KISH P & I LOSS PREVENTION CIRCULAR KPI-LP-24-2012
(Hints to Avoid Claims concerning Tanker Cargo Shortage)

In order to avoid claims concerning cargo shortage on a tanker, one must consider various stages of the operation and the points which should be taken into account:

►A) Prior loading the following should be noted:

1- Ability to load the offered cargo:
- Information & details of the nominated cargo with reference to quantity, quality, carriage and discharge as well as suitable cargo heating instructions for loading, the loaded voyage and subsequent discharge are made available through charterers/shippers.
- If the vessel can safely load, carry and discharge the nominated cargo & comply with any cargo segregation instructions.
- If the cargo lines & tanks are ready for loading and free from previous cargo residues or wash water, etc.
- If applicable, the vapour side of each nominated cargo parcel (inert gas and vapour relief systems) to be segregated throughout the entire voyage.
- To avoid large vapour losses, the Reid vapour pressure (RVP) of the cargo should be within the ship's capacity.
- If the cargo is required to be heated on the loaded voyage ensure that an accurate record of daily individual cargo tank temperatures (upper, middle and lower) is maintained throughout the whole loaded voyage, together with daily ambient air and sea temperatures.
- If the vessel is required to crude oil wash (COW) under the terms of the governing charter-party the master is to ensure that the nominated cargo is suitable for COW. If not then owners/ charterers should be informed as soon as possible.
- If the specific gravity of the cargo is high, confirm what ullages will be required to avoid exceeding the maximum weight for which the tanks were designed.
- The cargo/es to be loaded safely with regard to trim and stability (free surface effect) limitations.

2- Loading plan:
-When loading to maximum capacity make sufficient allowance for cargo expansion on the loaded voyage. Company policies often dictate the allowable filling limit but, in general, loading to 98 percent of capacity is allowed for a cargo temperature increase of 20 deg.C. *Remember that the temperature difference between northern Europe and the tropics often exceeds this figure.*
- Ullages outside of the limits set out in the stability booklet can lead to excessive free surface and cargo sloshing. This sloshing effect can damage the cargo tank structure and will result in excessive boil-off of the lighter fractions in the liquid. This, in turn, will lead to an increase in vapour loss through the pressure/vacuum valves on each tank. Hence try to minimize the number of slack tanks when planning the loading operation.
-Try not to load high RVP or light distillate cargoes into tanks adjacent to those containing heated cargoes as this will increase evaporative losses.

►During loading the following are to be considered:

1- Interaction with the terminal staff:
It may not be enough if only checklists are interchanged. The cargo officer should take the chance to build a strong & comprehensive working relationship with shore personnel.
The following items should be made clear:
-Means & how to communicate.
- Grade(s) and quantity/ies of cargo/es to be loaded and whether it will be a ship or shore stop.
- Number of shore tanks to be loaded from, and the quantity, temperature and density of cargo in each.
- Whether density is being expressed *"in air"* or *"in vacuum"*.
- If shore pipelines are full or empty at the start of loading, and details of any pipeline displacement checks planned.
- Proposed loading rate(s) and the notice required by the shore for stopping.
- Whether loading will be interrupted for shore tank change-overs.
- The emergency-stop procedure and ensuring that all of the equipment is in good working order.
- If loading by gravity or shore pumps.
- If applicable, whether pumps are displacement or non-displacement (in an emergency, only a non-displacement pump can tolerate the ship shutting valves, whilst the pump is running).

2- Liaison with the cargo inspector:
On Board Quantity surveys prior to loading: If any cargo tanks are not dry, the inspector must determine the on board quantity (OBQ) of the previous cargo. At the time of the OBQ survey all cargo line valves should be in the open position.
For accuracy, the inspector must establish:
- The amount of any sediment and/or free water present in each cargo tank. Ideally each tank should be dipped from at least three locations, with one dip taken at the aft most dipping point.
- If the residues are liquid or non-liquid. Liquid residues should be determined by wedge formula calculation.
- If applicable, the temperature of any liquid residues in each tank.
- The ship's draughts, trim and list at the time of the OBQ survey.
-When there are remains in the ship's pipelines, tell the inspector how much. He is unlikely to certify these figures but should include them in his report, prefaced *"said to contain"*.
<u>It is never in the ship's interest for the OBQ to be underestimated.</u>
This will result in an overstatement of the ship loaded figure, exposing the ship to an unwarranted short delivery claim. Establishing the amount of cargo loaded Claims for alleged shortages, after completion of discharge, are always based on the difference between the net bill of lading and outturn quantities in the first instance.
Even if both terminals carry out their measurements diligently, each will (quite legally) round off temperature and ullage readings in its favour, so differences are to be expected.

In general the bill of lading quantity may be overstated and the outturn quantity may be understated. In the absence of a like for like comparison, the ship is the only common factor and, therefore, the measurements taken on board are critical.
It is vital to the ship's interests to ensure that all cargo inspections are carried out carefully and comprehensively. The inspector must be accompanied at all times and his ullage measurements actively verified. In all instances where more than one method of measurement is available use all methods independently to confirm the accuracy of measurements obtained.

Bear in mind that an inspector is as prone to error as the next person.

3- Measurement Errors arise from:
- Various especially commercial pressures.
- Use of defective equipment.
- Improper measurement technique.

4- Mitigating or Reducing the error risks by:
- Bearing in mind that the vessel shall remain responsible & accountable after the immediate pressure has been forgotten, hence one must ensure that the measurements were carried out correctly. If, despite all measures taken, the ship is exposed to an unwarranted liability then a protest must be made.
- Frequently maintaining and checking ship's (electronic) measuring devices. These devices should be regularly calibrated by an agent approved by the manufacturer.
- Doing systematic work, sharing experience around and encouraging everyone to talk about their mistakes can help to avoid making the same mistakes in the future.
- Never permitting the sole use of the terminal's measuring equipment on board. Always compare the ship's equipment with the shore equipment.
- Recording differences & noting protest if measurements, taken with the independent inspector's equipment differ from those taken with the ship's equipment.
- Noting that Retro-fitted vapour lock valves, required by electronic gauging equipment, may have changed the height and/or position of the reference ullage point. If so; measurements taken at such points must be corrected to the official reference point before use.
-Practicing that if the ship is pitching or rolling, five measurements should be taken from each tank. The highest and lowest should be ignored and the middle three averaged. Weather and sea conditions should be logged at the time of the measurement survey.
- Realizing that in the same conditions on inerted ships, or where electronic closed gauging equipment is used, the probe should be withdrawn and lowered until three readings differ by no more than 5mm.

5-Cargo temperature measurement:
-The temperature of every cargo tank should be recorded separately.
-Cargo temperature may vary by 5 deg.C at different levels in the tank, so must be averaged from at least three readings (upper, middle and lower). Some digital probes can measure at more frequent intervals.
A measurement error of 1 deg.C can distort the volume calculated by 0.1%, depending on cargo density.

6-Checking cargo density:
- Despite practical difficulties, it is best practice to make sure the density of the cargo on board is measured and compared with the figures supplied by the terminal.
- If the loading terminal measures densities *"in vacuum"* and the discharge port *"in air"*, the figures must be corrected to avoid an apparent loss.

7-Allowing for vessel's trim and list:
- Many load port cargo measurement errors are caused by failing to make due allowance for trim and list. These should be based on visual draught readings whenever possible.

8-Sediments and water:
-The quantity of any free water detected must also be corrected for trim and list. Protest even for small amounts as it is likely to have more in suspension, which will settle to the bottom during the loaded voyage.
-If crude oil has been loaded in the Persian Gulf then it is imperative that a careful record is maintained, on the loaded voyage, of any free water increase. If a free water problem is suspected then it is recommended that charterers are asked whether the ship can stop at any designated place outbound so that an independent check can be made on any free water present. *Once the voyage has been resumed then a check on free water should be made at least every three days.*

9-Calculating cargo quantity:
- Make sure all parties are using the same edition of the ASTM petroleum measurement tables.
- The pre-1980 Table 6 (still used, instead of Table 6A or 6B, by some terminals. particularly in the Middle East and Asia) will overstate the quantity of cargo loaded, if the cargo temperature exceeds 60 deg.F (approx. 15 deg.C).
- If applicable, ensure the contents of the ship's pipelines are included in the calculations. In general; new buildings now have the cargo lines above main deck level.
- Sign the inspector's report *"for ullages and temperatures only"*.
- Apply the vessel experience factor (VEF) to obtain a more representative *"ship loaded"* quantity.
- If the ship's figures (adjusted for VEF) differ from the shore figures, review the calculations.
-If the difference is confirmed, initiate the owner's standard procedure.

►While Unloading, the following should be borne in mind:

1-Liaising with the cargo inspector & Monitoring the discharge of cargo:
- Accompany the inspector at all times, ensuring that he measures temperatures, ullages, densities, list and trim accurately.
- Water delivered with the cargo at the load port is nearly always understated on the bill of lading, whilst the amount of water said to have been received at the discharge port is almost always overstated. The result of this under and overstatement leads to a shortfall in the declared net quantity out-turned.
- If sludge is found, during the free water dipping operation, try to obtain a representative estimate of the quantity in each tank.
- Ensure that the arrival trim and list are accurately recorded and that the trim/list corrections are applied to all ullage measurements.
- Before discharging cargo, ask the inspector to witness that the overboard valves are sealed and record the seal numbers in the log.
- Make sure pump-room valves are properly set and bypass valves closed.
- As soon as cargo starts to be discharged, check over the ship's side for any signs of leakage.
- Verifying that ullages are constant in idle tanks confirms that the cargo is not being misrouted or leaking within the ship, during discharge operations.
- Ullaging active tanks regularly, and comparing results with hourly shore tank received rates, helps ensure that cargo is not being misdirected in the receiving terminal.
- Ensuring that cargo heating is maintained in the tanks being discharged and *recording* when the heating coils are shut down, and the time the tank has been completely drained, provides valuable evidence in cases of claims concerning the quantity of ROB.
- Monitoring air and sea temperature (and sea state) can provide valuable evidence in case of a subsequent dispute about the pumpability of the cargo.

2-Outturn Maximising & Crude oil washing (COW):
A properly & carefully executed COW plan is a core element for maximising the outturn of a crude oil cargo. Where applicable, *clingage* can account for as much cargo as remains on the tank bottoms if a ship is not able, or permitted, to carry out COW. On new buildings, with double-hulled construction, clingage may be minimal.
To avoid delaying the discharge operation, any officer involved in crude oil washing must have the appropriate training and be familiar with the vessel's COW systems.
To prove that COW was performed efficiently, log the following on hourly basis:
- Which pump is being used.
- Start and stop times for each tank.
- Number of cycles each tank is washed.
- Wash program used (e.g. top wash, bottom wash).
- Depth of residue detected on the bottom of each tank before and after the wash. These measurements should be taken in at least three points in each tank.
- Type of machine, and settings, used.
- Pressure in the wash line at the pump and on the wash line on deck.
Ask the cargo inspector to witness that COW is being carried out efficiently.
If either the terminal or the charterer will not permit COW, ask for written confirmation and consider a protest to protect against a subsequent shortage claim.

3-Stripping:
The best way to avoid losses, resulting from charter-party freight retention clauses, is to make sure the ship can demonstrate it handled the cargo appropriately, and did everything possible to discharge all of the cargo.
The discharge plan must take account of the locations of the tank stripping suctions and give directions for achieving the desired trims and lists.
Allowing for ship's stress limits, the greater the trim aft, the better the drainage.

When stripping high pour-point cargo:
- Maintain cargo at the recommended discharge temperature until the heating coils are exposed.
- Start stripping as soon as cargo pumping stops.
- Protest any request from the shore to stop during stripping operations.
- If the stop is essential, continue stripping to an accumulation tank. Heating should be maintained until the cargo is below heating coil level.

When stripping high vapour pressure cargoes:
- Avoid operating pumps at excessive speed as this will increase vaporisation, causing cavitation and reduced suction.
- Increasing the pressure of inert gas in the cargo tank, or manipulating the discharge valve on the pump to maintain high back pressure on that pump.
Re-inspect empty tanks before declaring a grade finished, or discharging the last cargo (or slops) capable of driving eductors.

Additional cargo may have accumulated due to:
- Changes in list and trim.

- Bulkhead, pipeline or valve leaks.

4-Remaining on board (ROB) surveys:
Determining an accurate ROB quantity is difficult due to:
- Difficulty of calibrating bottom levels of tanks.
- Where applicable, blocked limber holes (New building double-hulled cargo tanks do not usually have such a problem)
- Un-measurable tank side clingage.
- Uncertainty about the liquidity of bottom residues.

It is always important to observe and log precisely how the inspector measures ROB.

AND

- Ensure he surveys all the cargo tanks, not just those operated on this occasion.
- Make sure he takes great care reading sounding rods or bobs, to avoid the common mistake of overstating the liquid element of bottom residues because it has run down over the sediment as the rod is raised.
- Ask him to take samples of the bottom residue, from more than one point in each tank, if possible.
-If you suspect that the samples may be unrepresentative, because of the tendency of less viscous material to flow more easily into the sampling device, ask the inspector to sample the more viscous material found in the pump mud box or the manifold when it is disconnected.
- Urge that the wedge formula be applied only to the liquid element of the ROB, since it can be argued that there must be as much sediment under the liquid as there is in the dry parts of the tank.
- Invite the inspector to sight every ballast tank and void space to confirm that no cargo has leaked.
- If the cargo lines have been drained, demonstrate this to him and ensure it appears on the inspection certificate.
- Calculate the ROB independently, compare results with the inspectors, and log any differences.
-Do not allow the shore hoses to be disconnected until the inspector has signed a dry tank certificate, or a statement of ROB, that you agree with.
-If you dispute the inspector's figures, initiate the owner's standard procedure.

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