



FLOODING OF CARGO HOLDS



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THE CLUB HAS SEEN AN INCREASE IN THE NUMBER OF INCIDENTS RELATING TO WATER INGRESS INTO HOLDS, THE CONSEQUENCES OF WHICH CAN PROVE COSTLY AND CAUSE DELAYS TO VESSELS' SCHEDULES. THERE ARE A NUMBER OF WAYS IN WHICH WATER CAN ENTER THE CARGO HOLD OF A VESSEL. THIS ARTICLE WILL FOCUS ON WATER INGRESS FROM CARGO AND BILGE LINES, AS WELL AS BALLAST TANKS. FOR INFORMATION ON WATER INGRESS THROUGH HATCH COVERS, PLEASE SEE THE CLUB'S EXISTING GUIDANCE ON THIS TOPIC.



Cargo hold bilge systems are fitted with a non-return valve on each bilge line, normally within the bilge well above the strum box/strainer. Non-return valves can seize open or partially open; a lack of an audible clanking of the non-return valve in operation should be investigated. If the screw down valve between the bilge line and the bilge pumping system/eductor is not closed and bilge/general service/ballast pumps are subsequently operated, sea water may flood back along the bilge line, past the non-return valve and into the cargo hold.

It is recommended that the inspection, maintenance and testing of cargo hold bilge line non-return valves are incorporated into the vessel's planned maintenance system, including lubrication of the non-return valve flap bearings, and checks for backflow past the nonreturn valves when bilges have been pumped dry, and with cargo holds empty. Non-return valves and bilge line isolation screw down valves should also be opened periodically and inspected for obstructions and the build-up of cargo residues to ensure that they remain effective.

Non-return valve blockages can be caused by debris, cargo residues and rust entering the bilge line and affecting the operation of the non-return valve, a strainer/strum box should be fitted to the end of the bilge suction pipe.

When carrying dry bulk cargo, suitable protective measures should be taken to prevent cargo migrating past the bilge well plate into the bilge well, such as fitting hessian and taping this in place. When cleaning holds after the discharge of dry bulk cargo, bilge well plates should be removed and all traces of cargo residue and debris cleared from the bilge well.

Pipework failure can occur where bilge suction lines pass through ballast tanks, the pipework should be checked for excessive corrosion during routine ballast tank internal inspections.

Crew members engaged in pumping cargo hold bilges should ensure that all valves isolating the bilge lines from bilge/general service/ballast pumps and eductors are closed upon completion of pumping bilges. Consideration may be given to posting warning notices next to bilge line isolation valves reminding crewmembers that they should be shut once the pumping of bilges has been completed.

Damage to hold structure may be caused by cargo operations, for example, due to grab damage to tank top plating or hold pipework on vessels carrying dry bulk cargo. Similarly, container vessel tank tops may be damaged by containers which are landed heavily or if lashing material becomes trapped between tank top and the container base.

Periodic hydrostatic testing of ballast tanks surrounding cargo holds should also be considered as part of a vessel's planned maintenance system, conducted at suitable intervals when the holds are cargo free. The test should only be conducted when shipboard operations and local regulations allow and when the cargo holds in question are empty. The ballast tank is overflowed to deck and the cargo holds adjacent to the tank inspected for leaks. However, such a practice only confirms that the tank is not leaking at the time of the test. It is therefore recommended that, as far as is safe and practicable, ballasting operations are only undertaken when the adjacent cargo holds are empty of cargo, recognising that this may not always be possible due to operational reasons.

In addition, if a sounding or remote monitoring of a ballast tank reveals an unexpected reduction or increase in the tank's contents, a thorough investigation should be carried out to ascertain the cause of the change.

Severe corrosion of ballast tank steelwork may involve plating where localised corrosion is so severe that holes have appeared, or on ballast tank air and sounding pipes in holds



SUMMARY OF CAUSES OF WATER INGRESS INTO CARGO HOLDS AND PREVENTATIVE MEASURES

CAUSE OF WATER INGRESS

PREVENTATIVE MEASURES



Seizure of non-return valves

- Inspection, maintenance, testing and lubrication of cargo hold bilge line non-return valves.
- Checks for backflow past the non-return valves when bilges have been pumped dry (holds to be empty).
- Periodic opening and inspection of non-return valves and bilge line isolation screw down valves.



Non-return valve blockage

- Preventing cargo migrating past the bilge well plate into the bilge well, by fitting hessian or similar above the plate, and a strainer/strum box to the suction pipe in the bilge well.
- Removing bilge well plates and cleaning cargo residue and debris after each discharge.



Pipework failure

- Checking pipework for excessive corrosion during routine ballast tank internal inspections.



Operator error

- Ensure that all valves isolating the bilge lines from bilge/general service/ballast pumps and eductors are closed after pumping bilges.
- Posting warning notices next to bilge line isolation valves.



Damage to hold structure

- Performing effective cargo watches.



Severe corrosion of ballast tank structure

- Periodic hydrostatic testing of ballast tanks with cargo holds empty.
- When practicable, only conducting ballasting operations when the adjacent cargo holds are empty of cargo.
- Investigating any unexpected reductions or increases in tank contents.



Leaking ballast tank manhole covers

- Carry out maintenance on the manhole cover while in dry-dock, or when the tank is opened.
- Refitting the cover carefully on completion so that the tank is ready for use.
- Checking that sealing arrangements are free of debris.
- Gaskets to be in satisfactory condition and renewed as necessary.
- All nuts and bolts in place and correctly cross-tightened.
- Hydrostatic testing of manhole covers when cargo holds are empty.

where the blind side of pipework close to the adjacent steelwork has corroded unchecked due to the difficulty of examining this area and removing rust scale. Where inspection of the pipework within a hold is problematic this should be conducted during each dry docking period.

Leaking ballast tank manhole covers may be due to failure of the gaskets or the presence of debris preventing a suitable seal when manhole covers are refitted, or when manhole cover securing nuts and bolts have not all been replaced or properly tightened.

If a ballast tank manhole within a cargo hold has been opened for a routine inspection, to carry out maintenance or while in dry-dock, the manhole cover should be refitted carefully on completion so that the tank is ready for use. Checks should be made to ensure that sealing arrangements are free of debris, that the gasket is in satisfactory condition and renewed if necessary, and that all nuts and bolts are in place and correctly cross-tightened in order to achieve a watertight seal. Provided no cargo is present in the hold, it is recommended that the tank is then checked by means of hydrostatic testing at the earliest opportunity to confirm that the manhole cover does not leak.

Bilge high level alarms and hold water level detectors will provide an early warning, and if acted upon quickly can prevent water ingress into the cargo hold. If these alarms are fitted, they should be tested periodically to confirm that they will operate correctly if water accumulates in the bilge well/cargo hold. Regardless of such alarms, bilge well soundings should be taken and recorded twice daily as a matter of routine as there have been many cases of water building up in a hold undetected due to the sudden and unexpected failure of a bilge high level alarm. Any activation of a bilge high level alarm or water level detector, or build-up of water in a bilge well should be investigated immediately.