

Mooring Practice Safety Guidance

for Offshore Vessels When Alongside in Ports and Harbours



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IMCA SEL 029, IMCA M 214

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IMCA SEL 029, IMCA M 214 – July 2012

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I Introduction

Ships enter and leave ports regularly. Tying up a ship when alongside a berth or another vessel is potentially a very hazardous operation unless simple and effective safety procedures are followed. Mooring accidents are always on the list of personal injury accidents, often resulting in severe injuries or even fatalities.

2 Mooring Safety

2.1 Planning the Operation

The key to safe and effective mooring operations is planning and ensuring that appropriate procedures are followed. A mooring operation risk assessment should always be carried out. Suitable controls and procedures should be in place to minimise the risks identified for this operation. The use of toolbox talks to discuss the operation and the hazards involved is an effective way to help reduce accidents. Please refer to [IMCA pocket safety card 3 – Toolbox talks](#). It may seem like an unnecessary task to undertake, as mooring is a routine operation that most crew are very familiar with. However, this is the danger, as familiarity and complacency can lead to a mistake and an accident.

2.2 Who is in Charge?

The person in charge or directing the mooring operation at each mooring station on deck should be easily identifiable and heard clearly by the rest of the mooring team. Consideration should be given to issuing the person in charge with a different coloured high visibility vest and/or a different coloured safety helmet. Occasionally the Master issues instructions from the bridge to a dedicated person in charge at each mooring station. The change out of mooring operation personnel, for example, due to shift change, should be avoided until the mooring operation is complete.

2.3 Communication

Communication between the mooring team is a key part of mooring procedures. VHF, talk back systems, hand signals and verbal communication are normally used. Be aware of any language barriers which can lead to miscommunication and an unintended action that may result in an accident. Always ensure that emergency signals and procedures are understood and well-practiced. Ensure that after an instruction has been given or received it is repeated back to confirm it has been fully understood. Training should be carried out in these procedures.

2.4 Personal Protective Equipment

The mooring team should always be wearing the proper personal protective equipment (PPE). This should be verified by the team leader/person in charge. If the incorrect PPE is worn then the person should not be allowed to take part in the mooring operation until correctly attired. Typical PPE consists of the following items:

- ◆ Coverall;
- ◆ Safety boots;
- ◆ Safety helmet;
- ◆ High visibility vest;
- ◆ Gloves;
- ◆ Buoyancy vest if working near shipside or quayside.

2.5 Danger Zones

Be aware of snap back zones and potential pinch points. The use of deck markings can greatly assist in the identification of these zones. Reference can be made to the UK Maritime and Coastguard Agency guidance note [MGN 308](#) for snap back zone examples and its [Code of Safe Working Practices \(COSWP\) Chapter 25](#). Above all, try to use common sense during mooring operations and if you can see a dangerous situation developing make sure that the stop signal is given. It is better to be safe than to ignore a dangerous situation. Do not forget that your view of the mooring operation may be different to that of others and you may be the only person who sees the development of a dangerous situation. Ensure all crew that carry out mooring operations are trained in the identification and understanding of snap back zones.

2.6 Condition of Mooring Lines

Mooring lines should always be examined regularly for damage and records maintained. If in doubt over the condition of a mooring line, ensure that it is inspected by a competent person. When handling mooring lines particular attention should be paid to signs of fraying, any damage and signs of corrosion.

2.7 Hazards

Rope may be lying loose on the deck prior to being tensioned. Ensure that you are not standing in any rope bights. "Bights may bite." Hazards from mooring operations do not arise only from mooring line failures. The following are known to have caused personal injury whilst mooring:

- ◆ Oil – Slipping on oil from mooring equipment. Ensure that the equipment is well maintained and that working decks are coated with an appropriate anti-slip coating;
- ◆ Ice – Even though the deck may be coated in an anti-slip coating, a layer of ice may be present that introduces a slip hazard. Ensure when mooring in cold weather that the risk assessment includes snow or ice risks;
- ◆ Ship's side – Be aware of leaning on or over ship side handrails or bulwarks. Personnel have fallen over the ship side during mooring operations;
- ◆ Lighting – Inadequate lighting during mooring operations can cause accidents. Ensure that all working areas are adequately illuminated and that no shadows are cast from lighting that may hide potential hazards;
- ◆ Elevated winch gratings – Make sure that all gratings and supports are in good condition. Ensure that any steps for access to and from them are also inspected for signs of corrosion/damage;
- ◆ Manual lifting – When lifting mooring lines ensure that you use the correct method. Please refer to [IMCA pocket safety card 01](#) – *Manual handling safety guide*.

2.8 Environmental Conditions

Poor weather can have a big impact on mooring operation safety as follows:

- ◆ Ice – The formation of ice and snow may cause skin abrasions or cuts and will reduce the mobility of the affected person. It also presents a slip hazard (see above);
- ◆ Wind, currents and tides – Any of these can affect the movement of the ship. Excessive strain can be put on mooring lines and this may cause them to break. Pay particular attention to the snap back zones and vessel movement during mooring operations in these conditions. Gusting wind can also knock a person off balance;
- ◆ Fog – This reduces visibility and may make visual communication difficult with the persons ashore or on another vessel. Ensure that a good communication link is established and tested before mooring in these conditions. The risk assessment should take into consideration poor visibility;
- ◆ Cold weather clothing – If personnel are inadequately dressed this can have a great impact on concentration and mobility, which in turn may lead to an accident. Always ensure that you are appropriately dressed for the weather conditions.

2.9 Vessels Assisting

Tugs and small workboats are often used when mooring a vessel. Ensure that good communication between vessels is established and is tested. Remember the possibility of language barriers in these instances. When passing lines from the vessel to the assisting vessel or to the quayside, ensure that the heaving line 'monkey's fist'¹ does not include additional weight. It has been known for steel weights to have been added to these lines to enable them to be thrown further. This practice has been a cause of injury including causing serious head injuries.

If a line throwing gun is to be used, ensure that personnel are suitably trained in the safe operation of this equipment and that no modifications have been carried out to the gun or the line being fired.

¹ A monkey's fist is a type of knot, so named because it looks somewhat like a small bunched fist. It is tied at the end of a rope to serve as a weight, making it easier to throw.

2.10 Quay Access

Safe access to and from the vessel to the quay or another vessel may be required if personnel are not available to assist in the mooring operation. Means of safe access may include a gangway, pilot ladder to tender boat or a basket transfer. Reference is made to [IMCA M 202 – Guidance on the transfer of personnel to and from offshore vessels](#). In all cases ensure that the equipment used for personnel transfer is well maintained and has a valid test certificate. Do not jump from the vessel to the quay or other vessel or use any other non-approved method other than the aforementioned and always use a buoyancy aid. Lives have been lost through failures to follow safe access procedures.

2.11 Mooring Equipment

Mooring equipment comprises all the equipment required to moor and cast off a vessel effectively and safely. As with all shipboard equipment, it must be maintained and operated correctly to ensure safe and effective use. Ensure that no modifications are made to the layout of mooring arrangements and associated equipment without completing a risk assessment and obtaining the necessary approvals.

The main parts of a mooring system are as follows:

- ◆ Mooring winch – This can either be hydraulically or electrically powered;
- ◆ Winch brakes – These should be regularly inspected and adjusted to ensure that they render below the breaking strain of the mooring line. The Oil Companies International Marine Forum (OCIMF) provides good guidance on the testing and setting of mooring winch brakes;
- ◆ Mooring winch self-tensioning mode – Some winches have self-tensioning fitted. The correct operation of this system should be tested and verified. If the mooring winch hydraulic lines are corroded, then a failure of a line can result in the mooring line paying out with the added risk of oil pollution;
- ◆ Remote control stations – Are fitted to some systems. The control can be from the bridge and/or from a control station on the winch deck. In all cases the operator should have had appropriate training with the operation of the winch remote control system. During the operation, the operator should have a clear view of the mooring operation whilst maintaining good communication links with the rest of the mooring team. These systems are not meant as a replacement for a manned mooring deck. The mooring deck should always be manned even if the winches are driven remotely. Ensure that prior to every mooring operation the system is tested;
- ◆ Remote camera systems – It is common for modern mooring systems to be fitted with closed circuit TV (CCTV) monitoring which can be monitored from the bridge. These systems are not meant as a replacement for the mooring deck local safety monitoring but only as another pair of eyes;
- ◆ Ropes and wires (mooring lines) – Mooring lines that are to be used in operation should be in good condition. Ropes should be inspected frequently for both external wear and wear between the strands. Wires should be treated regularly with suitable lubricants and inspected for deterioration internally and for broken strands externally. The safe working load (SWL) of the mooring line should be on the mooring line certificate and this should not be exceeded. Tag lines are to be tidily stowed ensuring they do not form a trip hazard.
- ◆ Bitts and static fairleads (chocks) – These should be inspected for signs of deformation, corrosion, abrasive wear and pitting. If there is an indication that any of these are excessive then they should not be used. If they are badly corroded or worn they will cause mooring line damage and/or personal injury due to the sharp edges. The SWL should be permanently marked on or adjacent to this equipment by welded bead.
- ◆ Roller fairleads – These are to be inspected in the same manner as static fairleads, but additional attention should be paid to the rollers. Ensure that they are free to turn and that no excessive axial or radial movement is detected which may indicate a worn bearing. The rollers on button type fairleads are not meant to take axial force. If subjected to axial force due to incorrect mooring line positioning, the fairlead roller may become detached with severe consequences. Do not bring the vessel alongside using the capstans as there could be excessive force on the capstan that may result in equipment failure and injury. The SWL should be permanently marked on or adjacent to this equipment by welded bead.

3 Conclusion

Many people who read this guidance will remember some form of mooring incident. Whether it be a near miss or an accident, it should serve as a reminder that mooring and casting off a vessel is a potentially hazardous operation that should always be well planned by way of risk assessments and comprehensive procedures. The maintenance of all ship's equipment is important, but it appears that mooring equipment can sometimes be forgotten about. Look after all your mooring equipment and it should contribute to a safer operation.

4 References

- ◆ UK Maritime and Coastguard Agency guidance note MGN 308 – *Mooring, towing or hauling equipment on all vessels – safe installation and safe operation*: www.mcga.gov.uk/mca/308.pdf
- ◆ UK Maritime and Coastguard Agency *Code of Safe Working Practices for Merchant Seaman (COSWP)* Chapter 25: www.dft.gov.uk/mca/coswp2010.pdf
- ◆ IMCA safety promotion materials: www.imca-int.com/core/sel/publications/safetypromo.html
- ◆ *IMCA M 202 – Guidance on the transfer of personnel to and from offshore vessels*
- ◆ Oil Companies International Marine Forum (OCIMF) – www.ocimf.com/library/books
- ◆ The Nautical Institute – *Mooring and anchoring ships (Volumes 1 & 2)*
- ◆ International Labour Organization (ILO) – *Accident prevention on board ship at sea and in port*, Chapter 19, section 4:
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