



Hatch cover maintenance

Cargo hatch covers are important for the safety of the vessel, crew and cargo. Ensuring weathertight integrity while at sea is the primary objective of hatch covers. A number of reported casualties are related to the loss of weathertight integrity due to the collapse of hatch cover steel structures or failure of securing and locking devices.

One such casualty was the bulk carrier *Christopher*, which sank 150 nm off the Azores in December 2001 with the loss of 27 lives. Following engine failure in heavy weather, the forward cargo hold was apparently flooded through a collapsed/unsecured hatch cover.

In addition, cargo hatch covers have to protect the stowed cargo in the holds from damage due to water ingress, particularly if the cargo is sensitive to water damage. It must be noted that a significant portion of all cargo-related claims are caused by water damage, and many of these are related to seawater ingress through cargo hatch covers.

According to the North of England P&I Club, the top ten typical defects which lead to claims related to water damage are:

1. The seal set is beyond the point of replacement
2. The seal is worn/torn, displaced or missing (including cross-joints)
3. Temporary seal fixes
4. Wastage of steel support pads or cover side plates
5. Blocked drain holes
6. Wasted cross-joint drain channels
7. The cross-joint cleating or alignment is faulty
8. Cleats and support stools are wasted or missed
9. Holes in steel plating due to corrosion
10. Worn centre line wedge devices on side rolling covers which cause cross joints to open when the ship is at sea

As such, it is obvious that proper condition monitoring of the cargo hold hatch cover system and a consistent maintenance scheme are essential for the safety of the vessel, crew and cargo.

From the above figure, it can be seen that 50% of hatch cover defects are connected to the sealing and drainage arrangement while 18% are linked to the covers' structural strength aspects.

Following a number of measures introduced by the IMO and IACS to ensure that hatch cover arrangements are fit for purpose at the newbuilding stage as well as when existing bulk carriers are upgraded, the IMO has implemented a standard scope of inspection and maintenance so that bulk carrier hatch covers will be taken care of by owners and operators.

The on-board maintenance programme which is stipulated in the IMO's "Standards for owners' inspection and maintenance of bulk carrier hatch covers" and is to be established by the owner or operator must be directed towards the following points:

1. The overall structural strength is to be preserved by protecting the exposed surfaces of the hatch cover plating and stiffeners.

It is essential that the protective coating of the hatch cover structure is maintained in order to sustain the overall strength and avoid expensive repairs. Particularly single skin folding type covers are quite challenging in this respect as accessibility is difficult.

2. The surface smoothness and correct profile of trackways of rolling covers, compression bars and other steel work bearing on seals or friction pads are to be preserved to reduce wear rates on these components.

Corroded or damaged trackways affect the movement of hatch covers and may lead to misalignment. Trackways are therefore to be kept clean and in a good painted condition.

An effective seal can only be obtained if the compression bar is straight, undamaged and non-corroded. If this is not the case, the compression bar must be repaired or replaced.

Any debris left over from the last cargo operation will accelerate the wear rate of resting pads.

3. The hydraulic or mechanically powered opening, closing, securing or cleating systems are to be maintained in accordance with the manufacturer's recommendations.

All parts that move when operating the covers are to be kept in good condition. The play of hatch cover hinges and wheels is to be verified to be within the tolerances. Otherwise this will cause the slewing of panels. Besides other movable parts, the wheel spindles, hinge pins, racks, pinions and hydraulic cylinder bearings are to be regularly greased.

The hydraulic system's oil stowage tank level is to be monitored regularly. This is to ensure that the hydraulic cylinder valves are balanced to prevent the hatch cover panels from twisting. Oil samples should be taken frequently to verify the condition and, if necessary, the oil is to be changed.

While the hydraulic oil might last for approx. five years, the oil filters are to be changed more frequently as stated in the manufacturer's instructions.

4. Where it has been identified that resting pads, compression bars, seals, etc. are to be replaced due to significant wastage, wear or loss of adjustment capability, the adjustment of manual cleats is to be maintained.

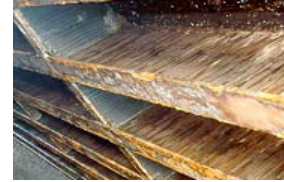
The function of the cleats is to keep the hatch covers in position and maintain the seal's design compression. The excessive trimming of cleats will not improve weathertightness but will lead to the accelerated wear of seals.

5. Seals and other wear components are to be replaced in accordance with the manufacturer's recommendations. This requires a sufficient number of spare parts of the correct specification to be carried on board or obtained, keeping in mind that seals are designed for a particular degree of compression, hardness and chemical and wear resistance.

The lifetime of hatch cover seals is in the range of four to five years given normal operations and maintenance. This period fits perfectly with the special survey interval and allows sufficient replacement time. Otherwise, due to the wear on steel-to-steel work or misalignment of hatch covers, the seals might have to be replaced earlier depending on the permanent set of the seals. In general, the manufacturer should state the permissible permanent set but a well recognised standard is to allow for 50% of the initial design compression which is stated in the hatch cover operating and maintenance manual.

In general, it is advisable to change the entire length of the respective seal at the first opportunity.

If resting pads are worn out, they have to be repaired in accordance with their original dimension. Although the relative movement of hatch covers is small on typical bulk carriers compared to on open hatch vessel with a higher torsional flexibility, it is advisable to use replaceable and adjustable low friction pads.



Corroded hatch cover.



Seal with permanent set.



Damaged resting pad.

6. All hatch cover drains and their non -return valves, where fitted, are to be kept in working order, noting that any drains fitted to the inboard side of seal lines will have non -return valves to prevent water ingress to holds in the event of boarding seas.

It should go without saying that, after each cargo operation, the coaming tops and cross -joint channels are to be cleaned by removing any loose scale or cargo residue. The same applies to the coaming drain holes and the non -return valves, which are to be checked to ensure they function, e.g. is the rubber ball moving freely.

A hatch cover inspection and maintenance routine which fits chronologically into the hull inspection and maintenance plan has to be implemented.

With regard to continuous maintenance, the schedules might in general call for the following intervals and should incorporate the manufacturer's guidelines:

- After every cargo operation
- Every three months
- Every 12 months

The IMO standard lists a number of hatch cover items which are to be inspected on each voyage cycle but not more than once per month. As certain items can be inspected only while the covers are open or semi -open, e.g. the sealing and draining arrangements, others may be inspected during the voyage to reduce interference to cargo operations as far as possible.

Although it is widespread practice to open hatches on voyages for different tasks, this should only be done if due care is paid to the risks involved. Due consideration should be given to the time needed to carry out an inspection to allow for an efficient maintenance and inspection plan. For example, more time for inspection is to be considered for the forward hatches within 25% of the ship's length.

The overall objective is to implement an efficient inspection and maintenance routine which is cost -orientated and allows the crew to conduct a thorough examination rather than just ticking a check box due to time constraints. We at DNV want to help you to achieve this objective.

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