COVER

Hatch sealing assessment

■ ■ A claim that frequently appears for the Club is damaged cargo due to ingress of water through the hatch covers rubber seals. This is not necessarily a problem of seaworthiness but definitely one to do with cargoworthiness. The objective of this article is not to address all possible aspects of hatch cover sealing properties and how to rectify them, but to give some simple means for the crew to assure that the covers are in a satisfactory condition.

We are basically addressing the hydraulically operated folding cover, where two panels are stowed forward and two aft, when in open position, the normal design of handy and handy max sized bulk carriers. We are assuming that coamings and panels are structurally sound, i.e. not distorted, non-parallel or wasted, also that the hydraulic system is sound and without leakages, since such defects are believed to be outside the crew's normal capacity to correct on board. We often hear from the masters/managers that the hatch covers have been subject to hose tests prior to loading and found to be in good condition. We are of the opinion that the hose test, as generally performed, is of little value for ensuring a proper sealing on a ship labouring in open sea. Possibly one can get an indication of the condition of the transverse joints, but the horizontal seals onto the coaming are far more difficult to address. It is quite obvious, in both cases, that the pressure of green sea on deck and covers can hardly be simulated with the water from a fire hose. A much more efficient way, in this context, is to use the ultrasonic devices readily available in the market, which are designed for this purpose.

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The advantages of using this type of equipment are evident, since sealing tests can be performed in a loaded condition without risking cargo damage and also the possibility of assessment in sub-zero temperatures, where hose tests are not an option, for obvious reasons.

Below are items listed that should be regularly checked by the crew:

With covers in open condition and climbing on top:

☑ Confirm that no excessive clearance exists in the hinges, indicating worn bushes/pins (when the ship is labouring at sea, any such clearance can result in insufficient compression of the rubber seal).

☑ Confirm that the hinges are satisfactorily greased.

☑ Confirm that the compression bar is free from mechanical damage and not wasted (if designed in stainless material, the latter is not a problem).

☑ Confirm that rubber seals are intact and in satisfactory condition.

☑ If gutters are fitted below the joint, confirm soundness and not being obstructed by debris.

With covers in open condition check from deck:

☑ Confirm at the outboard corners, meeting the compression bar of the panel stowed at the other end of the hatch, that the rubber seal corner profiles going from the horizontal to vertical seal are intact (if these rubber seal corner sections are crushed, this indicates that the panel is too low relative to the coaming compression bar and is pressed against the bar when operating the cover in a position of approximately 45 degrees).

☑ If crushed rubber corners were found at the inspection above, identify reason. Could be reduced wheel diameters or that pronounced tracks have developed in the coaming where the wheels are travelling.

☑ Confirm that the compression bar is free from mechanical damage and not wasted (if designed in stainless material, the latter is not a problem).

☑ Confirm sound gutter flat bar inside of compression bar and that gutter with drain holes and non-return valves fore and aft are clear and unobstructed.

☑ Confirm condition of rubber seals now available for inspection below the stowed panels.

☑ Confirm that all battening down cleats are in place and well maintained to facilitate adjustment if required.

Close the covers to half-open position:

☑ Confirm intact condition of rubber seals in the longitudinal sections.

Lower the covers completely and retract wheel lifters, if applicable:

☑ All covers are designed with surfaces on the cover meeting a similar one on the coaming, restricting a further compression, and/or to take the load from possible deck cargo, of the rubber seal. This might be designated resting pads at intervals all around the cover, it can also be the panel side plate being of thicker material resting uniformly onto the coaming.

Whichever, with the panels now freely resting on the rubber, there must be a distance between the resting surfaces, to ensure a sufficient compression when the battening down cleats are applied, which will bring down the panels to contact.

By ensuring this "gap requirement", the crew knows there is a positive engagement between rubber and compression bar after the cleats are applied.

See sketches "A" & "B" and photo of panels resting firmly on the coaming without being battened down and rubber with excessive impression, which would indicate a potentially questionable sealing property.

We can now anticipate some questions arising, such as:

How do we know what compression we have in the transverse joints?

Agree, this is slightly more time-consuming to verify, but is carried out as follows (reference to enclosed sketch "C"):

1. With the panels open or half open, measurements from the compression bar to a datum line on top of the panel, which is available also after the covers are closed, are recorded (by scribbling the measurements with a chalk on the panel), referred to here as measurement "A".

   A similar measurement is then taken on the rubber side panel, from the bottom of the permanent impression made by the compression bar to a similar datum line, referred to here as measurement "B". See enclosed sketch.

   These records are taken at, for example, 1.5 to 2-metre intervals.

   With the hatches closed and cleats applied, the distances between the datum lines are recorded and are referred to here as measurement "C".

   Conclusion: If "A" plus "B" is the same or more than "C", there is poor or no compression.

   On the other hand, if the sum of "A" plus "B" is less than "C", there is a corresponding compression.

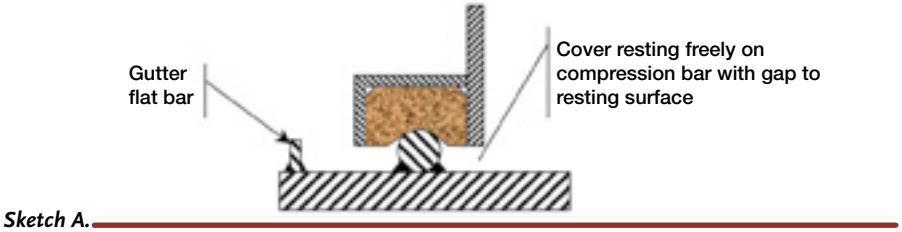
2. This method can of course be applied to compression assessment along the hatch coaming as well.

3. These measurements should be recorded two or three times a year and

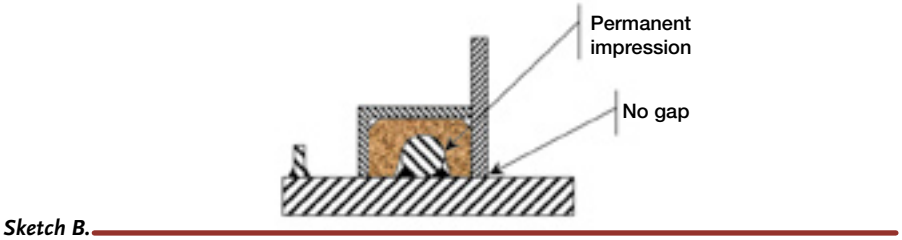
Rubber seal with permanent impression.

Panels resting freely onto coaming.

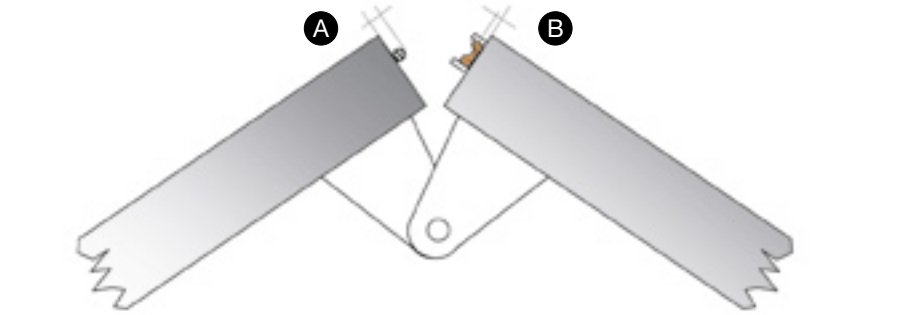
Attempt to upgrade seal with flat rubber.



Sketch A.



Sketch B.



Sketch C.

kept in the ship's records to be able to monitor the development of the sealing conditions of the hatch covers.

How much should the compression of the rubber be?

This varies with the type of rubber fitted and can be between 5 and 15 mm, depending on whether it is a solid type, hollow type or is more or less spongy. Hence, the manufacturer's advice should be sought. However, with a typical solid type of rubber, a total compression of 5 mm is deemed satisfactory.

It could, in this context, also be worth mentioning that when prudent repairs of the hatch cover sealings are done, i.e. the rubber channels are grit blasted, wasted material renewed and complete new rubber fitted, attention is paid only in rare cases to the panels' vertical position relative to the hatch coaming compression bar. The implication here is that over the years the resting surfaces, as mentioned earlier, have been worn, allowing the panels to move further down. This will create an unnecessary/unreasonable impression of the new rubber seal.

The consequence, in the worst-case scenario, is that the rubber is crushed, since rubber cannot, in fact, be compressed. Rubber is only flexible (reportedly water can be more compressed than rubber!)

The less dramatic result might be that the lifetime of the new rubber is considerably shortened due to excessive impression forces from the coaming bar. Hence, when doing sealing upgrading work, the maker's drawings should be sourced to find out the original measurements for the distances in way of the resting surfaces.

Having said this, a comment on how to improve the sealing properties for a shorter period of time, for example for attaining a better position for a permanent upgrading, is to insert flat rubber, 5-6 mm thick, in the channel behind the old rubber, hence achieving a temporary satisfactory sealing. We would advise strongly against the practice of gluing flat rubber to the surface of the old rubber, with its permanent impression, since there can be no way of checking what is happening to this application at that moment the compression bar and rubber touch and there is a slight sliding movement before the panel has settled. See photo to the left.

For further clarification, if required, please contact the writer at any time. In our mutual interest, we wish all operators a cargo-hold environment with no leaks or damage!

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