

# RISK WATCH



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## Introduction to the risk management series:

# Maintenance on board ship

The Club's ship condition survey programme helps identify good practices that can be shared by all Members and also focuses on areas where a lack of maintenance can lead to costly claims and detentions by Port State Control authorities.

The aim is to pre-empt such problems and advise Members of practical ways in which the crew can enhance maintenance on board whilst carrying out their daily duties. To help with this, there will be a series of articles in

*Risk Watch* looking at the various examples where risk managers have found that routine maintenance has lapsed and the ways this can be rectified by everyone involved in the venture.

## Hatch cover maintenance

The lack of hatch cover maintenance and/or improper repairs to hatch covers has been shown to be the primary cause of water ingress into the cargo holds which can lead to cargo damage. In addition to the financial and insurance claims, there are other potentially more serious consequences that need to be considered:

**Fire** – is the cargo being carried likely to self heat or combust when wet?

**Accelerated corrosion** – is the cargo being carried reactive to moisture (e.g. sulphur)?

**Loss of stability** – is the cargo being carried prone to liquefaction when wet?

Any one of the above could potentially lead to the loss of the ship and possible loss of life.



## Risk management

### Hatch cover maintenance (continued)

Through the Club's condition survey programme and data taken from claims histories, certain trends have been noted with regard to hatch cover maintenance or rather the lack of maintenance and also the lack of awareness of ship staff about maintenance requirements. Unfortunately, there seems to be a growing number of claims due to water ingress and the costs of such claims are increasing. The aim of this article is to highlight the most common defects and to emphasise the importance of proper maintenance routines. In addition, the article will discuss the safety considerations to be taken into account when working on or operating hatch covers. It follows on from a previous article in *Risk Watch* (Volume 20: Number 1, February 2013).

#### The basic procedures

Hatch cover maintenance routines should be drawn up following the manufacturer's recommendations and should take into consideration Classification Society requirements and the ship's trading patterns. Ship staff should be familiar with these requirements and checklists should be developed to cover all the items to be checked/inspected at each stage. These records need to be maintained.

Before the ship leaves port, all the weather deck hatch covers should be closed properly and all locking devices secured. Regular checks should be carried out on the security of the hatch covers while at sea and this is even more important when heavy weather is expected, as it may not be possible once the weather has deteriorated.

Only qualified personnel should operate the hatch covers. They should be well-trained and be fully aware of the manufacturer's procedures for the safe operation of the hatch covers that have been fitted to their particular ship. A proper risk assessment needs to be carried out which should be reviewed regularly and crew briefed and trained as to its contents.

Once opened, hatch covers should be secured properly, using the chain stoppers, chocks or other devices recommended by the manufacturers. Hatch openings should be well-illuminated and if there are guard rails and stanchions fitted, these need to be fixed into place.

Special care and attention should be paid to opening and closing the hatch covers when the ship has an excessive trim or list as there is a danger of the covers 'running away' when in motion.

It is not recommended to open the hatch covers whilst at sea to carry out maintenance and repairs but there will be times when it is necessary. In such cases there must be careful consideration of crew safety and the anticipated weather and sea conditions. It may be necessary to take additional measures to secure the hatch covers in the open position to prevent them moving when the ship is at sea.

#### General maintenance and routines

Continuous monitoring of the condition of the hatch covers and their sealing arrangements is best done when the covers are being opened and closed during operations. This continuous monitoring serves as an early warning and hopefully will prevent the development of more serious problems.

There follows a list of the common defects found during ship inspections and cargo damage investigations. This list is by no means exhaustive. These inspection and maintenance items should form part of the ship's regular routines.

**1** Before closing the hatch covers, ensure that the hatch coamings and double drainage channels are swept clean of any cargo debris. This will ensure that the coaming drain non-return valve remains clear and free as well as ensuring that no damage occurs to either the hatch cover rubber packing or the compression bar. It will also ensure that there is no obstruction to the correct and proper sealing of the hatch cover.

**2** Whilst cleaning, check for any damage to the coaming area, paying particular attention to the compression bars, wheels, wheel tracks and landing pads. Record details of any damages found for urgent or future remedial repairs as required. If temporary repairs are required these must not affect the ship's cargo worthiness. Ensure that the moving parts (wheels, cross joint hinges, hydraulic ram bearings etc.) are greased at regular intervals.

**3** If the hatch cover design is such that the cover side panels and end plates are in 'steel to steel' contact with the hatch coaming tops when in the closed position, check whether the coaming tops are free from grooving or wear. This would indicate worn hatch sealing rubbers.

**4** Hatch cover landing pads should be maintained in a good condition at all times, ensuring that any corrosion is dealt with in a timely manner and that the pads are greased regularly.

**5** Grooved, corroded or worn down landing pads are to be either built up with welding and ground back to original dimensions or cropped off and completely replaced.

**6** Check for any rust streaks on the inside of the coaming which would indicate water ingress from leaking hatch cover seals. Take remedial action and repair the seal and clean off the rust streaks.

**7** Check and clean the surface of the seals. This is particularly important if the cargo being carried is gritty or dusty.

**8** When cleaning the seals, check for signs of permanent deformation (a useful general rule is 30% of the seal thickness). If sections of sealing rubber are required to be replaced, the minimum length is 1m. However, it is often better to replace a full length of sealing rubber to ensure effective and even compression.

**9** Hold access hatches and ventilation covers need to be carefully scrutinised in the same manner as the hatch covers themselves, for signs of damage to the sealing areas, securing arrangements etc.

**10** The function of the cleats is to keep the hatch covers in position and maintain the seal's design compression. The excessive tightening of cleats will not improve weather tightness but will lead to the accelerated wear of the seals and the landing pads and could even distort the hatch cover. Cleats and their snugs should be inspected for any damage, ensure the rubber washer is intact and not perished and the tightening nut is free to move.

**11** Standard adjustment of the hatch cleats is to tighten the nut hand tight against the steel washer and then to further tighten by 360 degrees.

**12** Hauling wires/chains need to be inspected for correct adjustment and tension to avoid uneven seating and hatch cover distortion when closed.

#### Conclusion

It is evident from the results of the Club's claims and survey programme that hatch cover problems affect young and old ships alike. Effective maintenance can be achieved at minimum cost by both ship and shore staff implementing sound procedures and remaining alert to maintenance issues while on board the ship.



Hatch coaming not swept, cargo debris and rust still evident. Centre line joint closing wedge showing severe wear.



Corroded and wasted hatch cover landing pads.



Hatch cover sealing rubbers damaged and showing permanent deformation beyond the recommended limits. Rubber seal channels severely corroded.



Hatch coaming drain completely blocked with debris and rust.



Evidence of water ingress at the cargo hold entrance hatch and the hatch coaming.



Hatch securing cleat, seized and painted over.



Hatch cover guide wheel bearing failed – hatch cover will not close evenly.



Hatch cover sealing rubbers damaged and showing permanent deformation beyond the recommended limits. Rubber seal channels severely corroded.



Cross joint cleat renewed but old perished rubber still in use



Mechanical damage to the compression bar and inner drain channel.



Same class of ship, same age, two different owners, can you spot the difference?



## Containers and cargoes

### Mysterious white powder found in reefer containers

A cargo of frozen minced fish meat, shipped from Argentina to Japan, was found on arrival to be covered in a mysterious white powder.

In this recent case reported to the Club, no issues were found in relation to the cargo temperature. The white powder was analysed and found to consist mainly of aluminium oxide and a little aluminium sulphate.

It is thought that the presence of aluminium oxide did not affect the cargo but, as is often the case, the cargo was rejected as the consignee claimed that it was impossible to open the bags of the cargo without contaminating the cargo with the white powder. The carrier's surveyor considered that the powder on the cartons containing the cargo could be blown off by air. (The case remains in its preliminary stages.) The consignee stated that the cargo was contaminated and unsuitable for human consumption and therefore attempts at a salvage sale were limited. Furthermore the local Ministry of Agriculture, Forestry and Fisheries was unwilling to process the cargo as feed and so finally the cargo was disposed of as industrial garbage.

The question is: where did the aluminium oxide come from? Aluminium oxide is a coarse crystalline deposit most likely the result of surface corrosion of the aluminium parts within the reefer container. Surface corrosion can occur due to exposure to some fumigants which are commonly used for perishable cargoes such as grapes. Surface corrosion can also be caused by the use of low quality alloys used on the container components.

Many vapours are given off by chemicals and consideration should be given as to whether the aluminium oxide has been caused by current or previous cargoes. It is essential that reefer units, including the machinery unit, be thoroughly cleaned after carrying cargoes which require fumigation. If they are not cleaned sufficiently well then any aluminium oxide that becomes detached from the evaporator fan stators will eventually be circulated around the inside of the container as cooling air, therefore causing the powder to settle on the cargo.



In this instance the carrier had undertaken sufficient cleaning procedures and therefore denies liability. Carriers should highlight the possibility of aluminium oxide being present to their staff or contractors who are carrying out the pre-trip inspection and stress the need to clean the container of this potential contaminant.

The cause of this problem continues to be debated. If the presence of white powder is due to the use of low quality alloys then reefer containers should arguably be constructed with materials which are less susceptible to corrosion. If the presence of the powder is due to insufficient cleaning then further research is required to provide suitable cleaning products. At present there appears to be only one recommended product on the market and the cleaning process involved in its use is laborious.

### Open top container damage

Open topped containers are the cause of a substantial number of cargo claims being handled by the Club. In many cases the cargo stuffed into these containers is out of gauge (OOG) by virtue of being over height (OH).

A common scenario reported to the Club is that the container is stuffed at the shipper's premises and then a tarpaulin is stretched across to form the 'roof' of the container. However, sometimes the cargo itself also forms part of the roof bows or extends higher than the bows. Because the cargo is not declared as OOG or OH, no special instructions or arrangements are provided to the stow planners and consequently other cargo is loaded on top causing the cargo inside the open top container to be crushed

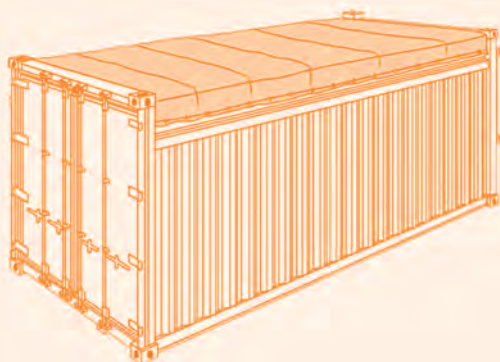
and damaged. In some cases, the floor of the container itself is also damaged by the cargo being compressed and this makes discharge at the destination a problem and can cause delay.

Open top containers are used to ship many different types of cargo, some of which are quite fragile, such as vehicles whose glass windscreens can crack easily and sensitive machinery which can be easily damaged. As well as the shipper's mis-declaration, the failure of terminals to recognise the over height condition of the container is a contributing factor.

In some cases, it was hard to see that the container was OOG or OH. However, in a number of cases it could quite clearly be seen that the cargo extended beyond the height of the container. Even if the problem is spotted in advance, it may be too late as the bay plan may call for other containers to be stacked on top and damage becomes inevitable.

Where open top containers are planned to be loaded it is recommended that crew take a few moments to look at the container to see if there are any obvious signs that the cargo may be over height, such as unusual bulging of the tarpaulin or obvious creases in the tarpaulin as it is stretched over the packing material or even over the cargo itself. In cases where the ship has a concern about the height of the cargo inside the container it may be possible to reject the container or arrange for it to be loaded without additional cargo on top.

By the time the unit arrives alongside for loading it may be too late to change the stowage position. However it should be possible to reject the shipment so that alternative arrangements can be made for shipment following consultation with the shipper.



### Crew washed overboard in heavy weather

A recent report from the Mariners' Alerting and Reporting Scheme (MARS) highlighted the case of two seamen who were washed overboard.

The ship was encountering force 9 winds with a 6m head sea when it was discovered that nylon mooring lines on the aft deck were becoming unsecured. The lines were a potential danger to the ship if they were washed overboard as they could sink and become entangled with the propeller. The plan was for two crew to access the aft deck, each wearing a lifejacket and a safety harness. One end of a firefighter's lifeline was attached to the safety harness securing ring and the other to a handrail on the external stairway platforms. It was intended that any slack in the lifelines would be manually taken up by other crew positioned on these stairway platforms.

As the two crew began their work on the aft mooring deck a large wave was shipped. The wave washed them overboard and also caused the safety crew to release their grip on the lifelines. As the two crew were washed away, their lifelines parted. The same wave crossed the first deck stairway platform, forcing one crew member to the deck and causing another's lifejacket to inflate. Despite the best efforts of the ship and the search and rescue services, the two men could not be recovered.

The following lessons can be learned from this tragic incident:

- No heavy weather checklist was available and none was required to be completed as part of the ship's safety management system.
- Previous occurrences of the aft mooring ropes coming loose had not been formally recorded, possibly because there had been no adverse consequences.

- The loose nylon mooring rope presented a significant risk of fouling the ship's propeller, owing to its inherent tendency to sink.

- The need for a designated enclosed space for stowing the coiled aft mooring ropes had been recognised.

- The ship's safety management system contained no detailed requirements with regard to sending crew on deck in heavy weather.

- The crew possibly underestimated the potential wave height that could have been expected in the prevailing weather conditions.

- No designated lifelines were provided on board for use in sending crew on deck in heavy weather.

- The crew overestimated the strength of the firefighter's lifelines and their ability to manually control their loading in the prevailing conditions.

- The strength of the firefighter's lifelines was insufficient to withstand the loading exerted on them by the large wave that washed the crew members overboard.

- Although both men had been wearing lifejackets that had inflated, neither was able to survive their exposure to the heavy weather conditions.

The full report can be found on the MAIB website:  
[http://www.maib.gov.uk/cms\\_resources.cfm?file=TimberlandReport.pdf](http://www.maib.gov.uk/cms_resources.cfm?file=TimberlandReport.pdf)



### No safety barriers around an open hatch

Another recent report from MARS concerned an incident where a crew member tripped and fell into an open hatch.

The ship was in ballast and had just weighed anchor at 0100 local time and was proceeding to berth. It was the practice to remove the hatch covers before berthing when loading or unloading cargo at this port and so the hatch covers had been removed before heaving anchor.

As the ship approached the berth the second officer reported to the Master that he would stand by at the aft mooring station. Two crew, both on the main deck, saw the second officer pass in front of them and enter the pump room just aft of the no. 2 cargo hold. Soon afterwards they heard a scream and raised the alarm. The no. 2 cargo hold was lit up and the second officer was found lying and bleeding at the starboard aft end of the hold. He appeared to have fallen over the one metre high hatch coaming to the bottom of the empty hold, 8.5m below. The victim was later confirmed dead at the hospital due to a severe fracture of the skull, among other injuries.

The official report notes the following factors that could have helped prevent this accident:

- Set up a safety barrier such as a fall protection fence while hatch covers are removed
- Ensure that the crew move safely on upper deck passageways
- Give the crew a warning when hatch covers are removed before berthing
- Light up the cargo holds, to the extent that doing so will not interfere with safe navigation while sailing at night with hatch covers removed.

The full report can be read by following this link:  
[http://www.mlit.go.jp/jtsb/eng-mar\\_report/2013/2012tk0029e.pdf](http://www.mlit.go.jp/jtsb/eng-mar_report/2013/2012tk0029e.pdf)

If you have experienced or seen any incident from which others may learn, MARS encourages all crew to report incidents to the MARS editor at: [mars@nautinst.org](mailto:mars@nautinst.org) or via the website: [www.nautinst.org/mars](http://www.nautinst.org/mars)

## Personal injury

### Take care when fumigating bulk cargoes

The aim of fumigation is to create a sufficient concentration of fumigant gas, for an adequate period of time, to kill any live insects and not risk the health of crew in the process.

The Club was recently made aware of fumigation on a dry bulk cargo performed in port where, soon after commencement of fumigation, the smell of gas entered the accommodation block causing considerable anxiety amongst the crew.

The Club recommends that crews, particularly chief officers and masters, are fully familiar and can comply with IMO guidelines. The IMO's MSC Circular 1264, dated 27 May 2008 (Recommendations on the safe use of pesticides in ships applicable to the fumigation of cargo holds) contains guidance on the safe use and application of fumigants, and should be referred to prior to fumigants being used.

The circular notes that fumigant gases are poisonous to humans and require special equipment and skills in application and

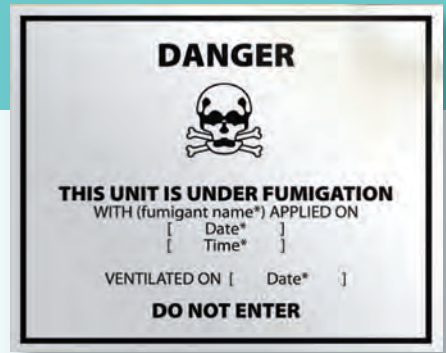
should therefore be used by specialists and not by the ship's crew. Evacuation of the space under gas treatment is mandatory and in some cases it will be necessary for the whole ship to be evacuated. A 'fumigator-in-charge' should be designated by the fumigation company, government agency or appropriate authority. The master should be provided with written instructions by the fumigator-in-charge on the type of fumigant used, the hazards to human health involved and the precautions to be taken and these should be carefully followed.

Crews should be aware there is more possibility for the fumigant to leak during the early stages of fumigation when the concentration of gas in the cargo holds is greater. If there are hatch cover defects this could cause the gas to leak and so it is

important that the hatch covers are always well maintained. A member of the crew should accompany the fumigator during the pre-fumigation inspection to check that the holds are gas tight.

The Club recommends that crews close all doors and ventilation to the accommodation block prior to fumigation until the crew and the fumigator are satisfied that there is no leak of gas. Regular checks should be made, after the fumigant is applied, to ensure that all working spaces (inside and outside) remain gas free.

Throughout the fumigation process the crew must also ensure that exhaust from the cargo hold smoke detector sampling fan is directed outside the accommodation.



### Out-of-date pyrotechnics

A case recently reported to the Club highlights the importance of the proper disposal of out-of-date pyrotechnics such as distress flares.

A bosun was taking part in a survival exercise when a flare exploded in his hand, injuring his hand and requiring the amputation of his thumb, index and middle finger. The ship had to divert to secure urgent medical attention. A subsequent condition survey on the ship disclosed that a number of the ship's distress flares were out-of-date, some by as much as six months.

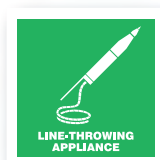
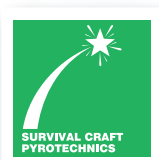
Out-of-date pyrotechnics deteriorate rapidly and should be landed ashore for safe disposal as soon as possible. It is an offence to dump out-of-date pyrotechnics at sea. It is also an offence to discharge pyrotechnics on land or in harbours.

Advice issued by Intertanko contains the following guidance, as recommended by the British Maritime Coastguard Agency in its Marine Guidance Note MGN 287:

- Return them to the supplier, directly or via the local representative;
- Request a life raft service station to accept any of the ship's out-of-date pyrotechnics when life rafts are being sent ashore for servicing. Many life raft service stations deal with the disposal of the expired pyrotechnics on a regular basis and have arrangements locally to do this;
- Contact the local coastguard or police who may be able to arrange disposal through a military establishment.

If the pyrotechnics cannot be sent ashore immediately, then they should be kept onboard (clearly marked as out-of-date) until they can be landed ashore. Following disposal ashore it is important to obtain a receipt/certificate which states that the pyrotechnic has been landed ashore for safe destruction.

Any firing of distress signals in any situation other than distress is an offence. Expired pyrotechnics should never be used at sea for testing or practice purposes or used on land as fireworks. The chemicals may have deteriorated and cause an unpredictable reaction upon ignition. They should be landed ashore as soon as possible after their date of expiry.



## Regulatory update



### MARPOL – Bo Hai Bay, China

There have been a number of recent incidents reported to the Club of fines being imposed on ships discharging food waste and/or sewage in Bo Hai Bay, China. It appears that ships' crews believe that they are far enough away from nearest land to discharge certain substances in accordance with the conditions of MARPOL. The term 'from the nearest land' as contained in MARPOL means from the baseline from which the territorial sea of the country in question is established in accordance with international law.

Although Bo Hai Bay is a large body of water, the entrance to the area is narrow and, therefore, China has designated much of the Bay as internal waters. The baseline to divide internal waters from territorial sea is in fact at the mouth of the bay. Accordingly, no matter how close to or far away from land a ship may be, if it is within Bo Hai Bay the ship is in internal waters. Under Chinese law, the requirements for discharging in territorial waters is in accordance with the MARPOL standard applying to the area of 3 nm within the nearest land.

In one case involving the discharge of food waste, the position under MARPOL Annex V is that waters are generally divided into three zones, i.e., within 3 nm within, beyond 3nm, and beyond 12 nm from the nearest land.

Each of these zones has different requirements for discharge of different substances. For ground food waste, discharge is permitted if at least 3nm from land, or 12nm from land if within a special area. Within Bo Hai Bay, a ship may well be more than 12nm from land and the crew may, therefore, believe they are entitled to discharge ground food waste. However, in fact they are in internal Chinese waters and, therefore, have to apply the same standard as MARPOL would for discharges within 3nm from land – i.e. discharge of food waste is prohibited. A fine can be issued under Chinese law for any discharge shown to have occurred.

Members and their crew should take care to ensure that in any situation, and in particular in Bo Hai Bay, they are aware of the boundaries or 'baselines' dividing internal waters from the rest of the sea and that they take care to apply the correct MARPOL standards for their exact location.

## Regulatory update

### MARPOL V – flexibility for hold water wash disposal

As at 1 January 2013, the amendments to MARPOL Annex V mean that shippers have new responsibilities regarding cargo classification which directly affects the ability of the crew to discharge hold wash water into the marine environment.

The last edition of *Risk Watch* (Volume 20: Number 2 August 2013) outlined the criteria governing the discharge of cargo residues contained in wash water.

Due to a reported lack of reception facilities, the IMO (by MEPC circular 810) have decided to allow the discharge of HME cargo residues contained in hold wash water until 31 December 2015 outside special areas if the following criteria are met:

- 1 Based on the information received from the port authorities, the Master determines that there are no adequate reception facilities at the receiving terminal or at the next port of call.
- 2 The ship is en route and as far as practicable (but at least 12 nautical miles) from the nearest land.
- 3 Before washing, the remains of the solid bulk cargo residues must be removed (and bagged for discharge ashore) as far as practicable and the holds must be swept.
- 4 Filters are used in the bilge wells to collect the remaining solid particles.
- 5 The discharge is recorded in the garbage record book and the flag state is notified using the revised consolidated format for reporting alleged inadequate port facilities as per MEPC.1/Circ. 469/rev2

It is still a requirement for receiving terminals to provide adequate port reception facilities for this waste and the circular only provides flexibility for ship owners in the event that receiving terminals have failed to meet their obligations under the Annex.

## Miscellaneous



### Risk management poster campaign: COLREGs

Continuing the series of posters to remind bridge watchkeeping officers of the requirements of COLREGs, a further poster is being sent out with this edition of *Risk Watch*.

#### COLREGs Rules 6, 8 and 16.

The poster illustrates an all too frequent cause of collision incidents, where instead of making a single bold alteration of course and/or speed that would be apparent to other ships, the tendency is to make many small alterations of course with little or no reduction in speed. The minimal alterations made in this scenario have not been apparent to the other ship. The poster depicts an irate master questioning the junior officer on why the ship is about to collide with another ship on the starboard bow. 'But Captain I altered many times to starboard, 3° each time and he still hit me!'

The scene played out in the poster emphasises the need for substantial action by either an alteration of course or speed in order to make it obvious to the stand on ship that action has been taken. The use of engines,

which appear rarely to be used for collision avoidance, can be very effective in very busy situations and allow more time for further assessment of the situation. Navigation officers must be made aware of the effect of slowing down the ship and be familiar with the responsiveness of the ship to be a useful procedure for collision avoidance.

Rule 6 focuses on safe speed whilst rule 8 addresses situations in any conditions of visibility and rule 16 for ships in sight of one another. Both give clear and concise instructions to make early and substantial action to avoid collision.

If extra copies of the poster are required, please contact us. The poster, along with the Collision Regulation (COLREGs) bulletin, can be viewed on the Britannia website. [www.britanniapandi.com](http://www.britanniapandi.com)