Circular

Mooring arrangement

Mooring and unmooring are amongst the most frequent operations on board ships, with a relatively high level of human involvement both on board as well as ashore and in frequently changing and sometimes challenging circumstances. Mooring incidents and accidents rank amongst the top 10 of shipboard hazards every year, with severe injuries or even fatalities (in more than 10% of the incidents!) as a result. Some incidents result from equipment faults, but over 90% of them are caused by mooring lines or ropes. Seafarers can be caught up in them if the ropes are suddenly tensioned, or can be forcefully hit by them if ropes or wires part or snap. With this circular, MSIG Europe hopes to build further awareness of the dangers and risks associated with mooring and unmooring by offering you information and practical guidelines.

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Crew awareness

Obviously, the crew engaged in the mooring operations should be aware of the risks involved. This starts with instructing and training them in how to handle and maintain ropes and mooring equipment, keeping their distance from tensioned ropes, staying clear from slack bights of rope on deck and wearing appropriate personal protection equipment at all times.

In particular, areas which are in the 'direct line of fire' of parting or snapping lines should be avoided as much as reasonably possible, especially during tensioning of the lines or when the lines are under strain. Lines subjected to suddenly increasing forces may part and forcefully 'snap back' upon such parting, potentially causing severe injury or death to anyone standing nearby.

It is common practice to identify so-called 'snap back hazard zones' and individually paint-mark them on the mooring decks. Whilst this may draw appropriate attention to the risks involved, this practice however is not recommended, as it may create a false sense of safety for the unmarked areas. It is therefore better practice to mark the entire mooring deck as a snap back hazard zone', see to it that the deck is clean and free of obstacles and trip hazards, and that anti-slip paint is applied all over. Reference is also made to the "Code of Safe Working Practices for Merchant Seafarers" (COSWP) of UK's Maritime and Coastguard Agency (MCA).

Mooring operation

The mooring operation is to be carefully planned and executed. The vessel's Mooring Arrangement Plan serves as input, as do others if applicable, such as the Oil Companies International Marine Forum. (OCIMF)/ Intertanko Mooring System Management Plan. Specific port or terminal instructions may apply as well, for instance in ports susceptible to hurricanes or significant swells, or at berths or jetties which require as little ship movements as possible (for instance for tankers when connected to a loading arm). Such requirements may have implications on the vessel, which could go above and beyond minimum Class requirements. Therefore, checking on the applicability of such mooring operations should also be a part of the vessel's Voyage Planning process.

Mooring parties (most times forward and aft, for tankers often also amid) should each be supervised by one deck officer who has to have as complete an overview as possible. He or she has to be in constant communication with the bridge, and preferably also with linesmen or boatmen who will have to place the mooring lines on bollards ashore or on dolphins or mooring buoys. In practice, the latter is often difficult for want of a common language or means of direct communication, other than the human voice or the use of hand signals. Sometimes (harbour) pilots act as an intermediary but this comes with communicational delays or potential losses in translation. Unmooring the vessel is as risky and dangerous as mooring. As lines are slackened and taken in one by one, the load on each remaining line increases. Particularly when offshore winds are experienced or, potentially worse, when impatient tugboats start pulling the vessel before it is completely unmoored, these loads can suddenly become substantial and can cause snapping or breaking of the lines.

Mooring lines

Mooring lines come in quite a variety such as hemp, manila rope, steel wires or synthetic fibres such as polypropylene, polyester and polyamide. Sometimes even chains are used. Combinations are also found. Different types of fibres can be used when manufacturing one rope, or lines of different materials are connected to each other, for example when a mooring tail or stretcher is affixed, which is fitted with an eye to be placed around a bollard.

Every material has its pros and cons in terms of breaking load, weight, susceptibility to damages and wear, to ambient circumstances (temperature, UV-light, salinity) and obviously of cost.

Practical guidelines

- Mooring arrangements and mooring equipment fall within the domain of ship's Classification and consequently require Class approval. The design, construction and installation of winches, windlasses, capstans and other shipboard fittings (bollards, rollers, chocks, fairleads, etc.) are to be Class approved. Arrangements include proper lighting and communication equipment; equipment includes the mooring lines themselves, both in number as well as in characteristics (such as the Minimum Breaking Load) and way of manufacturing.
- The 'hardware' requires regular maintenance, such as greasing of gears and bearings and renewal of winch brake linings, which should be incorporated in the vessel's Planned Maintenance System.
- On board, all mooring lines should preferably be of the same supplier, with the same specifications, age, breaking load etc., to ensure that forces are evenly spread when the lines are in use. Mooring lines should be supplied with the accompanying manufacturers' certificates which specify all the relevant details, in order to be approved by Class.
- Lines and ropes are to be checked regularly for damages and wear. Damaged lines and lines which have been overstrained should be renewed.
- Ropes must be stored clear from deck (for example on a pallet or rack), in a ventilated and dry compartment. Some synthetic fibres may even 'wear' when not in use, for example when subjected to prolonged exposure to sun light. Degradation may also occur when lines are stored in the open where funnel soot or salty air can affect them. Also, storing them in a locker or bosun store, where they may stand a chance of getting contaminated with paint or other chemicals, may seriously affect them.
- Splicing of ropes is a common activity, for example when making an eye on a tail. This requires skill and seamanship. A poor or failing splice not only diminishes the proper load transfer but potentially creates a hazardous situation. Similarly, the use of wire grips, or bulldog grips, needs to be done in such a way that the wire can still be safely used.
- When mooring lines are handled by winches, the working part should be on the working part of the drum for only one layer, with a minimum of six wraps. The unused rest of the rope is to be wound on the storage part. Multiple layers of rope, subjected to tension, may lead to pinching and consequential damages or parting.
- The working part of the drum should be smooth, not painted with multiple layers as this may cause damages to the ropes.
- Lines, when in use, should be properly guided along fairleads, chocks, rollers etc. In positions where they stand an increased risk of chafing, additional protection may be applied on these lines (for instance by using pieces of discarded fire hoses).
- Mooring parties on board are to make sure that more or less equal tension is applied on all lines in use, to ensure maximum utilisation of all ropes. This can sometimes be aided by the so-called 'self-tensioning' or 'automatic tensioning' winches, which check and adjust the tension for the duration of mooring. The use of this type of winch is only recommended for specific situations, such as using them for breast lines, and in cases where quay walls are fitted with fendering which are suitable to compensate for too large compressive forces. Using 'self-tensioning' winches all over may potentially result in the vessel 'walking' up and down the quay side, as external forces (for example due to wind or passing traffic) to which the winches will respond may frequently differ fore and aft. Furthermore, this may cause damages to shore fenderings and/or the vessel's hull.

- Sometimes, shore side facilities are fitted to control and regulate the lines' tension, but they do not relieve the vessel's staff and crew from the responsibility for their own equipment and lines.
- Most times, the lines are held on the brakes of the winch they're handled with. Alternatively, and in some cases even better, lines can be shifted from the winch drum and transferred to the ship's bollards, using 'rope stoppers'. The Latter obviously means that during a prolonged port stay, the lines will have to be checked frequently on their (pre) tension, which may need to be adjusted by the crew.
- Bollards need to be undamaged and firmly fitted to (or through) the decks. On the quay side, they need to be firmly affixed as well: if the on-board mooring party suspects defects, the bridge team needs to be informed immediately in order for them to inform the (harbour) pilot and the linesmen.

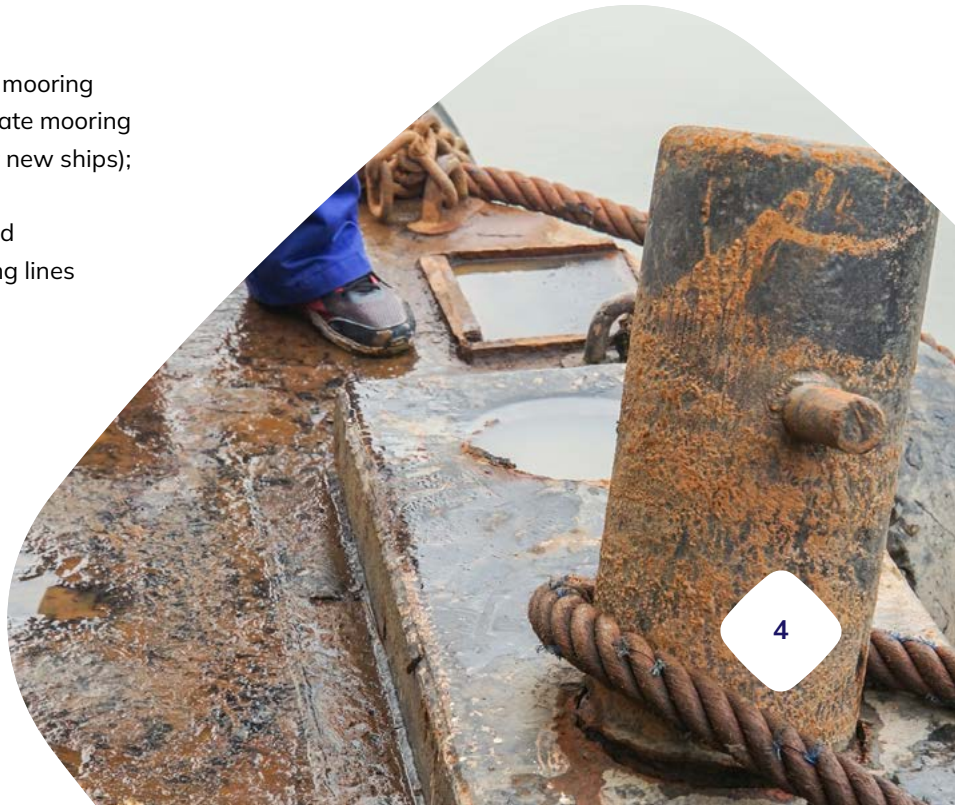
Summarizing

Despite all experiences and (product) developments, still a lot is desired to enhance safe mooring practices and reduce the risk of injury or death. This also leads to attention for and periodical revision of regulatory instruments.

Recently, amendments to SOLAS II-I Reg. 3-8 "Towing and mooring equipment" have been adopted, and will enter into force on 1 January 2024. Also, the "Revised guidance on shipboard towing and mooring equipment" (MSC.1/Circ.1175/Rev.1) have been approved for ships constructed on or after 1 January 2024 (for existing ships constructed after 1 January 2007 but before 2024, The MSC.1/Circ.1175 will remain in force).

Further, two new Guidelines were approved, also to enter into force on 1 January 2024:

- Guideline MSC.1/Circ.1619 on the design of mooring arrangements and the selection of appropriate mooring equipment and fittings for safe mooring (for new ships); and
- Guideline MSC.1/Circ.1620 on inspection and maintenance of mooring equipment including lines (for all ships).



For the sake of completeness, it is to be noted that the safety risks involved with mooring operations of a vessel also apply in case vessels are to be connected together for example for STS operations or towage operations. Extra care should then be exercised since in such cases, there will be no 'land-fixed' point such as a bollard or dolphin. Instead, the other vessel may or will move as well, causing additional sudden and unexpected external forces on the mooring or towage lines.

This information is intended for guidance only. Should you require more information or assistance, please feel free to contact our Loss Prevention Services at LPS@msigspecialtymarine.com

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