

Beware: Increase in cases of broken mooring lines

Gard has recently registered several incidents of broken mooring lines having occurred during strong wind gusts. Most incidents involve cruise vessels but also other large vessels are at particular risk.

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In the recent cases reported to Gard, wind speeds were over 80km/h, i.e. wind force 8+ Beaufort scale, and the majority of the vessels involved were large cruise vessels. Luckily no severe damages or personal injuries were reported, but the incidents still serve as an important reminder of how important it is to ensure safe mooring operations.

Broken mooring lines often cause hull damages involving one or more vessels and can also lead to severe port structure damages. Moreover, failure of mooring lines can lead to pollution or other severe accidents, including loss of life. In fact, from 2016 to 2021, IG clubs received reports on 858 injuries and 31 fatalities related to mooring operations.

Why mooring lines break

Gard analysis of mooring lines accidents have shown that they often could have been prevented by proper inspection and maintenance as well as by improved preparedness for critical situations.

Of critical importance is the officers and crew being aware of the environmental loads their equipment is designed for. Often, we see that environmental risk factors, such as strength of winds and currents, together with water depth, played a significant role in the incident. Tidal effects leading to decrease of under keel clearance are sometimes not considered, even though this can significantly increase the forces affecting the mooring lines. We should also bear in mind the interaction with other ships together with weather related effects, such as waves/swell and ice.

Vessels particularly at risk

The bigger the vessel, the bigger the windage area, and hence the more pressure and risk on the mooring lines. Cruise ships have increased considerably in size over recent years, and larger loads are therefore applied on the mooring lines. This naturally puts these vessels at higher risk, and additional safety precautions may be required.

The same goes for other vessel types with large windage areas, such as container vessels, ferries, ro-ro vessels, and car carriers.

New requirements

Recent amendments to SOLAS Reg. II-1/3-8, which became mandatory on 1 January 2024, introduce new requirements for all elements used in mooring operations. While [Circ.1175/Rev.1](#) and [Circ.1619](#) (which provide updated standards for the design and construction of shipboard fittings and supporting hull structures) only apply to ships built on or after 1 Jan 2024, [Circ.1620](#) applies to [all ships](#). It provides guidance for maintenance and inspections of mooring equipment, criteria for identifying worn-out lines and tails, and criteria for selection of replacements.

As a result of the amendments, the following procedures must be reflected and implemented in the vessel's Safety Management System no later than the first ship safety construction survey after 1 January 2024:

Before and during mooring operations

1. Prior to commencing mooring operations, a thorough assessment of environmental conditions, including wind, tide, and swell, should be conducted to anticipate potential challenges.
2. Adequate communication and coordination among crew members involved in the mooring operations are paramount to minimize the risk of accidents.
3. Proper techniques and equipment should be used for securing mooring lines to bollards, cleats, or other designated points on the vessel and ashore.
4. Continuous monitoring of mooring lines during and after the mooring operations is essential to detect signs of wear, tear, or malfunction.

Identification and control of mooring lines

1. Each mooring line should be clearly identified, labeled, and logged to facilitate easy tracking and monitoring.
2. Regular inspections should be conducted to assess the condition of the mooring lines, including any presence of fraying, abrasions, or weakening.
3. If any defects or abnormalities are identified, immediate measures should be taken to mitigate risks, such as replacing damaged lines or adjusting mooring configurations.

Inspection and maintenance

1. Mooring equipment should be subjected to regular inspections as part of the vessel's onboard maintenance plan.
2. Inspections should be conducted by trained personnel who are capable of identifying potential issues or defects.
3. Inspections should encompass visual assessments, physical examinations, and, if necessary, non-destructive testing techniques to assess the structural integrity of the mooring lines.
4. The full findings from the inspection should be documented, including any recommendations for repairs, replacements, or adjustments to the mooring arrangement plan

Replacing mooring lines

1. Mooring lines should be replaced as needed based on their condition, usage, and the manufacturer's recommended lifespan.
2. Replacement procedures should be clearly outlined, specifying the steps for safely removing and disposing of old lines.

3. Newly installed mooring lines should undergo rigorous testing and inspection before being put into service.

Recommendations

It is strongly recommended that the Master conducts a thorough risk assessment tailored to the specific mooring conditions and loadings, taking into account the characteristics of the vessel and the location, under both normal and adverse weather conditions. Historical information concerning local weather phenomena, such as catabatic winds or irregular tidal effects, should be included in risk assessment. The Master should take a proactive approach by actively seeking information from port authorities, pilots, and agents to understand how warnings will be communicated and to stay informed about changing conditions.

If deteriorated weather is expected, the Master should make prompt decisions to ensure the vessel is prepared for immediate action. This includes ensuring the vessel is fully manned, appropriately ballasted, and has engines ready for maneuvering. Close communication with terminal and port authorities is crucial to coordinate timing and availability for necessary actions such as halting cargo operations, deploying additional storm moorings, and arranging for tug assistance and pilotage.

The Master must also evaluate whether it is safer to remain alongside the berth or to depart for the open sea or a safe anchorage, considering the risks associated with staying moored during adverse conditions. It is important to note that even with additional precautions like extra mooring lines, there is no guarantee that a ship will not break free from her moorings in severe weather.

It is also essential to recognize that mooring stations can become hazardous environments during bad weather conditions. Therefore, delaying departure from the berth until the weather conditions become dangerous should be avoided at all costs.

Safety should always be the top priority when making decisions regarding mooring operations.

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