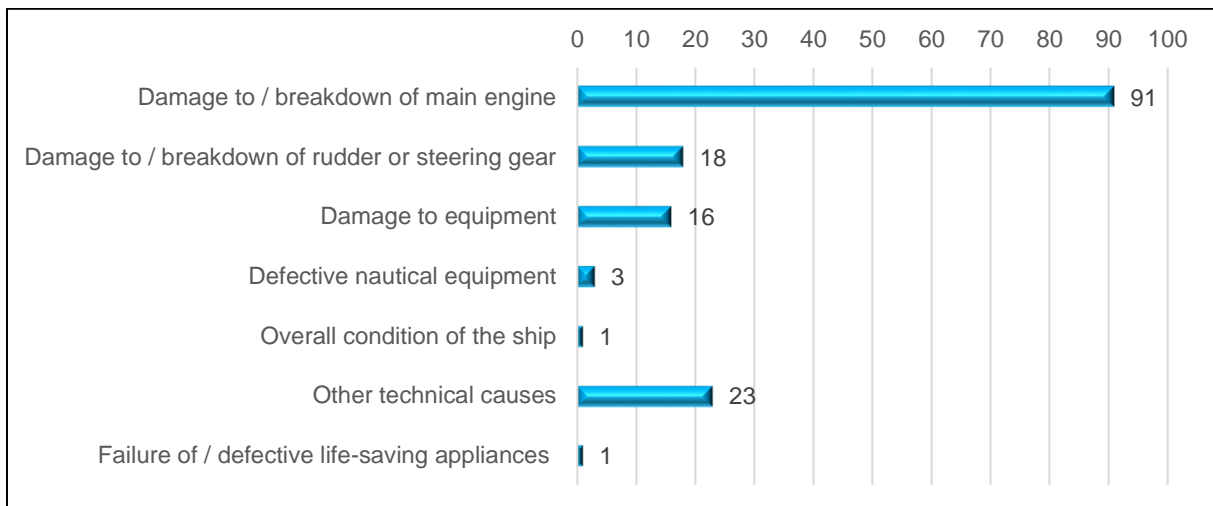
⁴³ This figure should not be equated with 'Breakdowns of the main engine or of the rudder' as a kind of event. One is the cause, the other the effect.

⁴⁴ The causes 'Unknown' (2) and 'dangerous goods' (2) have not been shown separately here because of insufficient case numbers.

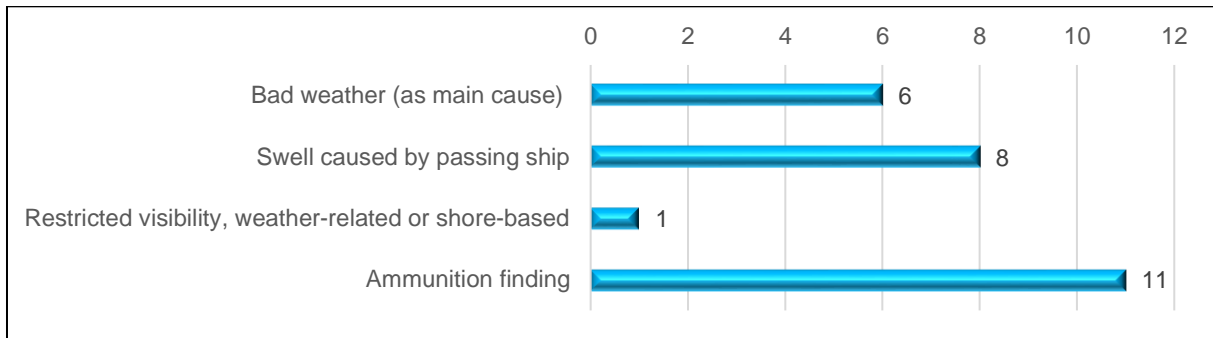
Graph 15: Human cause in incidents



Graph 16: Technical cause in incidents



Graph 17: Other agent or vessel



Finally, and for confirmation, an analysis of the accident causes on commercial vessels that led to personal injury. It becomes clear that human factors are usually decisive for such an accident situation here, too. In turn, almost half of the accidents involving personal injury on commercial vessels are due to inadequate occupational safety (15 out of 32). However, this is a broad field, which includes, for example, a lack of protective equipment, faulty procedures on board/in a company or also inadequate instruction, which have had a causal effect on an accident.

Table 11: Causes of personal injury accidents on commercial vessels⁴⁵

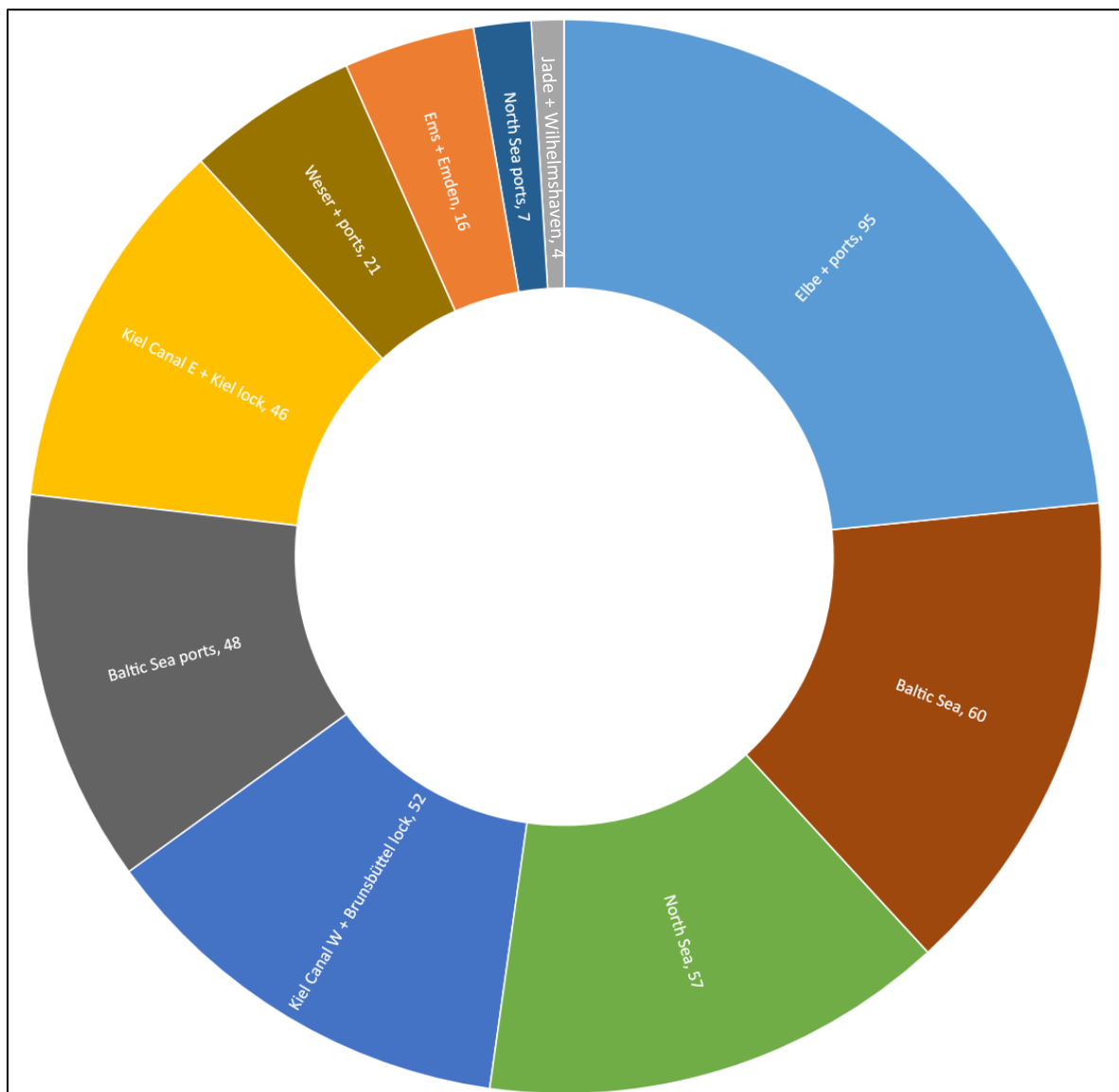
	Number of people injured (total)
Total	40
of which due to bad weather	1
of which due to technical causes	7
of which due to human causes	32
<i>of which due to insufficient occupational safety</i>	<i>15</i>

6.8 Distribution of marine casualties and incidents by sea area

Accidents and incidents are again combined in these statistics. After all, the formal classification of an incident does not determine whether a location is particularly dangerous. Please note that the graphs refer exclusively to **German maritime waters**, as not enough data are available for accidents on German ships in foreign waters and these would not be representative for an area. The following graphs explain the differences and specifics in German maritime waters.

Graph 18: Distribution of marine casualties and incidents by location

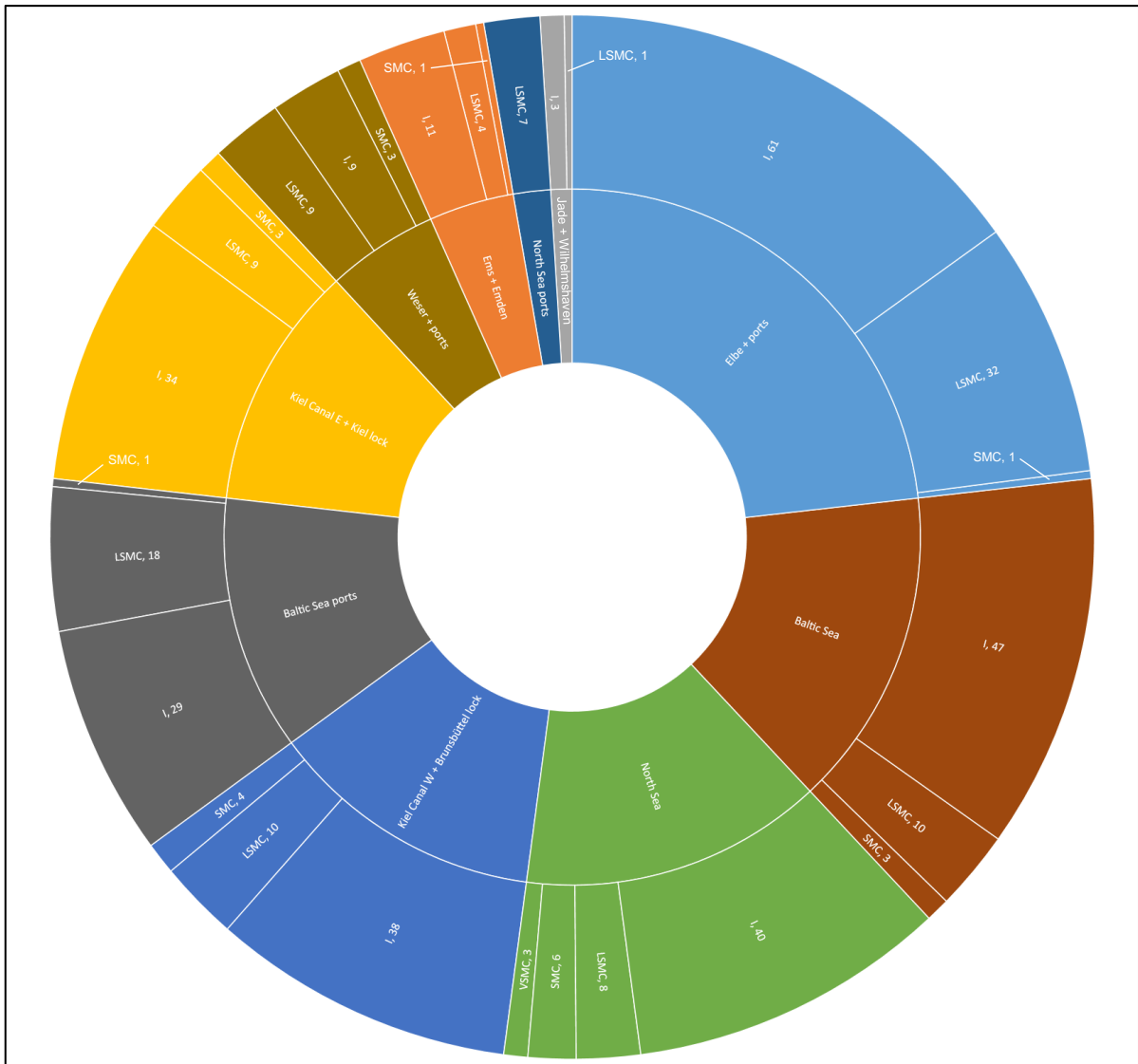
⁴⁵ The figure here differs from the figures for marine casualties according to international regulations and those for accidents due to insufficient occupational safety. However, the two facts are not in agreement. A marine casualty according to IMO regulations is only affirmed if there is an incapacity to work for at least 72 hours, while an injury is always affirmed if there was a physical impairment, regardless of severity.



The port of Hamburg and the River Elbe, as well as the Kiel Canal and its locks continue to be the most dangerous places for merchant shipping. This is still due to the fact that it concerns the busiest or also extremely narrow channels that offer little room for manoeuvring.

It is also worth taking a look at an analysis of the accident categories in connection with all locations, i.e. whether significantly more serious marine casualties occur in a certain area than somewhere else, for example.

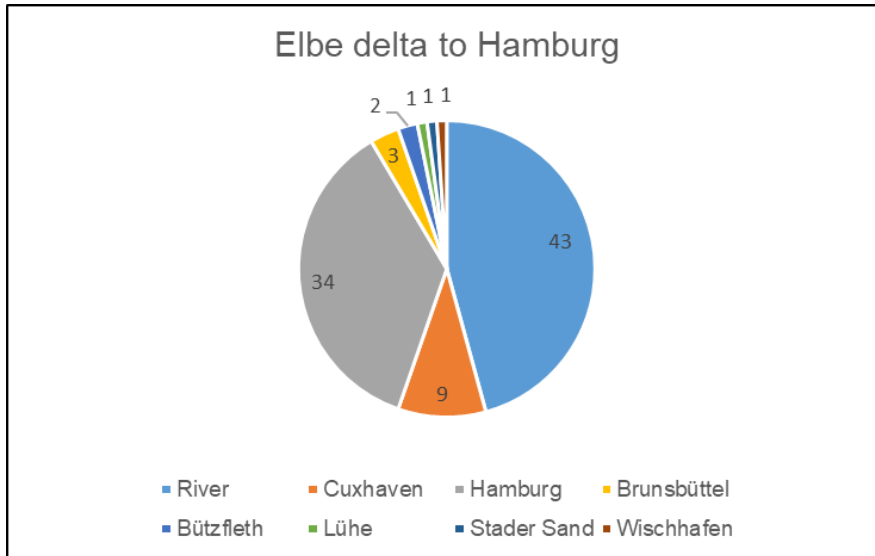
Graph 19: Distribution of marine casualties and incidents by German sea area



The graph shows that there are no specifics in the distribution by sea area and accident category. The incident is the most common category at every location. Unlike last year, marine casualties exhibit no particular trends this year. This may have something to do with the fact that the location does not play a role in many risks, e.g. fire, accident involving a person or damage to machinery.

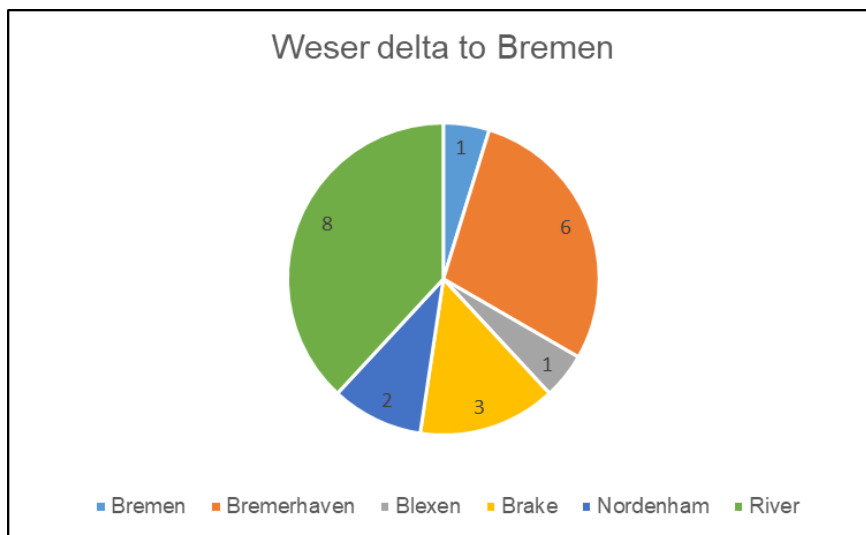
A more detailed distinction between the Elbe and Weser shipping routes in terms of port and route reveals the following picture:

Graph 20: Distribution on the River Elbe



This graph shows that most accidents occur where traffic is at its busiest (fairway of the River Elbe, ports of Hamburg and Cuxhaven). Hazardous local specifics that facilitate accidents cannot be identified here.

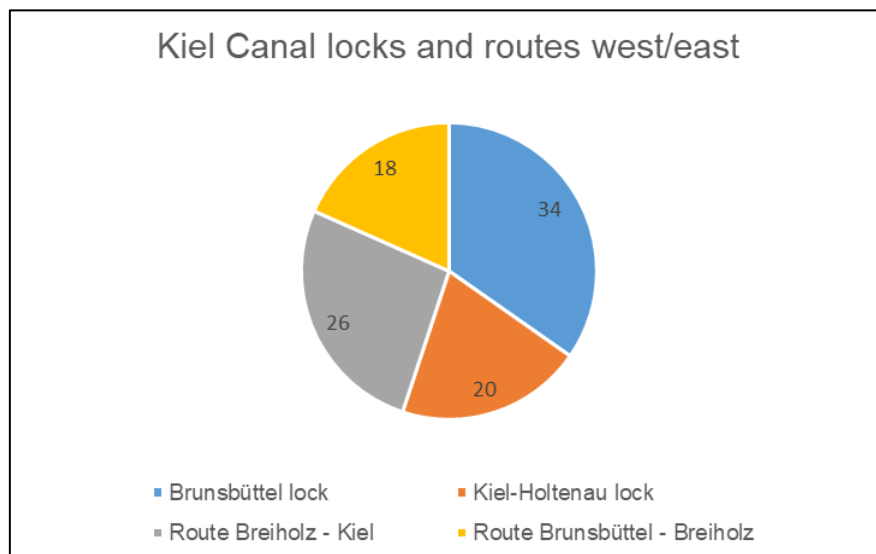
Graph 21: Distribution on the River Weser



As expected, the Weser fairway and Bremerhaven are also the most frequently affected. The fact that the port of Brake has more accidents than Bremen is due to the unfavourable currents that prevail there, especially at the pier.

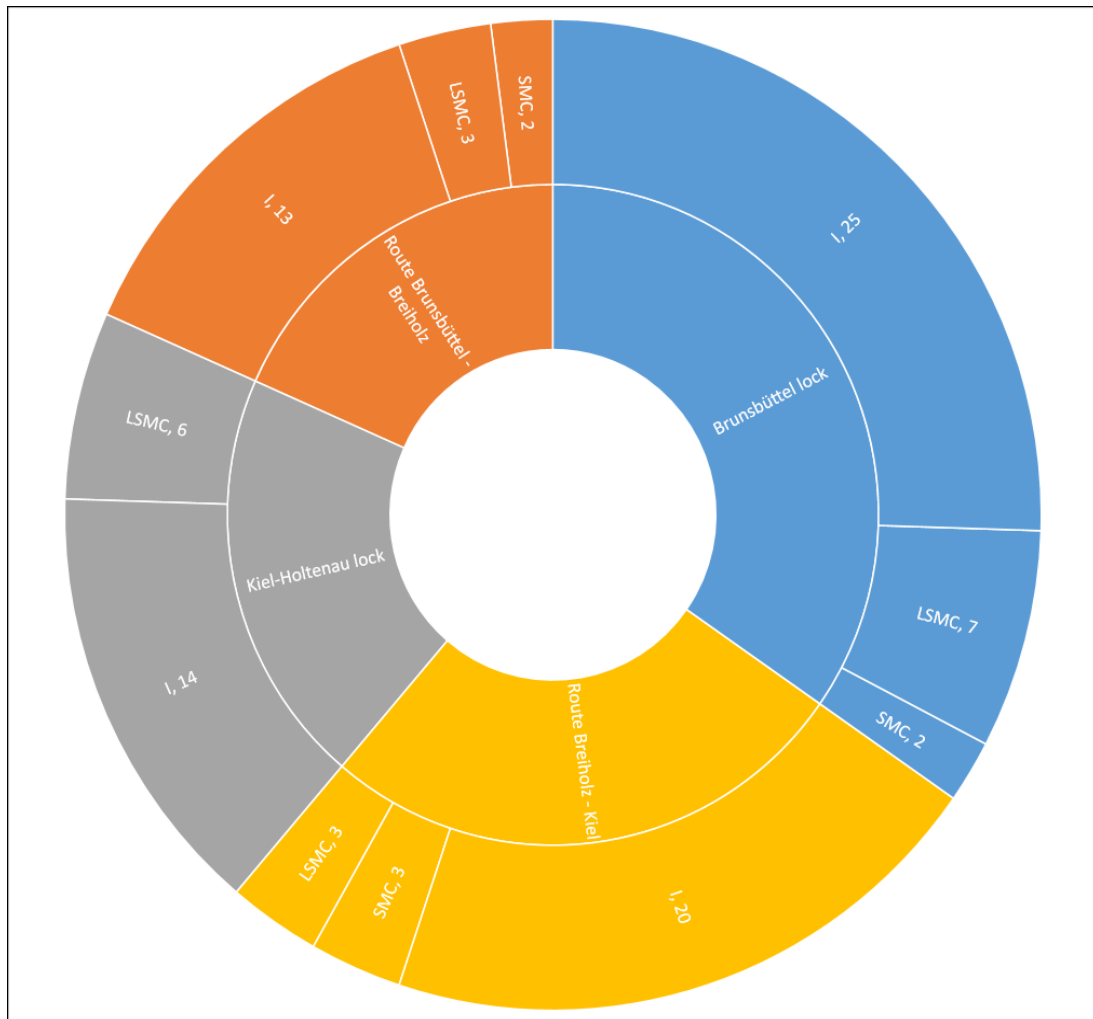
If the same analysis is applied to the Kiel Canal and a distinction is made between the two locks and the western and eastern stretches, the following picture emerges:

Graph 22: Distribution on the NOK



Most accidents occur in the lock at Brunsbüttel, as it is more difficult to enter than the one at Kiel-Holtenau due to the strong current in the River Elbe and the tide. On the other hand, there are more accidents along the stretches on the eastern side Breiholz to Kiel. This is due to the fact that development and the associated widening, including straightening bends, of the eastern stretch is not yet completed, meaning that the eastern stretch is more dangerous to navigate than the western stretch, which has already been widened.

Graph 23: The NOK broken down by accident category



There are no specifics when differentiating between accident categories on the NOK.

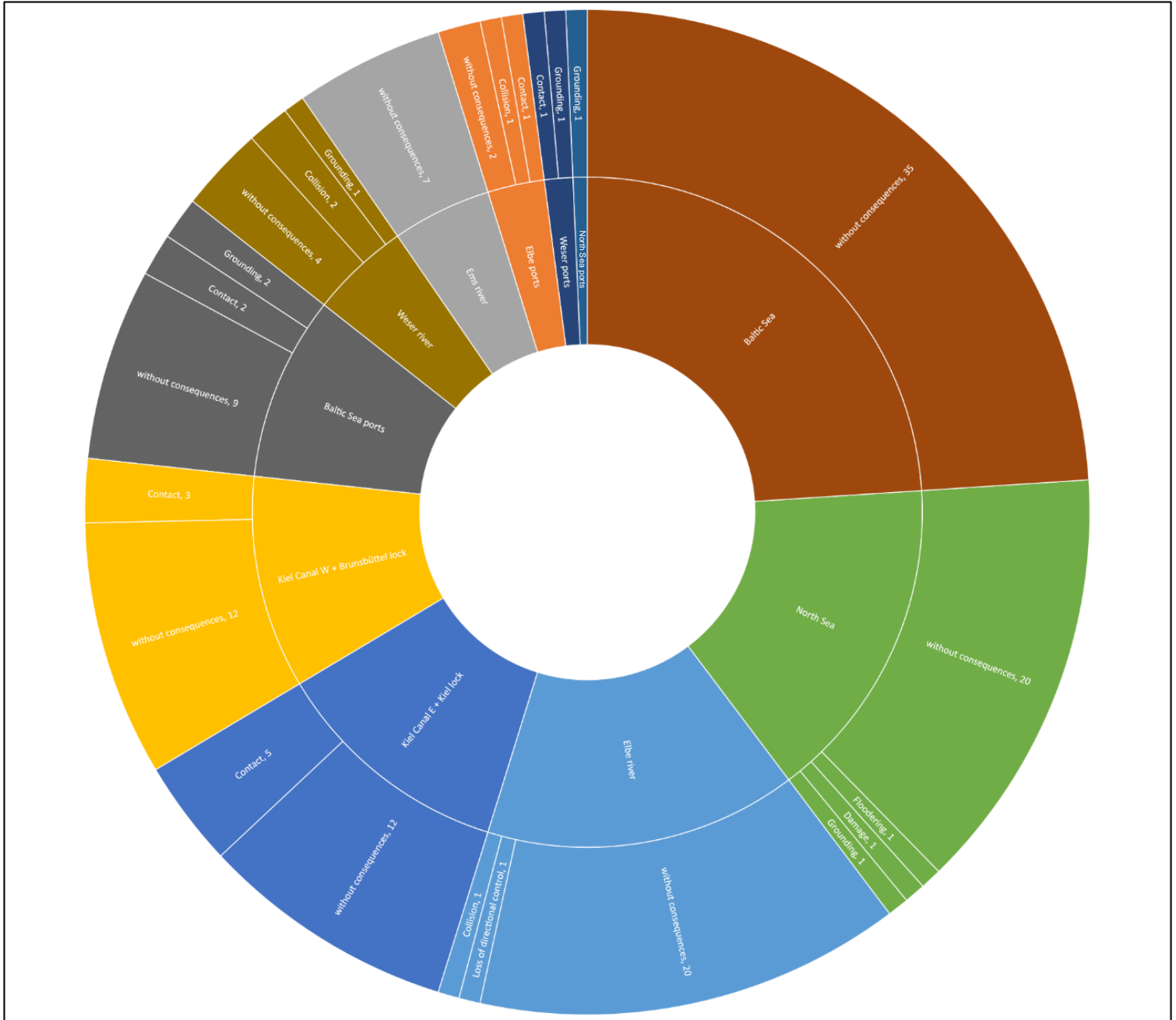
6.9 Consequences of an accident

The particular structure of the European Marine Casualty Information Platform (EMCIP) makes it possible to establish many more links between accidents and to better evaluate the consequences of an accident, or rather the consequences of an initial 'Accident event'. By way of example, the breakdown of a main engine leads to a grounding, which leads to damage below the waterline from which pollutants escape, which in turn leads to pollution. Alternatively, a fire leads to serious injuries to crew members, etc.

In particular, it is the breakdowns of a main engine or of a rudder (i.e. the loss of control of the ship) that can be linked to the scene of the accident which merit a closer look. Accident consequences are shown in the below graph by location. Not surprisingly, it can be seen clearly that any location where a ship has sufficient room to wait or drift and thus for repairs to be carried out – the North Sea, the Baltic Sea and their roadsteads – have no further consequences. However, in locations where space is confined and limited and there is no time or room to manoeuvre, the consequences can be severe and materialise extremely quickly. This is especially evident on the NOK,

in the river fairway or in the actual ports, where nearly one loss of control event out of three has further consequences, such as allision, collision or grounding.

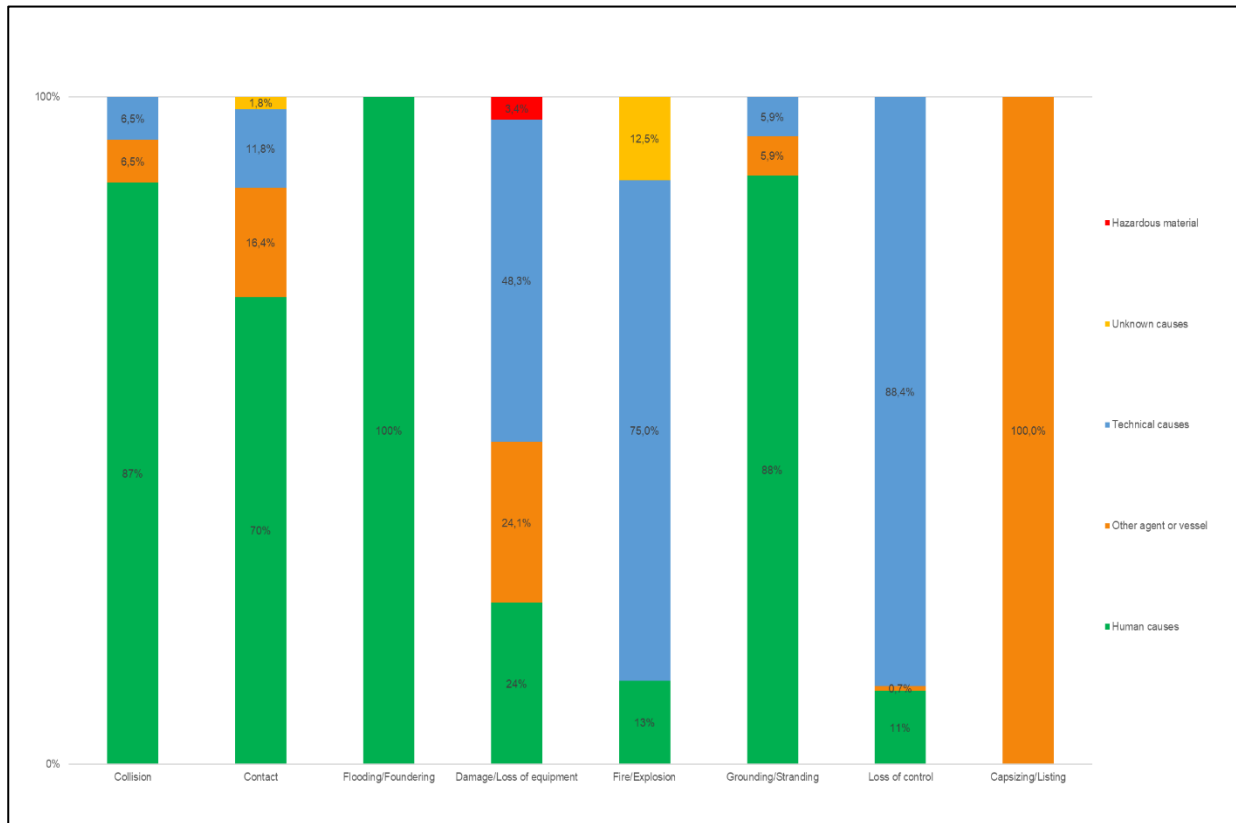
Graph 24: The consequences of a loss of control event by scene of accident⁴⁶



The actual consequences of each accident cause can also be determined. The divergent influence of human and technical causes is clearly evident here. While the consequences of grounding, allision or collision are usually due to human error, losses of control are usually caused by a technical failure.

⁴⁶ This graph should be enlarged when viewed.

Graph 25: Consequences of an accident and its causes



6.10 Investigation reports published and lessons learned

It is appropriate to close the statistics section and thus also this annual report with the summaries of the published investigation reports (including interim), as well as the lessons learned. The BSU published 15 investigation reports in 2023. They include eight interim reports (*in italics*).

Table 12: BSU investigation reports published in 2023

No	Published on	Report number	Description of accident
1	01/02/2023	37/22	<i>Grounding of the MUMBAI MAERSK while entering the Weser fairway on 2 February 2022</i>
2	24/02/2023	138/22	<i>Person over board resulting in fatality on board the sailing yacht SPEEDY GO on the Flensburg Firth on 8 April 2022</i>
3	15/03/2022	300/21	Fire in the engine room with subsequent foundering of the fishing vessel FREYJA in Schleswig-Holstein's Wadden Sea during the night of 17 to 18 September 2021
4	21/03/2022	97/22	<i>Collision between the PAIVI and the BJOERKOE in the Kiel Canal on 29 March 2022</i>
5	29/03/2022	108/22	<i>Cargo fire on the LASCOMBES in the connecting port of Bremerhaven on 1 until 11 April 2022</i>
6	05/05/2023	6/22	Serious accident involving a person while a mooring line was being handled on the tug ZP BOXER in the port of Hamburg on 4 January 2022
7	25/05/2023	236/20	Fire in the main engine's scavenging air duct on board the EBBA MAERSK on 29 July 2020
8	01/06/2023	138/22	<i>Person over board resulting in fatality on board the sailing yacht SPEEDY GO on the Flensburg Firth on 8 April 2022</i>
9	19/07/2023	343/22	<i>Allision with the Old Kattwyk bridge by FAIRPLAY 82 on 21 July 2022</i>
10	02/08/2023	380/22	<i>Fatal occupational accident on board the bulk carrier PETER OLDENDORFF in the port of Mukran on 3 August 2022</i>
11	30/08/2023	359/22 and 513/22	Less serious accidents involving a person on board the ROBIN HOOD in the Baltic Sea on 19 June 2022 and on 26 June 2022
12	15/11/2023	284/21	Allision with a pier involving the use of an automatic steering control system by the motor yacht SANTA CECILIA in the port of Hamburg on 5 September 2021 as well as four other accidents of recreational craft in conjunction with automatic steering control systems
13	30/11/2023	582/22	<i>Allision of a mobile harbour crane, transported on the heavy-lift vessel MERI, with two overhead</i>

			<i>bridge constructions crossing the Kiel Canal on 30 November 2022</i>
14	08/12/2023	600/22	<i>Grounding of the PARANA on the Ems on 9 December 2022</i>
15	20/12/2023	343/22	Allision with the Old Kattwyk bridge by FAIRPLAY 82 on 21 July 2022

The BSU also published two lessons learned:

Table 13: Lessons learned

Cons. No	Date	Kind of accident	Description of accident
15	22/06/2023	Accident with subsequent loss of life	Very serious marine casualty – death of the skipper of a sailing yacht after falling overboard
16	05/12/2023	Collisions, etc.	Various accidents involving recreational craft when using an autopilot
