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10 Bulk Cargo Operations

10.1 General Requirements

Cargoes carried in bulk on offshore support vessel include dry products in powder form together with various types of oil and water based muds, base oils, brine and numerous other chemicals transported in liquid form.

Attention is drawn to Chapter 3 which emphasises, that when planning to load any cargo, including those consisting of bulk powders or liquids onto an offshore support vessel, the various parties involved have several joint responsibilities, including ensuring that:

1. The proposed vessel is fully fit for the purpose intended.
2. It is fully in compliance with all relevant legislation, rules and codes relating to the carriage of the relevant goods or products.
3. Appropriate procedures for the loading, carriage and discharge of the products are in place.
4. The personnel involved have relevant experience and competencies.

Bulk cargo transfer is potentially hazardous and must be done in a controlled manner.

10.2 General Precautions

In undertaking bulk cargo operations the following precautions should be observed:

1. The pressure ratings of all components of the transfer system should be verified to ensure that they are appropriate for the proposed operation.
2. Prior to commencement, agreement shall be reached between all relevant parties, including vessel, base, facility or roadside tanker regarding the pressure rating to avoid overpressure.
3. The protocols for control of the transfer operation are to be agreed by all parties involved.
4. Communications arrangements are to be agreed and to be tested prior to the commencement of the operation and at frequent intervals as it proceeds.
5. If communications are lost, Stop the Job
6. Shipper and receiver should confirm quantities to be transferred and subsequently monitor at regular intervals.
7. Shipper and receiver to agree on rates of delivery and densities of cargo being transferred.
8. Relevant personnel must be readily available and nearby throughout transfer operations.
9. At facility the Master or senior OOW must ensure he can see bulk hose(s) at all times and not be distracted away from these. Particular attention should be paid during hydro-carbons transfers that proper consideration is taken of potential hazards when carrying out concurrent cargo operations.

10. Each party shall give sufficient warning prior to changing over tanks and communicate when changes have occurred.

11. Do not close valves against a cargo pump.

12. If at any point vessel Master, shipper, OIM or any other person have concerns relating to the safety of the transfer operation it must be terminated.

13. Unregulated compressed air should not be used to clear any bulk hoses back to the vessel since this may damage tanks.

14. Compressed air should not be used to clear hoses used for the transfer of any hydro-carbon based products since an increased risk of explosion will result.

15. Do not transfer any other liquids using potable water hoses.

16. Before use flush potable water lines through to clear any residues.

17. Hoses must remain afloat at all times through use of sufficient floating devices.

18. Use of self-sealing weak link couplings in the mid-section of the hose string is recommended.

19. Avoid use of heavy sections of reducers or connections at hose ends.

20. The hose from the facility should not be connected to the vessel until both have agreed that all preparations have been completed and that the transfer can commence immediately after connection has been satisfactorily completed.

10.3 Bulk Operations in Port & at Facility

Flow charts illustrating the processes involved in handling of bulk cargoes both in port and at the offshore facility are included in Appendix 10 - A.

Particular responsibilities associated with such operations are described below.

A check list which should be completed prior to commencing any transfers of bulk cargoes is included in Appendix 10 - B.

10.3.1 Vessel Responsibilities at the Facility

Before offloading bulk cargo confirm the following with facility:

1. Communications protocols have been agreed and in particular party whose “STOP” it is.

2. Quantity of bulk to be offloaded.

3. Hoses and connections, colour codes and dimensions.
4. Rigged hose lengths are adequate.
5. Procedures for venting and blowing through hoses.
6. Facility is ready to receive cargo; all valves and vents are open and correct tanks lined up.
7. Emergency shut down procedures are in place and crew familiar with these.

Ensure that:
1. All pollution prevention equipment is in place, as per SMPEP.
2. All manifold valves are in good condition.
3. The person in charge cannot or will not be distracted from the operation.
4. Facility under-deck lighting is adequate.
5. Dry bulk vent line positions are identified.

Master shall submit to the designated contact person:
1. All receipts where applicable, including meter-slips, for cargoes transferred.
2. Any other relevant documentation and information.

10.3.2 Facility Responsibilities

Ensure that:
1. Communications protocols have been agreed and in particular party whose “STOP” it is.
2. Hoses, manifolds and valves are visually inspected, maintained and replaced as required and/or in accordance with the planned maintenance system.
3. Slings and lifting points are visually checked and replaced as required.
4. Hoses are lifted by a certified wire strop on a certified hook eye fitting.
5. Under-deck lighting adequately illuminates the transfer hose and vessel.
6. Appropriate flotation systems are intact and in place.

10.4 Preparations Relating to Transfer of Dry Bulk Materials

The following recommendations are included to supplement those in the flow-charts included in Appendix 10 - A.

It is recommended that procedures should be adopted as follows:
1. Prior to confirming that a vessel is ready to transfer any dry bulk cargoes it should be verified that all on-board preparations have been completed.
This includes a requirement to ensure that, where relevant, all elements of the system have been vented to atmospheric pressure.

2. When transferring dry bulk cargoes to or from vessels personnel responsible for delivering the product should confirm that those responsible for receiving it have completed all relevant preparations.
   
   Assumptions that preparations have been completed can be dangerous and must be avoided. Relevant check lists are to be completed as required by the parties involved.

3. When transferring dry bulk cargoes to or from vessels care should be taken when deciding the sequence and manner in which the various valves are opened to avoid the risk of inadvertently over-pressurising any elements of the system.

4. It will be appreciated that the handling of dry bulk materials involves systems containing large volumes of pressurised air. The stored energy in such systems is therefore considerable and the potential for serious personal injury in the event of failure is high.

5. All personnel involved in such operations must therefore comply with all relevant procedures and to ensure that all checks have been satisfactorily completed prior to confirming their readiness to deliver or receive the product.

10.5 Hose Usage

General guidelines regarding the usage and care of offshore bulk hoses are included in Appendix 10 - C.

10.6 Hose Marking Connections

Further information relating to hose marking, usage and connections are included in Appendix 10 - E.

10.7 Bulk Hose Handling Procedures at Facility

It is recommended that the following procedures be adopted during receipt and handling of bulk hoses at the offshore facility.

1. The vessel should take up position and confirm readiness to receive the hose.

2. Except where other arrangements are in use the Crane Operator on the facility lowers the hose to the vessel, holding the hose against the ship’s side and at a height that allows the crew to catch and secure it to the vessel’s side rail, keeping the hose end clear of the crews’ heads.

   Where other arrangements exist the appropriate procedures should be followed.
3. Once secure, the hose end is lowered inboard of the rail and the crane hook discon-
nected.

4. When the hook is clear, the crew install the hose on the appropriate connection on the ship's
manifold.

5. Uncoupling is the reverse of the above procedure.

6. After releasing any self-sealing connection it should be visually inspected by the deck crew
to ensure that it is fully closed and is not passing any liquids.

Vessel crews should be reminded that hose couplings should, whenever possible, avoid con- tact
with the ship’s structure. The integrity of the couplings should be monitored by visual inspection of
the painted line on the couplings, where applied.

In marginal weather greater care than normal is needed by the vessel to avoid over running the hose
especially if deck cargo is also being worked. Consideration should therefore be given to working
bulk only in such circumstances.

10.8 Hose Securing Arrangements

Section 10.7 above describes the general principles of handling bulk hoses at offshore facili-
ties. However, these often require personnel securing the hose(s) to work underneath or in very close
proximity to the suspended hose for some time whilst completing the arrangements used to secure the
hose.

Any arrangements which reduce the time personnel are required to work in close proximity to the
suspended hose, or avoid this altogether should be investigated.

Appendix 10 - C includes a description of arrangements which are relatively simple, requiring only
minor modifications on any vessel and none on the facility other than the rigging of a soft strop at a
suitable distance from the end of the hose. Whilst, when it is being passed to the vessel personnel
still have to work in close proximity to the suspended hose when securing it, the time required is
much reduced. On recovery, personnel are required to disconnect from the manifold and connect
the crane hook to the recovery pennant, but thereafter further intervention is not normally required.

Other arrangements having similar objectives have also been developed.

Further proprietary arrangements have been developed, for example those illustrated in Ap-
dex 10 - D. These also involve minimal modifications to the vessel and have been used successfully in
some operational areas. Whilst undoubtedly minimising risks associated with hose handling even
further such arrangements are likely to be more complex, requiring fairly extensive modifications on
both vessel and facility. The flexibility to utilise vessels not equipped with the particular features
required will therefore be reduced.

10.9 Bulk Transfers of Common Liquids
10.9.1 Cargo Fuel (Marine Gas Oil)
Establish a sampling and receipting procedure when transferring fuel. Sampling taken in accordance with MARPOL Annex VI will normally suffice for these operations. However, in some circumstances more rigorous sampling procedures may be required. Any such requirements should be included in the Master’s sailing instructions and should always be complied with.

10.9.2 Potable Water
Specific national or charterer’s requirements may apply to the carriage, storage and transfer of potable water. The Charterer, Owner and Master should ensure that any such requirements are understood and complied with.

10.10 Bulk Transfers of Special Products
Special care must be taken to follow correct procedures when transferring special products which include but are not limited to methanol and zinc bromide. Appropriate risk management procedures should be in place when transferring special products. Reference should be made to Chapter 4 of this document, with particular attention being given to PPE required for personnel involved.

When transferring these products the following should be observed:

10.10.1 Shipper
1. Provide full details of product(s) being shipped, including details of all precautions to be taken when handling.
2. Staff to be on site throughout to advise on pumping, handling, earthing and discharge of tanks.
3. Provision of appropriate fire fighting equipment, where relevant.

10.10.2 Operating Company and Base Operator
1. Nominate berth after liaising with harbour authority, fire brigade and harbour police or security.
2. Ensure sufficient cooling or drenching water is available.
3. Cordon-off area, with signs posted to indicate a hazardous area.
10.10.3 Master

1. Should complete a ship to shore safety check with shipper.
2. Must authorise loading.
3. If required, ensure a permit to work is in place before any loading operations can be conducted.
4. Ensure vessel's restricted zone is clear, fire hoses are rigged and SMPEP equipment is ready for action before commencing loading.

10.10.4 Characteristics of Some Special Liquid Products.

Whilst the shipper should provide full details of any products being shipped characteristics of some of the more common chemicals which may be shipped in bulk liquid form are included below.

10.10.4.1. Methanol

Particular characteristics of this product are as follows:

1. Burns with no visible flame in daylight conditions.
2. Readily or completely miscible with water.
3. Is a class 3 substance with noticeable odour.
4. Is highly flammable, with a flashpoint below 23°C.
5. Can evaporate quickly.
6. Has heavier than air vapour that may be invisible, and disperses over the ground.
7. Can form an explosive mixture with air, particularly in empty unclean offshore containers.
8. Experiences pressure increase on heating, with the risk of bursting followed by explosion.
9. Is very toxic, and possibly fatal, if swallowed or absorbed through skin. Symptoms may not appear for several hours.
10. Can cause significant irritation of the eyes.

The following specific precautions should be observed when transferring this product:

1. Ensure that integrity of system is intact, including all relevant certification which should be valid and in-date.
2. During bulk methanol transfer, smoking and the use of ignition sources are prohibited.
3. During electrical storms (lightning) operations should be terminated.
4. Free deck space around bulk loading / discharge stations so that coverage of foam monitors is not obstructed.
5. No other operations to be undertaken when handling this product.

10.10.4.2. Zinc Bromide

Zinc Bromide is a highly corrosive and environmentally contaminating product. Due to its corrosive nature, protection against injury from exposure to it is essential. Information provided by the shipper should be used when undertaking risk assessments involving the carriage of this product to determine the appropriate level of PPE which should be used.

10.11 Attendance of Facility Personnel During Bulk Transfer Operations

Whilst vessels are connected to offshore facilities by hose(s) for the purpose of delivering bulk commodities to facilities it is important that, in the event of a change in the operating circumstances developing, personnel on the facility remain available at all times to disconnect the hose(s) at short notice.

Failure to disconnect the hose(s) in a timely manner should circumstances change during bulk transfer operations could well result in significant risk of injury to personnel and/or damage to assets or the environment.

The crane operator and deck crew on the facility shall therefore remain readily available, contactable and nearby throughout transfer operations.

In the event that any such personnel are required to leave the vicinity of operations for any reason the vessel should be immediately advised. The vessel bridge team in conjunction with the facility manager should assess current and anticipated operational risks. It is the Master’s decision as to whether the vessel remains connected to the facility pending restoration of the required level of support.

10.12 Back-Loaded Liquid Bulk Cargoes

Please refer to Appendix 10 - F for further details.

10.13 Transfer of Noxious Liquids During Hours of Darkness

It is recognised that it will be necessary to transfer hydrocarbon or other noxious liquids during the hours of darkness, particularly in higher latitudes in the winter months.

For clarity, these Guidelines do not advocate that such operations should be curtailed or restricted, but seek to identify the additional risks involved in such transfers and to make appropriate recommendations to manage such risks.

It is recognised, for example, that leaks are most likely to occur in the early phases of any transfer operation as connections become pressurised.
Once all aspects of the transfer operation have been stabilised leaks are less likely to occur. It is therefore recommended that, wherever practical, the following practices may be adopted in relation to the bulk transfer of hydrocarbons (or other recognised marine pollutants) during the hours of darkness:

1. Adequate artificial illumination of the operational areas on the facility, the vessel and the water between them should be provided.
2. Additional high-visibility and / or reflective panels on the hoses (or their buoyancy elements) are recommended.
3. All preparations for the transfer to completed in daylight, where practical.
4. Careful check to be made for leaks, etc on vessel, facility and connecting hose as transfer commences.
5. Transfer may continue into the hours of darkness, provided that the entire area and associated equipment is adequately illuminated to an acceptable standard.
   In the event that the transfer continues a careful watch of the connections and hose should be maintained throughout.
   It is recommended that hydrocarbons or other noxious products should not be transferred simultaneously in these circumstances.
6. On completion of the transfer extra care should be taken when breaking the connection and returning the hose to ensure that the risk of spillage on completion of the operation is also minimised.

General precautions to be observed regarding safety of personnel working on deck during the hours of darkness should continue to be implemented.

10.14 Tank Cleaning

10.14.1 Preparations

10.14.1.1. Risk Assessment

The Tank Cleaner Foreman must demonstrate to the Master that he understands the principles and, if necessary, has undertaken a risk assessment relevant to the intended task.

The outcomes of the risk assessment should have been addressed in the subsequent tool box talk prior to commencing the task.

10.14.1.2. Protective Equipment

Personnel working in the tank shall wear the appropriate PPE as identified in the risk assessment, COSHH or equivalent assessment and MSDS.
10.14.1.3. **Atmosphere Testing/Tank Entry**

All tanks should be considered as “dangerous spaces” which, if appropriate precautions are not taken, would represent a serious risk to personnel entering them.

The Tank Cleaning Foreman must demonstrate to the Master that the atmosphere in the tank has been tested to prove that it does not represent a threat to any personnel who may be required to enter the space. He must also be able to demonstrate that any equipment utilised for this purpose has been used in accordance with the manufacturer’s instructions.

The results of the atmosphere testing should be recorded on the permit or other agreed document.

10.14.1.4. **Communications**

Communication system between all personnel within tank and at access must be agreed, tested prior to commencement of cleaning activities and checked at frequent intervals until all persons have exited the tank on completion of operations.

A stand by person at each tank will almost always be required. This person should be competent and trained to take the necessary action in the event of an emergency.

Effective means of ship/ship and ship/shore communication shall be established and maintained throughout the tank cleaning operation.

10.14.1.5. **Emergency Response and Escape**

The Tank Cleaning Foreman must demonstrate to the Master that the emergency response and escape arrangements identified in the risk assessment are in place and available if required.

10.14.1.6. **Check List**

A typical example of a check list which should be completed prior to the commencement of tank cleaning operations is included in Appendix 10 - G.

10.14.2 Operations

10.14.2.1. **Control**

Although the tank cleaning operation is conducted by a contractor under control of the contractor’s supervisor the safety of the operation remains the responsibility of the Master. The operation should be continuously monitored by a designated responsible vessel person who should stop any operation that he considers unsafe.
10.14.2.2. **Atmosphere Testing**

Regular tank atmosphere testing by competent personnel from both the vessel and tank-cleaning contractor must be undertaken both prior to commencement of cleaning activities and checked at frequent intervals until all persons have exited the tank on completion of operations. Equipment utilised to conduct these tests of the tank atmosphere must be used in accordance with its manufacturer's instructions.

10.14.2.3. **Simultaneous Operations**

Where simultaneous tank cleaning and other operations i.e. cargo operations, are undertaken then suitable safety precautions must be in place. Interfaces between vessel's officers, tank cleaning and quay supervisors must be kept open and active during the tank cleaning operation.

10.14.2.4. **Shift Hand-Overs**

Hand over between shifts of vessel's and tank-cleaning personnel must be carefully controlled to ensure continuity. Consideration must be given to holding a further tool box talk.

10.14.3 **Completion of Tank Cleaning**

On completion of tank cleaning operation the Master must carry out an inspection together with the tank cleaning contractor supervisor to ensure that the tanks have been properly cleaned and lines and pumps are thoroughly flushed. If these parties disagree an independent surveyor will carry out an inspection.

The various commonly accepted tank cleaning standards are shown in Appendix 10 - H. The tank inspection should confirm that the tanks have been cleaned to the appropriate standard.