

Loss Prevention Bulletin

STS Transfer Operations – Incidents Resulting in Contact Damage

The Club has experienced an increasing number of claims involving contact damage during ship to ship (STS) transfers, mainly during manoeuvring operations. Some of the incidents were serious.

Following a claims review it appears that the majority of these cases took place in conditions that may have been unsuitable for the activity undertaken. Contributory factors generally included one or more of the following:

- Adverse weather conditions such as high winds, heavy seas, strong currents and/or tidal streams. In one case a daughter vessel, which was moored alongside an anchored mother vessel, made contact when trying to unmoor in a Force 8 wind. A significant number of other incidents occurred in winds of Force 6 or more.
- Lying beam on to a long swell while lightering a vessel which was partially aground. The swell increased during the operation, causing both vessels to roll up to 10° and hit each other.
- Poor communications and misunderstandings between vessels.
- Excessive speed either moving ahead or during the approach while both vessels were underway.
- Pulling ahead or falling astern of the other vessel and attempting to steer away while still in close proximity, failing to take account of the negative transfer that may cause the manoeuvring vessel to head the opposite way at the start of the turn.
- Attempting to moor against an anchored mother vessel on the same side as the anchor in use, contrary to best practice.
- An insufficient number of fenders, or fenders of an inappropriate type or size. Also poorly positioned fenders in the vicinity of the shoulder or quarter regions of the hull, or a complete absence of fenders in these areas.
- Not enough crew in the mooring gang. A daughter vessel was forced to hold station alongside an anchored mother vessel for a prolonged period of time in poor weather while the mooring gang moved from one end of the vessel to the other to let go the lines. The vessels eventually collided.
- Unsatisfactory use of tugs. A tug was instructed to pull the bow of a daughter vessel away from an anchored mother vessel that was yawing in high winds, rather than using the tug to hold the mother vessel steady. The mother vessel swung and struck the daughter vessel causing significant damage.
- IMO Manual on Oil Pollution, Section 1 Prevention, Chapter 6 - Ship-to-ship transfer of crude oil and petroleum products while underway or at anchor.

This safety alert highlights the risks and safeguards that should be considered to reduce the likelihood of contact damage during STS mooring and unmooring operations.

STS Planning and Preparation

STS operations may take place while both vessels are underway or with one vessel at anchor. When both vessels are underway it is customary for the larger vessel to steer a steady course and maintain a constant speed, usually around 5 knots, keeping the wind and sea on the port bow while the smaller vessel moors on the starboard side. The vessels may then carry out the cargo transfer while underway or may stop and drift in order to do so. Local conditions may sometimes require an alternative arrangement.

Mooring and unmooring should always be conducted in accordance with the STS Operations Plan, the Safety Management System, any local, national and/or flag state requirements that may apply and the guidance contained in the latest edition of the following publications:

- ICS/CDI/OCIMF/SIGTTO Ship to Ship Transfer Guide for Petroleum, Chemicals and Liquefied Gases (“Ship to Ship Transfer Guide”)



A risk assessment should be conducted prior to every STS transfer. For routine STS operations a generic risk assessment may be used. However, if any unusual conditions or factors are anticipated, a more detailed risk assessment should be carried out. In addition to covering the transfer of cargo (which is outside the scope of this safety alert), the risk assessment should address all aspects of the approach, mooring, unmooring and departure.

A Person in Overall Advisory Control (POAC) should be appointed in advance to oversee and manage the operation. This may be one of the masters or a trained and experienced STS superintendent generally known as a “mooring master”. If a master is inexperienced in STS transfer operations, the appointment of a STS superintendent to provide advice and assistance is recommended.

Unsuitable weather has been a major factor in many of the STS incidents experienced by the Club, therefore it is essential that the current and anticipated weather, sea and tidal conditions are carefully evaluated before deciding whether or not to commence an STS operation. The evaluation should include the following factors:

- Weather forecast.
- Weather window required to complete the operation safely, including sufficient contingency time for any delays that may occur.
- Visibility.
- Direction, height and length of the swell and its effect on the movement of the vessels, particularly if they may lay beam on to the swell and start to roll.
- Wind speed and direction.
- Effect of the wind on vessels with a high freeboard.
- Strength and direction of currents and/or tidal streams.
- Relative directions of the wind, currents and/or tidal streams.

- If one of the vessels is at anchor, the likelihood of it yawing in the prevailing and predicted weather conditions.

STS mooring and unmooring operations should take place during daylight unless those involved are sufficiently experienced to undertake such activities at night.

Key personnel should be provided with walkie talkies which are capable of two-way communication between both vessels during the STS operation. If the frequencies are incompatible, one vessel should provide spare walkie talkies to the other for the duration of the transfer.

All aspects of the operation should be discussed and agreed in advance by both vessels. Joint use should be made of generic operational checklists such as those contained in the Ship to Ship Transfer Guide.

All personnel involved in the STS operation should be briefed in advance to ensure that everyone is familiar with each stage of the operation and any particular hazards.

Good communication between the vessels is vital during the approach and throughout the mooring operation. A common working language should be agreed beforehand.

Fendering

Appropriate fendering must be used to prevent contact during mooring and unmooring, and to keep the vessels apart during the transfer. The fenders should be of adequate size, correctly positioned and sufficient in number.

Primary fenders should be placed between the hulls to provide protection and separation while the vessels are moored together. Secondary fenders should be positioned at the shoulder and quarter to shield the areas that are most exposed to contact damage during manoeuvring operations.

Typically the fenders are deployed by the manoeuvring vessel to minimise

the risk of damage if it lands against an unprotected section of the other vessel's hull. The fenders are normally positioned by service craft employed by the appointed STS service provider.

The quantity, type and position of the fenders needs careful thought. The general information set out in the Ship to Ship Transfer Guide may assist in this respect. Specific advice on fendering arrangements for particular vessels and/or operations may be obtained from fender manufacturers and providers.

Given that approach speeds can be difficult to control with precision in an offshore environment, consideration should be given to using fenders which are slightly larger than necessary to allow for approach speeds and berthing forces which may be higher than intended.

When fenders are delivered to the vessel, as far as possible they should be inspected visually to ensure that they are in satisfactory condition. Their mooring wires should be scrutinised in the same way. Pneumatic (Yokohama) fenders should be constructed in accordance with International Standard ISO 17357 and be fitted with safety valves that have been inspected and certified within the last two years. The provider should be asked to confirm these details. All fenders should be less than 15 years old.

Prior to unmooring it may be necessary to reposition the secondary fenders as differences in freeboard following the transfer operation may have changed the possible points of contact on the shoulder and quarter.

Mooring

Both vessels should be upright and suitably trimmed for the operation. Nothing should project overboard on the berthing side.

If it is necessary to carry out the berthing operation at night the main deck should be lit and, where possible, the fenders illuminated. When placing the lights, care should be taken to ensure that they are not directed towards the other vessel's bridge.

The engines, thrusters, steering motors and navigational equipment of both vessels should be in full working order and tested prior to the approach. Both vessels should check that they can communicate with each other well in advance of the operation.

All navigation lights, shapes and sound signals as required by the International Regulations for Preventing Collisions at Sea (COLREGS) should be displayed and sounded as appropriate, including manoeuvring signals and requirements for vessels restricted in their ability to manoeuvre when conducting STS transfer operations underway.

A mooring plan should be agreed before commencing the operation. The number of mooring lines and where they are situated will depend on several factors including the size of the vessels, their freeboards, the weather conditions and the location and relative positions of their mooring fairleads. The usual practice is for

the mooring lines to be passed by the manoeuvring ship to the vessel maintaining its course and speed or laying at anchor, as appropriate.

Heaving lines and stoppers should be made ready for use and mooring lines and messengers should be flaked out. The condition of all lines should be checked beforehand. Winches should be tested and spare mooring lines should be readily to hand. Possible snap back zones should be discussed with the mooring team and fire axes or bow saws should be placed at each mooring station ready to cut the lines if deemed necessary.

The number of crewmembers available forward and aft should be sufficient to ensure that the mooring operation can be undertaken safely and completed in a timely manner.

Communications with the mooring parties should be tested prior to commencing the approach.

A full bridge watch including a proper lookout should be maintained throughout the approach and during the mooring operation.

The vessel should be steered by a proficient helmsman and the officer of the watch should check that all helm orders are closely followed.

If local regulations require the attendance of a pilot, it should be acknowledged that the master remains in overall charge and is ultimately responsible for the

manoeuvring and safety of the vessel. If any doubts arise regarding the pilot's orders, the master should not hesitate to seek clarification or take whatever action may be necessary to avoid an incident.

Prior to the approach, both vessels should agree a course and speed for the mooring operation.

If possible, and in order to avoid sudden changes in momentum, speed should be controlled by adjusting engine revolutions rather than using the engine telegraph. Where available, minor adjustments to the propeller pitch are ideal for making small variations in speed. The number of air starts available for diesel engines should be confirmed in advance and monitored closely thereafter. The non-manoevring vessel should not alter its course or speed unless authorised by the POAC or the master of the other ship.

The operation should only commence once both vessel have confirmed their readiness to proceed.

If communications fail during the approach, the operation should be aborted if safe to do so. The vessels should then move clear of each other.

The angle of approach by the manoeuvring vessel should not be excessive. Typically the manoeuvring vessel will head towards the quarter of the other ship and steer a parallel course when a suitable distance away before moving into the desired position. The manoeuvring vessel will then use small engine and rudder movements to move slowly alongside.

The effect of interaction when manoeuvring at close range should be taken into account.

Once the vessels are in close proximity, the mooring lines should be passed across in accordance with the mooring plan. Lines should not be over-tightened when making fast to avoid pulling the bows too closely together or, in the case of an anchored vessel, straining the anchor cable.

Below: Severe damage to a lifeboat caused by contact with the port shoulder of another tanker whilst it was manoeuvring alongside



Both vessels should be steaming at the same speed when the manoeuvring vessel lands alongside. Astern movements should be avoided.

If one of the vessels is required to anchor in order to carry out a STS transfer, the anchor opposite the side where the operation will take place should be used. When considering how much anchor cable to lay, the master should bear in mind that it will have to hold the weight of both vessels. Consequently a greater length of anchor cable than normal will usually be required.

After dropping the anchor the vessel should be brought up and allowed to settle on a steady heading, riding to the wind, sea, current and tide. The manoeuvring vessel may then start the approach. In tidal waters the manoeuvring vessel should wait until the anchored vessel has finished swinging before proceeding.

Should a tug be required as a control measure following the risk assessment exercise, it should be used to assist the manoeuvring vessel to berth alongside the anchored vessel.

If the anchored vessel is yawing excessively, employing a stern tug to hold the vessel on a steady heading is recommended. If no tug is available the approach should be delayed until the situation improves. Where conditions permit, the vessels may carry out the mooring operation while underway and anchor afterwards.

When heading towards an anchored vessel that is not being held by a tug, a larger angle of approach is often advisable in case the anchored vessel begins to swing unexpectedly.

Unmooring

Prior to departure any projecting obstructions on the side closest to the other vessel should be stowed inboard and checks should be made to ensure that the fenders are still properly positioned and secured.

All engines, thrusters, steering motors, navigational equipment and communications (both internal and between vessels) should be tested beforehand. The unmooring operation should only proceed if everything is found to be in full working order.

The order of releasing the lines should be agreed in advance as part of the unmooring plan. The mooring party on the manoeuvring vessel should wait for instructions from the bridge before slackening the lines. Personnel on the other ship should only let go when told to do so by the mooring party on the manoeuvring vessel. The use of quick release toggles, as described in the STS Transfer Guide, may be used to minimise the risks. Some STS service providers may supply quick release hooks for this purpose.

When an STS operation has been completed underway it is customary to position the vessels so that the wind and sea are on the port side during the unmooring operation. The vessels are then brought head to wind to allow them to separate. However, local conditions may require alternative arrangements.



Above: Significant damage to the bridge wing occurred when this vessel was attempting to depart an anchored vessel in heavy weather

Photo courtesy of: Capt. Jose Mallo / Venepandi, Caracas

After singling up forward and aft the manoeuvring vessel will usually release the forward line when instructed and let go the aft line once the bows have drifted apart. Neither vessel should pull ahead or drop astern during the unmooring operation. The non-manoevring vessel should maintain speed and steer a steady course until the other ship has confirmed that it has moved well clear.

All navigation lights, shapes and sound signals as required by COLREGS should be displayed and sounded as appropriate, including manoeuvring signals during the unmooring operation.

A careful lookout for other traffic in the vicinity should be maintained by both vessels as they unmoor and steer clear.

If the vessels are yawing excessively after completing an STS transfer operation at anchor, the use of a stern tug is recommended to hold the anchored vessel on a steady heading. If no tug is available, subject to the views of the POAC the anchored vessel may heave up and leave the anchorage and perform the unmooring operation while underway.

Cover

Routine STS transfer operations are generally covered under the Rules, however, a non-routine STS transfer such as lightering a grounded vessel should be discussed with the Managers beforehand as unusual STS operations may not be covered if considered to be imprudent, unsafe, unduly hazardous or improper (Rule 19). Alternatively, the Managers may require additional control measures in order to reduce the risk.

If any doubts arise as to whether or not a proposed STS transfer operation is covered, the Managers should be contacted for advice.