ANCHORING, MOORING AND TOWING OPERATIONS

25.1 Introduction

25.1.1 Based on the findings of the risk assessment, appropriate control measures should be put into place to protect those who may be affected. This chapter highlights some areas which may require attention in respect of anchoring, mooring and towing operations. It is particularly important that the risk assessment considers the consequences of the failure of any element of the equipment.

25.2 Anchoring and Weighing Anchor

25.2.1 Before using an anchor a competent seafarer should check that the brakes are securely on and then clear voyage securing devices. A responsible person should be in charge of the anchoring team, with an adequate communications system with the vessel's bridge. The anchoring party should wear appropriate safety clothing - safety helmets, safety shoes and goggles as a minimum protection from injury from dirt, rust particles and debris which may be thrown off during the operation. Wherever possible, they should stand aft of the windlass.

25.2.2 Where the means of communication between bridge and anchoring party is by portable radio, the identification of the ship should be clear to avoid misinterpretation of instructions from other users of such equipment.

25.2.3 Before anchors are let go, a check should be made that no small craft or other obstacle is under the bow. As a safety precaution it is recommended that the anchor is 'walked out' clear of the pipe before letting go. For very large ships with heavy anchors and cables, the anchor should be

walked out all the way to avoid excessive strain on the brakes (and on the bitter end if the brakes fail to stop the anchor and chain).

25.2.4 Where the anchor is let go from the stowed position, if upon release of the brake, the anchor does not run, personnel should NOT attempt to shake the cable, but the brake should be re-applied, the windlass placed in gear, and the anchor walked out clear prior to release.

25.2.5 Cable should stow automatically. If, for any reason, it is necessary for personnel to enter the cable locker, they should stand in a protected position and, as far as possible, have constant communication with the windlass operator.

25.2.6 Anchors housed and not required should be properly secured to prevent accidental release.

25.3 Making Fast and Casting Off

25.3.1 During mooring and un-mooring operations a sufficient number of personnel should always be available at each end of the vessel to ensure a safe operation. A responsible officer should be in charge of each of the mooring parties, and a suitable means of communication between the responsible officers and the vessel's bridge team should be established. If this should involve use of portable radio, then the ship should be clearly identified by name to prevent misinterpretation. All personnel involved in such operations should wear suitable protective clothing (see Chapter 4).

25.3.2 Vessels' heaving lines should be constructed with a 'monkey's fist' at one end. To prevent personal injury, the 'fist' should be made only with rope and should not contain added weighting material.

25.3.3 Areas where mooring operations are to be undertaken should be clutter free as far as possible. Decks should have anti-slip surfaces provided by fixed treads or anti-slip paint coating, and the whole working area should be adequately lit for operations undertaken during periods of darkness.

25.3.4 All equipment used in mooring operations should be regularly inspected for defects. Any defects found should be corrected as soon as possible. Particular attention should be paid to the risk of oil leaks from winches, and surfaces of fairleads, bollards, bitts and drum ends should be clean and in good condition. Rollers and fairleads should turn smoothly and a visual check be made that corrosion has not weakened them. Particular attention is drawn to the need to ensure that pedestal roller fairleads, lead bollards, mooring bitts etc are

(a) properly designed to meet all foreseeable operational loads and conditions,

(b) correctly sited, and

(c) effectively secured to a part of the ship's structure which is suitably strengthened.

25.3.5 Mooring ropes, wires and stoppers that are to be used in the operation should be in good condition, Ropes should be frequently inspected for both external wear and wear between strands. Wires should be regularly treated with suitable lubricants (see section 21.2.28) and inspected for deterioration internally and broken strands externally. Splices in both ropes and wires should be inspected regularly to check they are intact. Where wire rope is joined to fibre rope, a thimble or other device should be inserted in the eye of the fibre rope. Both wire and fibre rope should have the same direction of lay.

25.3.6 Ropes and wires which are stowed on reels should not be used directly from stowage, but should be run off and flaked out on deck in a clear and safe manner, ensuring sufficient slack to cover all contingencies. If there is doubt of the amount required, then the complete reel should be run off.

25.3.7 It is often difficult to achieve an ideal mooring layout. Ship's equipment can be employed to the best advantage if the following general principles are remembered:-

(a) breastlines provide the bulk of athwartships restraint;
(b) backsprings provide the largest proportion of the longitudinal restraint;
(c) very short lengths of line should be avoided when possible, as such lines will take a greater proportion of the total load, when movement of the ship occurs.

25.3.8 Careful thought should be given to the layout of moorings, so that leads are those most suited without creating sharp angles, and ropes and wires are not fed through the same leads or bollards. Pre-planning of such operations is recommended and a risk assessment of the operation should be completed, especially in cases where the ship is having to use an unusual or non-standard mooring arrangement.

25.3.9 Personnel should not in any circumstances stand in a bight of rope or wire. Operation of winches should preferably be undertaken by competent personnel to ensure that excessive loads do not arise on moorings.

25.3.10 When moorings are under strain all personnel in the vicinity should remain in positions of safety, i.e. avoiding all 'Snap-Back' Zones. It is strongly recommended that a bird's eye view of the mooring deck arrangement is produced (an aerial view from a high point of the ship can be utilised) to more readily identify danger areas. Immediate action should be taken to reduce the load should any part of the system appear to be under excessive strain. Care is needed so that ropes or wires will not jam when they come under strain, so that if necessary they can quickly be slackened off.

Where a mooring line is led around a pedestal roller fairlead, the 'Snap-Back' Zone area will change and increase in area. Where possible, lines should NOT be led round pedestals except during the operation of mooring the ship, thereafter lines should be made up on bitts, clear of pedestals if at all possible.

25.3.11 Annex 25.1 shows diagrams of simple and complex mooring systems, as well as an example of an actual mooring deck arrangement, illustrating the associated 'Snap-Back' Zones.

25.3.12 Further information on 'Snap-Back' Zones can be found in section 6.3.5 of the Oil Companies International Marine Forum (OCIMF) publication "Mooring Equipment Guidelines".

25.3.13 Where moorings are to be heaved on a drum end, one person should be stationed at the drum end, backed up by a second person backing and coiling down the slack. In most circumstances three turns on the drum end are sufficient to undertake a successful operation. A wire on a drum end should never be used as a check wire.

25.3.14 A wire should never be led across a fibre rope on a bollard. Wires and ropes should be kept in separate fairleads or bollards.

25.3.15 When stoppering off moorings the following applies:-

(a) Natural fibre rope should be stoppered with natural fibre.

(b) Man made fibre rope should be stoppered with man made fibre stopper (but not polyamide).

(c) The 'West Country' method (double and reverse stoppering) is preferable for ropes.

(d) Wire moorings should be stoppered with chain, using two half hitches in the form of a cow hitch, suitably spaced with the tail backed up against the lay of wire, to ensure that the chain neither jams nor opens up the lay of the wire.

25.4 Mooring to buoys

25.4.1 Where mooring to buoys is undertaken from a ship's launch or boat, personnel engaged in the operation should wear lifejackets and a lifebuoy with attached lifeline should be kept readily available in the boat.

25.4.2 Means should be provided to enable a person who has fallen into the water to climb back on board the launch or boat. If a boarding ladder with flexible sides is used, it should be weighted so that the lower rungs remain below the surface.

25.4.3 Where mooring to buoys is undertaken from the ship, a lifebuoy with attached line of sufficient length should be available for immediate use.

25.4.4 When slip wires are used for mooring to buoys or dolphins, the eyes of the wires should never be put over the bitts, as at the time of un-mooring it may not be possible to release the load sufficiently to lift the eye clear. To prevent accidental slippage of the wire eye(s) over the bitts or other obstruction the eyes should be seized, partially closing the eye.

25.5 Towing

25.5.1 A number of accidents to persons have occurred during the relatively simple operation of making fast and letting go of tug's tow lines. The common factor was that, for various reasons, the tow lines became taut, causing, for instance, messengers to part and strike ship's crew, and seamens' hands to become trapped, all of which resulted in major injuries.

25.5.2 Equipment used for towing should be adequately maintained and inspected before use, as during towing operations excessive loads may be applied to ropes, wires, fairleads, bitts and connections.

25.5.3 Prior to towing operations being undertaken, the master should establish suitable means of communication, exchange relevant information (eg speed of vessel), and agree a plan for the tow with the tug master.

25.5.4 All workers involved should be adequately briefed in their duties and safety precautions to be taken. They should be equipped with personal protective equipment including safety helmets and safety shoes.

25.5.5 Workers should, wherever possible, agree with the tug crew the area where the heaving line is to be thrown to, in order that they move clear. A messenger should be used to heave the tug's tow line on board by a winch, and then a stopper used while the eye is placed around the bollard. Only enough turns of the messenger should be used on the warping drum end to heave in the tow line. On tankers, do not place the tow line's eye over the bollard which has the fire wire made fast to it. Take the fire wire off, if there is no bollard available.

25.5.6 Once the tow is connected, non-essential personnel should keep clear of the operational area. If anyone is required to remain in this area or to attend to towing gear during the towing operation, they should take extreme care to keep clear of bights of wire or rope and the "Snap-Back" Zone should a line break. Exposure time should be kept to a minimum.

25.5.7 During operations, communications should be maintained between:-

(a) the towing vessel and both the bridge team and the foredeck of the vessel under tow; and

(b) the tow party and the bridge team.

In all communications clear identification of the parties communicating should be used to prevent misunderstandings. The Tug Master should be kept informed of engine movements, proposed use of thrusts etc. Persons in charge of the mooring party should monitor the tow line to give warning to the crew if the tow line should become taut, for whatever reason.

25.5.8 When letting go the tow, no attempt should be made to heave in the tow line slack before making positive communications with the tug's crew and they have indicated that they are ready to receive their line. Use the tug's attached messenger to heave in the slack and then stopper it off before taking the eye off the bollard. Use turns of the messenger around

the bollard to control the speed at which the tow line goes out and is retrieved on board the tug. If the tow line is allowed to run out uncontrolled, it could whiplash, and strike a crewmember, causing severe injuries.

25.5.9 Further recommendations on towing are contained in Merchant Shipping Notices.

25.6 Safe mooring of domestic passenger craft & ships launches to quays

25.6.1 The recognized and safe method for securing small vessels and launches alongside a quay or wharf in a good seamanlike manner is by the use of **all** of the following ropes:-

a forward spring,
an aft spring,
a forward breast line, and
an aft breast line.

A risk assessment must be carried out for the full mooring arrangement and should include a diagram.

25.6.2 **Annex 25.2** shows the full and safe mooring arrangement for small domestic passenger craft and ships launches. The diagram further illustrates the assessment of 'Snap-Back' Zones.

25.6.3 Reduced mooring arrangements may be used when considered safe to do so. This may only be done after taking into account the weather and sea conditions, tidal state, tidal flow and respective 'Snap-Back' Zones. Risk assessment must be carried out for all arrangements that diversify from the full safe arrangement in

25.6.1.

25.6.4 Passengers and crew should spend minimal time within 'Snap-Back' Zones.

25.6.5 Where mid-ships mooring is the only means of making fast, breast lines can be run from mid-ships straight to a quay.

25.6.6 Single point moorings and steaming on a spring are not recommended and should be avoided. After a full risk assessment has been done and in good weather, a normally accepted minimum would be two lines, one either side of the embarkation point. Local byelaws and guidance should always be sought.

ANNEX 25.1

Diagrams of simple and complex mooring systems and an example of an actual mooring deck arrangement, illustrating the associated 'snap-back' zones.

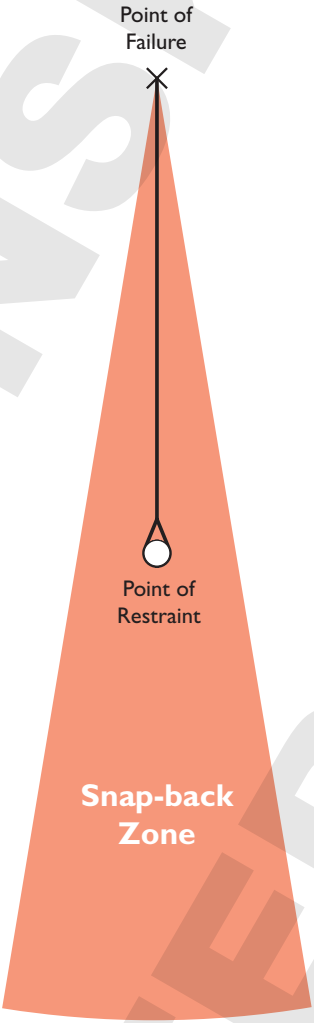


Diagram 1 - A Simple Mooring System Illustrating The Potential "Snap-Back" Zone Area

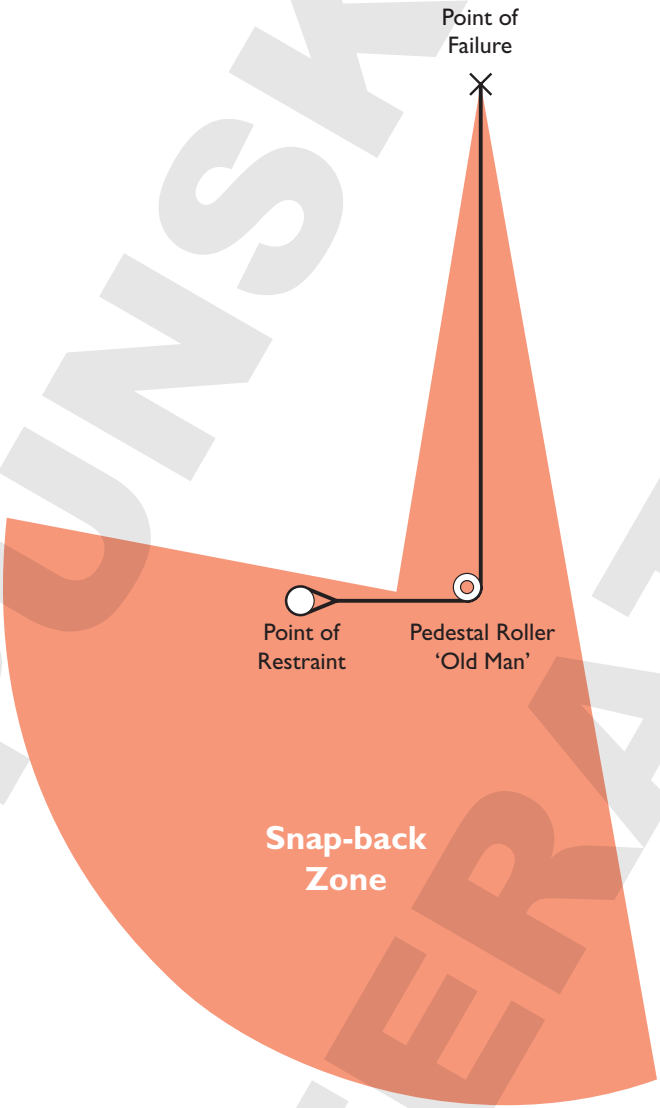


Diagram 2 - A Complex Mooring System Illustrating The Potential "Snap-Back" Zone Area

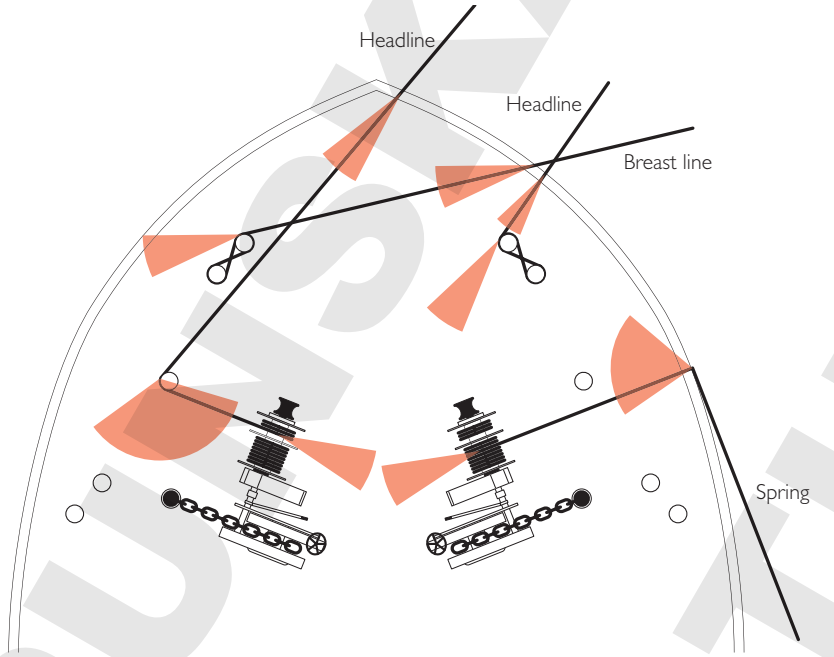


Diagram 3 - An Actual Mooring Deck Arrangement Illustrating Potential "Snap-Back" Zone Areas

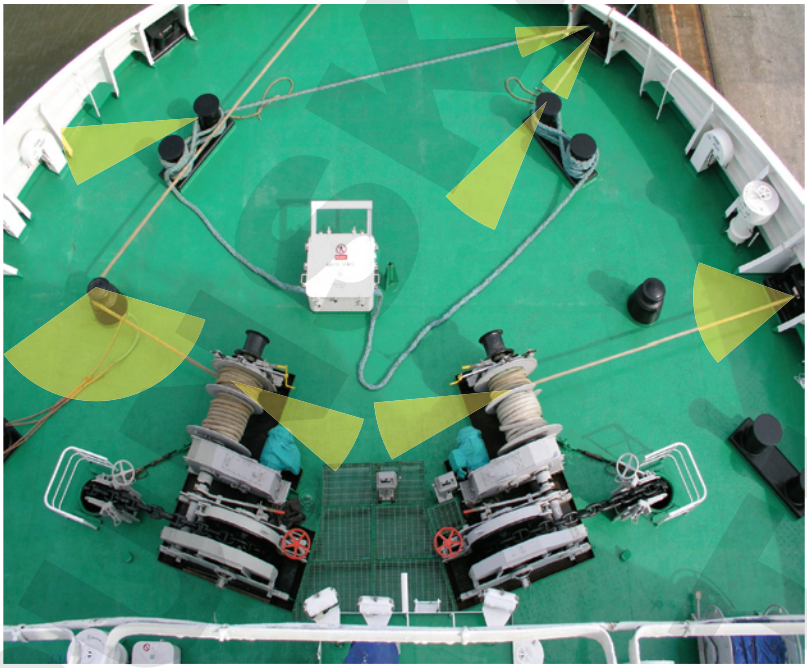
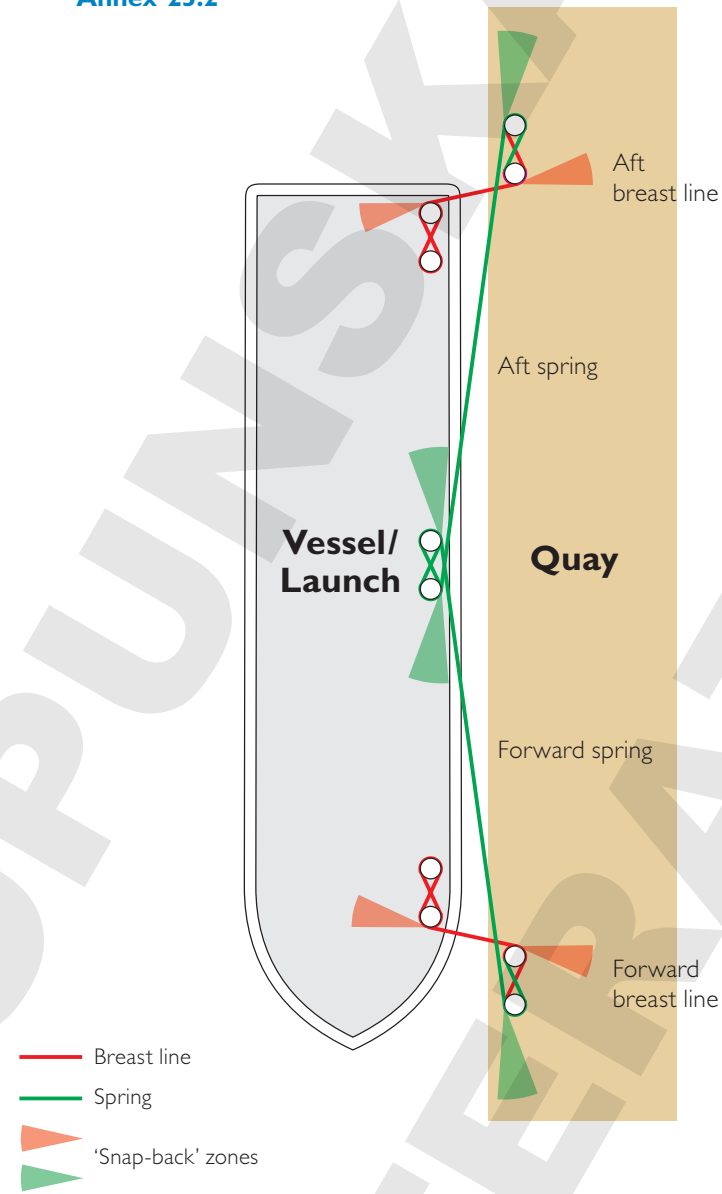


Diagram 4 - A Picture Of An Actual Mooring Deck Arrangement Illustrating Potential "Snap-Back" Zone Areas

Annex 25.2



The full and safe Mooring Arrangement for small Domestic, Passenger Craft and Ships Launches illustrating potential 'Snap-Back' Zones