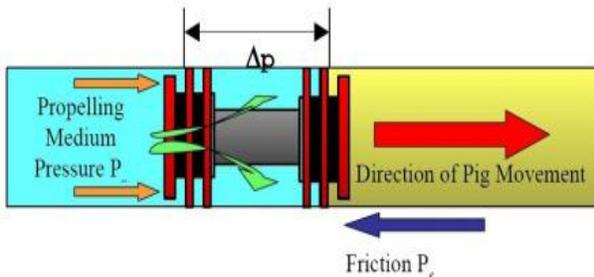


KISH P & I LOSS PREVENTION CIRCULAR KPI-LP-63-2012 **(Precautions about the clearing of shore pipelines after cargo operation)**

► Introduction:

There have been reports of some extensive structural damage incidents as a result of overpressure in the liquid cargo tanks during loading operations. Such damages result in time consuming and costly repairs and unfortunately, for reasons unknown, the frequency of such incidents has increased, despite ship procedures addressing the risks involved.

In experts' experience such incidents often occur during the loading operation phase when shore pipelines are being cleared, either by line blowing or by pigging (i.e. Pigging is a form of line clearing in which an object, most often in the form of a rubber sphere or cylinder and known as a "pig", is pushed through the line by a liquid or by compressed gas. A pig may be used to clear the line completely, in which case it will usually be propelled by compressed gas, or to follow a previous grade to ensure that the pipeline remains as free of product as possible, in which case it is likely to be propelled by the next grade.)



In a reported case after the completion of loading of one tank and initial clearing of the line, the terminal requested the re-opening of the manifold valve for further blowing of the cargo line. The line was then left open and the ship reportedly did not receive any further information from the terminal. Some five hours after the request for the re-opening of the manifold valve, a "blast" was heard on deck and cargo was seen emitting from the tank vent. The results were significant damage to the transverse bulkheads between the tanks and cargo mixing between tanks.

The main causes of such incidents may be; failure to maintain close communication with the terminal, lack of personnel's attention to and awareness of the hazards related to an unattended open manifold valve during shore pipeline clearing operations.

It is important to highlight the main issues involved in order to minimize the risk of pollution and damage to the cargo tanks during cargo operations involving clearing of shore pipelines.

► Minimizing risks involved in shore pipeline clearing:

The immediate causes of any damage are gas being supplied at a too high pressure compared to the capacity of the ship's tank vent system arrangement; or that the amount of cargo being pushed into the ship's cargo tank is too large compared to the tank ullage available, or the cargo coming at too fast a rate.

The root causes are, however, often complex and may involve lack of detailed planning of the overall operation, lack of communication between the parties involved during the operation, and personnel having a lack of training and awareness of procedures applicable to the actual operation. The procedure for clearing shore pipelines between the shore tank and the ship manifold will depend on the facilities available at each terminal and the type of cargo loaded. Ship and terminal procedures will address all relevant aspects of the cargo and line clearing operations but it has become evident that enforcement of good communication between the involved parties prior to and during the entire operation is a key factor in order to prevent incidents.

The following should therefore be borne in mind:

A) Planning the operation and allocation of responsibilities: All cargo operations must be carefully planned and documented well in advance of their execution. The details of the plans must be discussed with all personnel, both on the ship and at the terminal and the manner in which responsibility is to be shared between the ship and terminal must be agreed.

The Master or Responsible Officer should ensure that ship's personnel assigned duties during the cargo operation are made aware of the hazards associated with pipeline clearing operations.

A pre-cargo operation meeting (briefing) between personnel responsible for the operation from ship and terminal should confirm all critical interface parameters, including those important in the pipeline clearing operations.

[Refer to Ch.11.1.15 of the International Safety Guide for Oil Tanker and Terminals (ISGOTT)]

Specific hazards that the ship's personnel should be aware of and related interface parameters to be discussed with the terminal during the pre-cargo operation meeting are listed below:

Hazards to be aware of:

- ✓ pressure surges in line
- ✓ tank over-pressurization
- ✓ dramatic increase in the filling rate
- ✓ cargo tank overflow due to excess cargo
- ✓ cargo tank overflow due to entry of compressed gas.

Parameters to be discussed in pre-cargo operation meeting:

- ✓ stages at which the line clearing will be carried out
- ✓ notice period required by the ship prior to line clearing operations
- ✓ propelling medium to be used
- ✓ length and size of the shore line
- ✓ time required for a pig to travel along the line
- ✓ pressures and venting capacity of the ship's reception tank

- ✓ volume of residual cargo in the line and the amount of ullage space available in the ship's reception tank
- ✓ capacity of the vapour return line to shore
- ✓ amendments to the cargo operation plan as a result of pipeline clearing operations, including volumes available for topping off
- ✓ communication routines during the entire operation.
- ✓ consider to include provisions for a standby cargo tank to be lined up and ready to be opened
- ✓ keep manifold valves closed during idle periods
- ✓ ensure that the vapour return line to shore is open during the operation (when available)
- ✓ throttle the main manifold valve as required
- ✓ monitor the manifold pressure closely
- ✓ monitor the available amount of cargo tank ullage space and pressure in tank

B) Procedures used & Precautions to be taken:

At the commencement of loading, and at each change of watch or shift, the Responsible Officer and the Terminal Representative should each confirm that the communications system for the control of loading is understood by them and by the personnel assigned duties during the cargo operation.

During the operations, there should be continuous and direct communication between the terminal and the ship until the operation has been completed and all valves have been closed.

Precautions and procedures requiring special awareness by the ship's personnel are quoted below:

- ✓ avoid using tanks that are loaded close to 98% as reception tanks for line clearing
- ✓ add a safety margin when estimating required ullages for reception tanks, this to take account of the potential for inaccurately declared "pigging quantities"

► **Summary:**

Procedures for cargo operations should be reviewed to ensure that the correct procedures are followed when dealing with shore pipeline clearing operations. A key issue in order to prevent incidents is the enforcement of good communication, both prior to and during the entire operation.

- ✓ ***Hazards to be aware of: Prior to the commencement of the cargo operation, and in order to raise awareness, specific hazards associated with pipeline clearing operations should be communicated to the ship's personnel who are assigned duties during the operation.***
- ✓ ***Parameters to be discussed in the pre-cargo operation meeting: Through the pre-cargo operation meeting, the responsibilities, time frames and critical interface parameters, including those important for line clearing operations, should be agreed between the Responsible Officer and the Terminal Responsible. Specific communication routines to be adhered to during the actual operations should be established.***
- ✓ ***Precautions and procedures requiring special awareness by the ship's personnel: Precautions and procedures during cargo operations should ensure that all ship manifold valves are kept closed unless specific operations that require open valves are ongoing, that each operation is continuously monitored by responsible personnel, and that there is direct communication between the terminal and the ship until operations have been completed and all valves have been closed.***