STEAMSHIP MUTUAL

Risk Alert

Safe Ship-to-Ship operations (STS)

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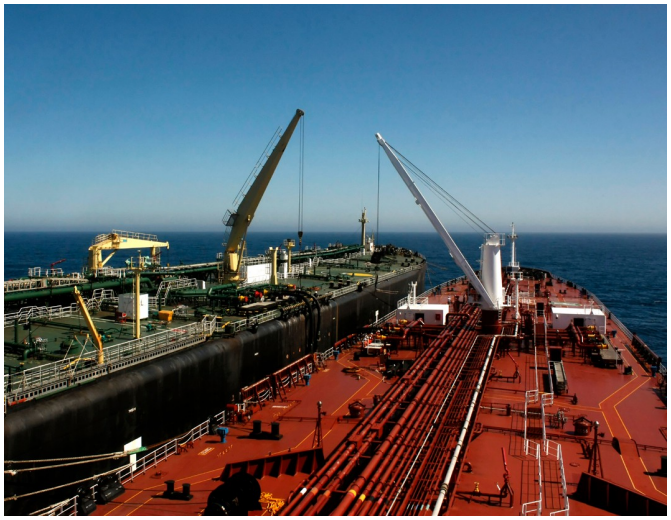
Overview:

Ship-to-ship operations, more commonly known as “STS operations” is the transfer of oil/gas cargo from one vessel to another and can be referred to as “lightening” or “lightering”.

Over the years the transport of oil and gas trade has increased significantly with the size of ships growing accordingly, however at some ports the infrastructure may not have evolved to keep pace with the increased size of vessel or they may simply not have the capabilities to handle larger size vessels. Limitations can be imposed by factors such as available water depth or restrictions resulting from international or national regulatory requirements.

STS operations are a way to overcome some of the limitations and restrictions imposed by local factors, such as draught restrictions when STS can be performed in deeper waters offshore.

To perform safe STS operations, it is imperative that vessels abide by all international, national and local regulations and this Risk Alert is intended to provide guidance for undertaking safe STS operations in compliance with international regulations and industry guidance.



Regulatory requirements:

To perform safe STS operations, IMO’s Marine Environment Protection Committee (MEPC) adopted resolution MEPC.186(59) and a new chapter 8 was added to The International Convention for the Prevention of Pollution from Ships - MARPOL Annex I, describing regulatory requirements that should be adhered to at all times when undertaking STS operations.

To summarise these International regulatory requirements

i. Ships involved in STS Operations shall have an Approved STS operations Plan;
ii. When engaged in STS Operations, ships must comply fully with the Approved STS operation plan;
iii. The STS operations Plan must contain best practice as identified in the latest edition of –
   - IMO Manual on Oil Pollution; and
   - OCIMF Ship to Ship Transfer Guide for Petroleum, Chemicals and Liquified Gases.
iv. A Person in Overall Advisory Control (POAC) for safe STS operations;
v. Records of STS operations retained on board for three years, readily available for inspection;
vi. Each vessel intended to carry out STS operations shall notify local authorities not less than 48 hours in advance of the scheduled STS operations or at the earliest opportunity.
vii. Notification to local authorities shall include as a minimum –
   - name, flag, call sign, IMO Number and estimated time of arrival of vessels involved in the STS operations;
   - date, time and geographical location at commencement of planned STS operations;
   - whether STS operations are to be conducted at anchor or underway;
   - cargo type and quantity;
   - planned duration of STS operations;
   - identification of STS operations service provider or POAC and contact information; and
   - confirmation that there is a STS Operations plan on board.
viii. If the estimated time of arrival of vessel changes by more than six hours, the master, owner or agent of that vessel shall provide a revised estimated time of arrival to local authorities.

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Approved STS operations plan:

Each vessel involved in STS Operations should have on board an STS plan approved by its Flag Administration prescribing how to perform safe STS operations. The STS Operations plan must be written in the working language understood by the ship's officers and be incorporated into the existing on-board Safety Management System (SMS).

A copy of the approved STS Operations plan must be available at the following locations on each vessel –

i. the bridge;
ii. the cargo transfer control station; and
iii. the engine room.

The STS Operations plan shall be up to date and all personnel on board shall understand and follow the procedures in the Approved STS Operations plan. The Approved STS Operations plan should contain the following information –

i. a step-by-step description of the entire STS operation;
ii. a description of the mooring and unmooring procedures and arrangements, including diagrams where necessary, and procedures for tending the vessel's moorings during STS operations;
iii. a description of the cargo and ballast transfer procedures, including those used while the ship is either underway or anchored, as well as procedures for –
    - connecting and testing the integrity of cargo hoses and the hose to manifold interface;
    - topping off cargo tanks; and
    - disconnecting cargo hoses.
iv. the titles, locations and duties of all persons involved in the STS operation;
v. procedures for operating the emergency shutdown and communication systems, and for rapid breakaway;
vi. a description of the drip trays and procedures for emptying them;
vii. procedures for reporting spillages of oil into the water;
viii. an approved contingency plan; and
ix. a cargo and ballast plan.

Person in Overall Advisory Control (POAC):

STS transfer operations should be performed under the advisory control of a POAC, who could either be one of the Masters concerned or an STS Superintendent. For reasons of impartiality, and to provide an objective oversight of STS operations, it is suggested that the appointment of an independent POAC be considered. It is not intended that a POAC relieve the ships' Masters of any of their duties, requirements or responsibilities as required by the ISM Code. The POAC shall be suitably qualified and have sufficient experience to perform all aspects of STS operations having at least the following qualifications –

i. an appropriate management level deck licence or certificate meeting STCW standards with appropriate and up to date dangerous cargo endorsements;
ii. attended a suitable ship handling course;
iii. conducted an appropriate number of mooring and unmooring operations in similar circumstances and with similar type of vessels;
iv. experienced in loading and unloading relevant cargo;
v. a thorough knowledge of the geographical transfer area and surrounding areas;
vi. a thorough knowledge of spill clean-up techniques, including familiarity with the equipment and resources available in the STS contingency plan.
vii. A thorough knowledge of the STS Operations plan

The POAC Should:

i. ensure cargo transfer, mooring and unmooring operations are undertaken in accordance with the STS Operations Plan, Chapter 6 of the IMO manual on Oil Pollution; and the recommendations contained within *Ship to Ship transfer guide* - petroleum.
ii. advise on critical phases of cargo transfer, mooring and unmooring.
iii. ensure provisions of the contingency plan are carried out in the event of spill.
iv. ensure all required reports are made to appropriate authorities.
v. ensure crew members are properly briefed and understand their responsibilities for each aspect of the operation.
vi. ensure proper and effective communication confirmed between the two vessels and appropriate checklists completed before any approach and mooring operations are attempted.
vii. ensure pre-transfer STS safety check undertaken in line with accepted industry guidance.
viii. ensure appropriate checks undertaken prior to unmooring.

The POAC should have the authority to advise:

i. suspend or terminate the STS operation; and
ii. review the STS Operations plan for that particular operation

Risk Assessment:

STS Operations must be thoroughly risk assessed for each of the following phases: –

i. Pre-contract, inclusive of a vessel compatibility study;
ii. Pre-arrival of vessels;
iii. Approach of the two vessels and the mooring operation, including any transfer of equipment such as fenders and cargo hoses;
iv. Commencement of cargo operations;
v. Completion of cargo operations; and
vi. Unmooring of two vessels.

The Club has experience of a number of incidents arising during STS operations where a thorough and robust risk assessment for each phase of the operation, such as identified above, may have reduced the potential for a claim.

The scope of a risk assessment should include, but not be limited, to the following and where significant dissimilarities are identified which could give rise to unsafe STS operations then a detail gap analysis should be performed –

i. Careful study of a vessel's history, structural and compliance with Flag, Class, PSC, oil major acceptance and vetting review, casualty review;
ii. Vessel Compatibility, sizes, including freeboard and mooring review;
iii. Adequacy of navigational processes and manoeuvring characteristics of both vessels;
iv. Study of manoeuvring area where STS is to be conducted;
v. Possible effect of interaction (particularly where there are shallow waters compared to vessel draught);
vi. Mooring equipment such as winches, mooring lines and fenders, their strength, material, arrangements and maintenance history;
vii. Sufficient number of crew on each vessel, adequately trained, qualified and experienced;
viii. Effective and reliable communications between vessels and with POAC;
ix. Proper understanding of signals and/or commands at all stages of the operation;
x. Suitability of the agreed STS Operations plan;
xi. Condition of cargo equipment such as transfer cranes, hoses and any other equipment, and their maintenance records up to date;
xii. Appropriate preparation of vessels for STS operations, reliability and testing of main engines and other essential systems and sufficient control over the vessels during operations, particularly the relative vessel approach speeds and the angle of approach;
xiii. Attention to changes in freeboard, vessels' draughts and for listing when transferring cargo; and
xiv. Constant and continuous monitoring of weather conditions prior to and throughout the course of the operation, having due regard to agreed weather criteria and limitations.

Members are also reminded that any modifications needed in the Approved STS Plan as result of gap analysis then Flag Administration and Classification Society of the vessel are to be consulted.

Photograph from MAIB report 03/2010
STS transfer Collision MT Saetta and MT Conger

Readiness of Equipment for STS Operations:

It is vital that during pre-contract compatibility study, Companies are to study every aspect of STS operations and the Masters of both vessels should be consulted regarding their on board equipment. Prior to commencement of any STS operations, POAC and Masters of both vessels should exchange information regarding the availability, readiness and compatibility of the equipment to be used in the STS operation.

Fenders:

The Contracting parties should provide marine industry recommended ISO 17357 (or latest equivalent) fenders (primary and secondary) of adequate quantity and size to meet the requirements of protecting the vessels from the possibility of damage. It is recommended to rig the fenders on the maneuvering vessel in order to avoid landing on an unprotected hull section of the vessel. The POAC should advise in advance the positioning and method of securing of fenders to the vessels.

Frequent areas of damage are on the shoulder and around the accommodation areas where secondary fenders have not been correctly positioned or adjusted to take account of changes in draught and freeboard and where vessels may roll together due to swell and waves. There is an elevated risk of damage to vessels during manoeuvring operations, both berthing and sailing.

Secondary fenders too low and too far aft to afford adequate protection

Hoses:

The hoses used for the STS transfer should be specially designed for the product that they are handling and should comply with industry standard EN1765 (or latest equivalent). The handling, inspection and testing of hoses should comply with BS1435 (or latest equivalent) and OCIMF guidelines. Industry standard hoses should bear the following durable indelible markings –

i. The manufacturer's name or trademark;
ii. Identification of the standard specification for manufacture;
iii. Factory test pressure (note: equal to rated working pressure, maximum working pressure, maximum allowable working pressure);
iv. month and year of manufacture and manufacturer's serial number;
v. indication that the hose is electrically continuous or electrically discontinuous, semi-continuous or anti-static; and
vi. the type of service for which it is intended, e.g. oil or chemical.

Test data with respect to each hose should be available and should be sighted prior to the hose being used for transfer. Hoses should be withdrawn from service when any kind of defect is identified during visual inspection, when, following consultation with the manufacturer, a defined period of service has been completed and / or when the temporary elongation of a hose exceeds the maximum allowable value.

In addition to the testing of individual hoses, and in order to protect against the risk of oil leaks at the connections of suspended hoses, it is important to test the integrity of the hose string(s) to verify that hose flange connections are properly made up and tight.

Hoses should at all times be suspended and adequately supported in such a manner as to avoid their twisting and pinching between the vessels, rubbing against the ships' structure and placing excessive strain on the manifold fittings. Care should be taken not to exceed the applicable limits on bend radius.

Mooring equipment:

It is important that both vessels involved in STS operation are fitted with good quality mooring lines, efficient winches and sufficiently strong closed fairleads, bitts and other associated mooring equipment. All fairleads used should be of the enclosed type. A main consideration in mooring during STS operations is to provide fairleads and bitts for all lines to try and preclude the possibility of lines chaffing against each other, against the vessels or the fenders. It is important that fairleads, bitts and mooring fixtures and fittings be free of burrs and potential snagging obstructions that could cause damage to the moorings of the other vessel and that other potential sources of chaffing be identified, and the risk addressed. Steel wire mooring lines and high modulus synthetic fibre ropes should be fitted with synthetic fibre tails to provide the additional elasticity required for STS mooring arrangements. A minimum of four strong rope messengers should be available on both vessels, made from a buoyant synthetic fibre material.

Communications:

Good, reliable communications in the common language between all concern parties is the key for safe and successful STS operations. Companies should ensure that, from start to finish of STS operations, all essential personnel are provided with a reliable means of communication such as an explosion-proof type or intrinsically safe handheld radios.

In the event of breakdown of communications on either vessel, the vessel should sound an agreed emergency signal. At this signal, the STS operation should be suspended and only resumed after the regular means of communication have been restored.

Contingency planning and emergency procedures:

As stated above, before committing to an STS transfer operations a thorough risk assessment must be carried out covering all aspects of the operation, identifying potential risks and the means by which these risks are to be managed. The output from the risk assessment should be used to develop risk mitigation measures and contingency plans covering all possible scenarios and emergencies and providing for a comprehensive and appropriate response, including the notification of relevant authorities. Any leak or spillage during STS operation should be reported immediately to the officers on cargo watch who should immediately stop the cargo transfer and notify the POAC. The transfer should remain suspended until the root cause of any leak or spillage has been identified and addressed and it is determined to be safe to resume the operation.

In the event of any dispute or a claim, and dependent on the particular circumstances, the Club would require such documents and evidence as:

i. Investigation reports;
ii. Statements from Masters of both vessels, POAC and other pertinent staff;
iii. Details of POAC;
iv. LOP's;
v. VDR data;
vi. Copies of log books;
vii. Weather reports;
viii. Photographs of damage and / or other pertinent areas / equipment, general photographs to represent the transfer operations, vessels alongside each other, mooring arrangements etc;
ix. Copy of STS Operations Plan (Both Vessels);
x. Copy of vessel compatibility study;
xi. Copies of STS Operation checklists, cargo transfer checklists etc;
xii. Copy of CP;
xiii. Copies of certificates for appropriate equipment, fenders, hoses, mooring ropes etc; and Maintenance reports.

Suspension of STS operations:

Both vessels should be prepared to immediately discontinue the STS operation, and if appropriate to unmoor and depart. The operation should be suspended when –

i. environmental conditions such as wind and/or sea conditions approach pre-agreed limits;
ii. movement of the vessels is such that there could be vessel to vessel contact, or the possibility of breaches the maximum permissible separation and putting excessive strain on hoses;
iii. evidence of moorings chaffing or the potential for chaffing
iv. either vessel experiences a power failure;
v. there is a failure of the main communication system between the concerned parties and there are no proper standby communications;
vi. any oil spillage is discovered;
vii. there is an unexplained pressure drop in the cargo system;
viii. fire danger is discovered;
ix. any oil leakage is discovered from hoses, couplings, or the vessel's deck piping;
x. overflow of oil onto the deck occurs caused overfilling of a cargo tank;
xi. any faults or damage threatening the escape of oil are discovered;
xii. there is a significant, unexplained difference between the quantities of cargo delivered and received; and
xiii. in the opinion of the POAC or either of the vessel Masters, suspension of transfer operations is warranted for safety or other identified operational needs.

STS operations may be resumed only after appropriate remedial action has been taken or the adverse weather condition are subsided.

Completion of STS operations:

Upon completion of the STS operation, the vessel with the greatest freeboard should close its manifold valve and drain cargo hose contents into the tank of the other vessel. Only when the hoses are fully drained should they be disconnected and then securely blanked. The cargo manifolds should also be securely blanked. Following completion of any relevant checklists, the Masters should co-ordinate the unmooring plan in preparation for the unmooring operation, taking into account weather and sea conditions prevailing in the area. As soon as cargo transfer operations are completed the responsible person on each vessel to ensure that all valves in their system are closed and cargo tank openings are closed and secured for sea. Finally, the cargo transfer documents must be completed, communications checked, and the readiness of both vessels established, at which time the unmooring operations can take place in accordance with the plan.

References:

MARPOL Annex I IMO MEPC.186(59)
IMO Manual on Oil Pollution
International safety guide for oil tankers and terminals (ISGOTT) – (IAPH/ICS/OCIMF)
Ship-to-ship transfer guide – petroleum – (ICS and OCIMF)

This Risk Alert is intended to supersede RA 17 – STS Operations.