BSAFE

INCIDENT CASE STUDY

No.28 | SEPTEMBER 2025

ALLISION WITH PIER AND DRY DOCK BY CAR CARRIER

ON 13 MARCH 2021, THE MOORING ROPES OF A CAR CARRIER MOORED AT THE PORT OF BREMERHAVEN PARTED. AT THE TIME OF THE INCIDENT, THE WIND WAS BLOWING OFF THE BERTH, GUSTING UP TO 50 KNOTS (KTS), AND THE SHIP SUBSEQUENTLY DRIFTED WITH THE WIND IN AN UNCONTROLLED MANNER. THIS INCIDENT CAUSED IMPACT DAMAGE TO THE SHIP, BERTH, AND A NEARBY FLOATING DOCK.

INCIDENT OVERVIEW

BACKGROUND OF SHIP AND VOYAGE DETAILS

The 72,708 gt car carrier, built in 1996, had a length of 264.6m and was sailing under the flag of the United States. The ship was in ballast condition and had moored starboard alongside on 9 March 2021, with the stern ramp deployed on the quayside. The mooring configuration initially consisted of four head lines, four stern lines, and two spring lines forward and aft. On 11 May 2021, gale force winds of Beaufort (Bf) Scale 7–8 with heavy squalls (Bf 10) were encountered from a west-south-westerly direction. During this period of adverse weather, the ship was successfully held in position utilising tugs.

SUMMARY OF THE INCIDENT

On the day of the incident, the forecasted wind was south-westerly, Bf 5–6, later increasing to westerly, Bf 7–8. In view of the forecast, the Master had one additional line added forward and aft. The anchor was made ready for emergency deployment, and a request was made for a tug to be kept on standby.

At 0924 the master went to the bridge due to the worsening conditions. At 0930, tug assistance was requested, and two deck officers were instructed to inspect the lines. At 0945, before the requested tugs had arrived, mooring lines parted consecutively as the wind gusted to Bf 10 (50 kts). When the lines parted, the master ordered the starboard anchor to be dropped, the main engine to be started, and the vehicle ramp raised. The master then activated the emergency alarm, initiated the contingency plan, and notified the Port Authority.

The head lines parted first, followed by the failure of a shore bollard cover with a spring line attached. The ship began drifting in a north-easterly direction towards the adjacent dockyard, around 120 m away on the opposite side of the waterway. Eight minutes after all lines parted, two tugs arrived. Despite their efforts, the ship's bulbous bow struck two floating pontoons at the dockyard, before the drifting ship contacted a floating dock within the dockyard and became trapped against it and the dockyard quay.

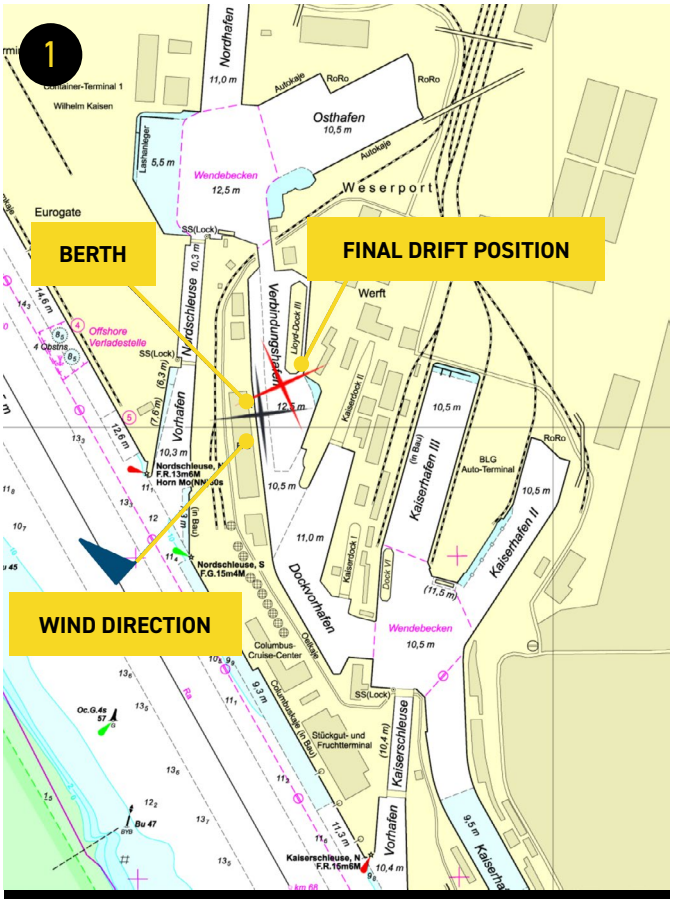

FIGURE 1 SCENE OF THE ACCIDENT, NAVIGATIONAL CHART NORTH SEA, GERMAN COAST – BREMERHAVEN
SOURCE BUNDESSTELLE FÜR SEEUNFALLUNTERSUCHUNG (BSU) SUMMARY INVESTIGATION REPORT 95/21

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At 0953, a tug was ready to push from the port side aft, and the anchor was weighed. At 1000, an additional tug made fast at the bow, and at 1014, another tug assisted amidships from the port side. A pilot boarded at 1015.

The ship was manoeuvred back to the original berth but attempts to moor with replacement lines were unsuccessful. At 1324, with the assistance of another pilot and a fourth tug, re-berthing was achieved at a more protected berth.

DAMAGE CAUSED

The ships port side shell plating was cracked, and its bulbous bow was holed. On the berth where the ship was originally moored the concrete facing, a mooring bollard, a roller fender, and a lifebuoy bracket were damaged. Whilst in the nearby dockyard, two floating pontoons suffered minor damage, and a fender was torn from the quay and sank. The dockyard's floating dock also sustained damage, including bending and deformation of the deck edges.

INVESTIGATION FINDINGS

The subsequent casualty investigation identified the following findings:

An independent consultancy was employed to determine the condition of the mooring lines at the time of the incident and the consequences for the ship. Their expert report revealed that only one stern line was in good condition, while 12 of the 14 deployed mooring lines were found to be inadequate. The investigation showed that the mooring lines would have been unlikely to fail if they had been in new condition.

Line failure incidents have not been uncommon at the Bremerhaven port, with one major event reported in 2023. In response to these events, the port authority has acquired berth analysis software to assess the parameters of existing berths and to monitor those in use.

Had a tug arrived in time, it could have been used to keep the ship alongside.

CONTACT

For more information on this incident email lossprevention@tindallriley.com

THIS CASE STUDY IS DRAWN FROM BUNDESSTELLE FÜR SEEUNFALLUNTERSUCHUNG (FEDERAL BUREAU OF MARITIME CASUALTY INVESTIGATION) - SERIOUS MARINE CASUALTY - ALLISION WITH PIER/DRY DOCK BY THE CAR CARRIER ENDURANCE AS A RESULT OF BROKEN LINES IN BREMERHAVEN ON 13 MARCH 2021. SUMMARY INVESTIGATION REPORT 95/21: https://www.bsu-bund.de/SharedDocs/pdf/EN/Investigation_Report/2025/Summary_Investigation_Report_95_21.pdf?__blob=publicationFile&v=2

THE PURPOSE OF THIS CASE STUDY IS TO SUPPORT AND ENCOURAGE REFLECTIVE LEARNING. THE DETAILS OF THE CASE STUDY MAY BE BASED ON, BUT NOT NECESSARILY IDENTICAL TO, FACTS RELATING TO AN ACTUAL INCIDENT. ANY LESSONS LEARNED OR COMMENTS ARE NOT INTENDED TO APPORTION BLAME ON THE INDIVIDUALS OR COMPANY INVOLVED. ANY SUGGESTED PRACTICES MAY NOT NECESSARILY BE THE ONLY WAY OF ADDRESSING THE LESSONS LEARNED, AND SHOULD ALWAYS BE SUBJECT TO THE REQUIREMENTS OF ANY APPLICABLE INTERNATIONAL OR NATIONAL REGULATIONS, AS WELL AS A COMPANY'S OWN PROCEDURES AND POLICIES.

BRITANNIA COMMENTARY ON INCIDENT ON NEXT PAGE

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BRITANNIA COMMENTARY ON INCIDENT

SHIP TYPE AND MOORING ARRANGEMENT

The car carrier was in ballast. This type of ship has a high freeboard and a large windage area. At the time of the incident, the mooring arrangement consisted of five head lines, five stern lines, and two spring lines forward and aft. Properly deployed breast lines in good condition would likely have been more effective in high offshore wind conditions, particularly at a less protected berth, as this ship type is more susceptible to the effects of wind.

WEATHER CONDITIONS

The forecast predicted Bf 8 winds, but on the day conditions reached Bf 10. The ship had previously experienced similar conditions two days prior to the incident, during which the master managed to keep the ship alongside with the assistance of two tugs pushing against the berth. As the ship and master had recent experience, he was confident in his preparations.

ACTIONS TAKEN IN RESPONSE TO PARTING LINES

Immediate actions were taken after the lines parted, including dropping the starboard anchor, starting the main engine, and hoisting the stern ramp. However, tugs arrived eight minutes later, the main engine was not immediately available, and the ship's thrusters were either unavailable or not used.

RESPONSE FROM SHORE RESOURCES

The investigation report revealed that the requested tugs arrived within the expected timeframe, suggesting that earlier notification could have helped. Had the tugs been mobilised sooner, they may have kept the ship alongside and prevented the drift.

MOORING LINES CONDITION

The investigation report identified that 12 of the 14 mooring ropes in use were not in adequate condition and should not have been employed. According to the investigation report, the ship's mooring equipment was designed to withstand wind forces of up to 60 kts (Bf 11). Therefore, the poor condition of the mooring lines was identified as the main cause of the incident. The ship operator's Safety Management System (SMS) required deck officers to monitor mooring lines during berthing and manoeuvring. However, this procedure was clearly insufficient, as it did not ensure effective mooring line inspection and line management.

This inadequacy is addressed in the SOLAS amendments to Chapter II-1, Part A-1, Regulation 3-8, point 9, which require companies to develop procedures for mooring operations, inspection, and maintenance of mooring equipment, including lines. These procedures must specify criteria for the replacement, end-to-end change, and retirement of mooring lines and tails, considering manufacturers' recommendations.

FIGURE 2 LINE FRAGMENTS
SOURCE BUNDESSTELLE FÜR SEEUNFALLUNTERSUCHUNG (BSU) SUMMARY INVESTIGATION REPORT 95/21

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BRITANNIA COMMENTARY ON INCIDENT

EXPOSED BERTHS WITH LIMITED SPACE

Some berths at Bremerhaven port are exposed, making ships particularly vulnerable to offshore winds at these berths. The failure of a single mooring line can quickly trigger the failure of others or of their shore securing points, causing the vessel to drift. Due to the proximity of berths—for example, in this case the distance to the opposite berth was only about 120 m—tugs have only a limited time window to keep ships alongside once drifting begins.

CONCLUSION

The main cause of the incident was the poor condition of the mooring lines deployed for mooring. Historically, line failure incidents have almost always occurred when mooring lines were in damaged condition and not fit for use. The risk of line failure can be significantly reduced by careful and diligent handling of mooring lines, regular visual inspections, timely replacement, and adherence to specified load limits. Retirement of lines should be based on their condition as determined during inspections; however, a maximum service period should also be established regardless of condition. Manufacturers' recommendations should be used when developing SMS guidelines for inspection and retirement. In addition to manufacturers' recommendations, guidelines such as the 'Cordage Institute Guideline CI 2001 Fiber Rope, Inspection and Retirement Criteria' can also be consulted.

REFLECTIVE LEARNING MATERIAL ON NEXT PAGE

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REFLECTIVE LEARNING MATERIAL - ALLISION WITH PIER AND DRY DOCK BY CAR CARRIER

THE QUESTIONS BELOW WILL HELP YOU TO REVIEW THE INCIDENT CASE STUDY EITHER INDIVIDUALLY OR IN SMALL GROUPS. IF POSSIBLE, DISCUSS YOUR CONCLUSIONS WITH OTHERS, AS THIS IS AN EFFECTIVE WAY OF THINKING ABOUT THE ISSUES IN MORE DEPTH.

PLEASE USE THE INFORMATION PROVIDED IN THE CASE STUDY TOGETHER WITH YOUR OWN EXPERIENCES AND THOUGHTS, TO REFLECT ON THE INCIDENT AND HOW THE ISSUES IDENTIFIED MIGHT RELATE TO YOUR OWN SITUATION.

WHAT DO YOU BELIEVE WAS THE IMMEDIATE CAUSE OF THE INCIDENT?

WHAT OTHER FACTORS DO YOU THINK CONTRIBUTED TO THE INCIDENT?

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COULD EARLIER DETECTION OF THE MOORING LINES' CONDITION HAVE PREVENTED THIS INCIDENT?

ARE YOU FAMILIAR WITH MOORING WINCH BRAKE TESTING AND ITS SIGNIFICANCE IN SAFE MOORING?

WERE SMS PROCEDURES FOR LINE INSPECTION SUFFICIENT?

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ARE YOU AWARE OF SOLAS AMENDMENTS TO CHAPTER II-1, PART A-1, REGULATION 3-8?

ARE YOU FAMILIAR WITH YOUR COMPANY'S MOORING MANAGEMENT PLAN?

ARE YOU AWARE OF INDUSTRY GUIDELINES FOR INSPECTION AND RETIREMENT OF MOORING LINES SUCH AS CORDGAE INSTITUTE CI 2001 AND ISO 4309?

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