

A MASTER'S GUIDE TO:

# HATCH COVER MAINTENANCE



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# VOORWOORD

Het is algemeen bekend dat lekkage van luiken de voornaamste reden is dat lading nat wordt. Luiken kunnen om verschillende redenen lekken, de voornaamste redenen zijn echter gebrekkig onderhoud en het niet goed sluiten van de luiken. Lekkage en gebrek aan onderhoud kunnen weer leiden tot grotere problemen dan alleen natte lading zoals – het onderlopen van het schip met water, versnelling van het corrosieproces of zelfs tot het verlies van het schip. Al deze problemen worden in deze uitgave behandeld.

Het doel van deze tweede NNPC Master's Guide is de belangrijkste kernpunten van de veiligheid van luiken toe te lichten en scheepseigenaren er toe te bewegen over te gaan tot regulier onderhoud. Regelmatig onderhoud is op termijn goedkoper dan het betalen van een claim bij waterschade, daarnaast draagt het bij aan de veiligheid aan boord.

Ook voor deze uitgave zijn de rechten verkregen van een van onze herverzekeraars The Standard P&I Club.

## FOREWORD

It is generally accepted that leaking hatch covers are a principal cause of cargo wetting. Hatches leak for a variety of reasons, but mainly because of poor maintenance or failure to close them properly. Leaking or badly maintained hatch covers can lead to more serious consequences than wet cargo – flooding, accelerated corrosion or even loss of the ship. These problems are addressed in the guide.

It is the aim of this second NNPC Master's Guide to explain the key issues of hatch cover security and to steer mariners towards active maintenance. It is less expensive to keep hatch covers weather tight by regular maintenance, than to pay claims for wet damaged cargo. Besides that it is crucial for the safety on board ship.

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*NNPC, Expertise bv  
Gijs Lindenburg*

# 01 HATCH COVERS AND THEIR FUNCTION

The purpose and function of a hatch cover and its coamings is to prevent ingress of water into a cargo hold after a large opening has been cut in the deck for cargo access. Hatch covers are a moveable structure designed to a weathertight standard.

## HATCH COVER CONSTRUCTION

Typically hatch covers are lightweight steel grillages. Modern design methods using finite element technology enable more efficient material distribution which results in lighter (thinner) structures. Construction from high tensile steel results in even thinner plate being used. For this reason these lightweight structures must be 'handled with care'. Prevention of corrosion is essential – safety margins are finite.

## HATCH COVER FUNCTION

Hatch covers provide a primary structural and weathertight barrier to prevent water ingress into cargo holds. Rigorous inspection, regular maintenance and prompt repair of damaged covers, securings and supports are essential to maintain fitness for purpose and, in particular:

- to maintain sufficient strength to resist green seas landing on hatches in extreme weather;
- to maintain a barrier against ingress of water during normal seagoing weather conditions.

Failure to maintain hatch covers correctly can lead to physical loss of a cover in extreme weather and hold flooding and possible foundering. Minor leakage can cause cargo damage and, if over a prolonged period, damage to the ship's internal structure. Long-term structural decline can lead to structural collapse and total loss.



## 02 BASIC ADVICE

There are procedures which will help to keep your ship's hatch covers in good condition. The following advice can be considered best practice.

### ALWAYS

- carry out regular examination of the hatch covers, hatch beams and coamings to identify:
  - general levels of corrosion (check with your classification society for corrosion allowances);
  - localised corrosion at welded connections (grooving);
  - cracks in joints and weld metal;
- permanent distortion of plating and stiffeners;
- call a Class Surveyor and carry out repairs as soon as possible when there are:
  - indications of excessive corrosion e.g. holes or local buckling of the top plate;
  - cracks in main structural joints;
  - areas of significant indentation, other than localised mechanical damage;
- be particularly vigilant after heavy weather;
- rectify any steel-to-steel fault before renewal of rubber packing. Renewal will not be effective if steel-to-steel contact points are defective, and expensive rubber packing will be ruined after only a few months of use;
- replace missing or damaged hatch gaskets (rubber packing) immediately;

tely. The minimum length of replaced gasket should be one metre;

- keep hatch coaming tops clean and the double drainage channels free of obstructions. (Open hatch covers to clean coaming tops and the double drainage channels after loading bulk cargo through grain or cement ports);
- keep cleats and wedges in serviceable condition and correctly adjusted;
- keep hauling wires and chains adjusted correctly;

■ attach locking pins and chains to open doors and hatches;

- keep wheels, cleats, hinge pins, haul wires, and chain tension equipment well greased;
- test hydraulic oil regularly for contamination and deterioration;
- keep hydraulic systems oiltight;
- ensure the oil tank of the hydraulic system is kept filled to the operating level and with the correct oil;

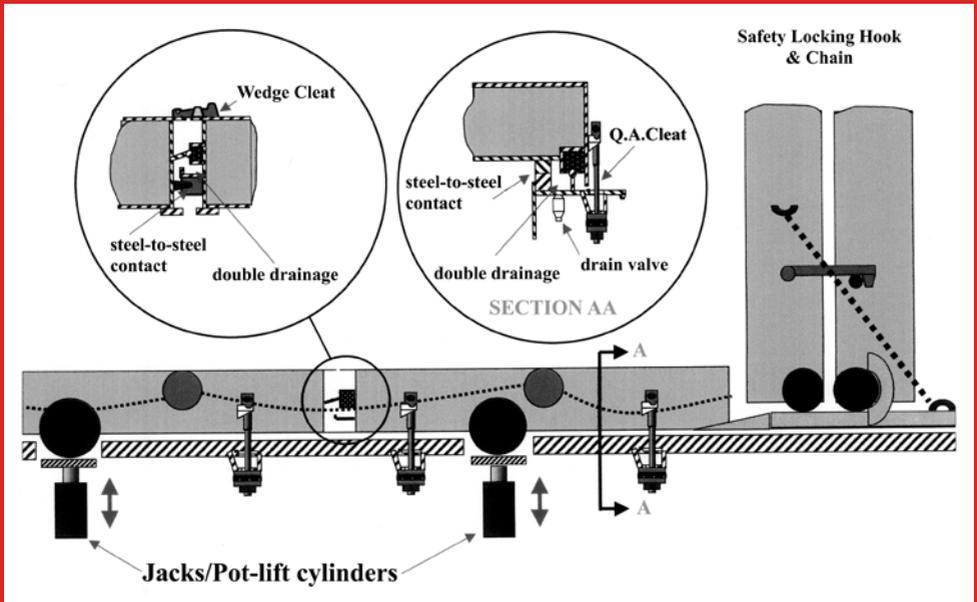
■ clean up oil spills. If the leak cannot be stopped immediately, construct a save-all to contain the oil and empty it regularly;

- engage tween deck hatch cover cleats when the panels are closed;
- give notice that maintenance is being performed so that no one tries to open/close the hatch;
- remember that continuing and regular maintenance of hatches is more effective and less expensive than sporadic inspection and major repair.



## NEVER

- treat temporary repairs as if these were permanent. The strength of the cover and ultimately the ship will depend on the quality of repairs carried out;
- ignore serious corrosion, cracking or distortion in the covers and supports. These are signs of weakness and are potentially hazardous;
- allow grooves to form in the coaming top, especially where the hatch side or end panel rests when the hatch is closed;
- apply petroleum-based grease or paint to rubber packing;
- remove the rubber ball from a non-return drain valve;
- use anything other than the recommended hydraulic oil;
- leave cleats unfastened when proceeding to sea;
- attempt to open or close any hatch that has a load or cargo on it;
- open hatch covers at sea unless absolutely essential;
- leave open covers unattended when at sea;
- tighten down the cleats so that the hatch cover is unable to move on the coaming top.



TYPICAL ARRANGEMENT OF A MULTI-PANEL HATCH COVER. THE DOUBLE DRAINAGE CHANNEL AND 'STEEL-TO-STEEL' CONTACT ARE SHOWN.

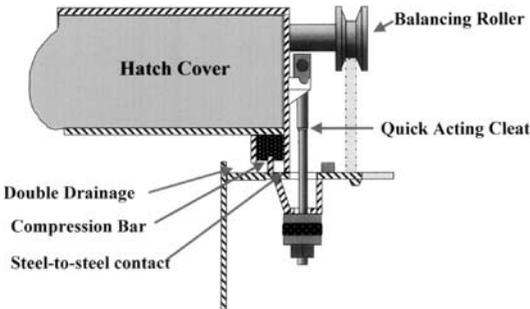
False

# 03 HATCH COVERS

## COMMON FALSE BELIEFS

- **Hatch covers are non-load bearing – they are only there to keep the water out.**

Hatch covers can be subjected to very high pressure loadings during heavy weather. This in turn induces significant in-plane stresses in the component plating, girders and stiffeners.



CROSS-SECTION SKETCH OF A MULTI PANEL HATCH COVER ILLUSTRATING THE COMPRESSION BAR GASKET AND CLEAT ARRANGEMENT.

- **Leakage is an inconvenience resulting in cargo wetting.**

Leakage can, where unchecked, cause serious flooding and ultimately endanger the ship and its personnel.

- **Internal cracking at joints, corrosion/cracking in way of welds and distortion of plating do not affect the hatch cover function.**

Such problems change the way a structure works and can significantly reduce the load carrying capacity.

- **Hatch covers constructed of high tensile steel are more robust than those made from mild steel.**

This is not the case. A cover constructed from high tensile steel will normally comprise thinner plating than one constructed from mild steel.

- **It is the rubber seal that keeps the water out of the cargo.**

The double drainage system is as important in keeping water away from cargo.

- **Renewing a worn rubber seal is all that is needed to keep a hatch weathertight.**

Worn rubber is usually the result of worn steel-to-steel contact surfaces or a deformed structure. Rubber renewal alone is futile unless the steel-to-steel contact surface is repaired.

- **The hatch cover side plate when closed should rest on the coaming top.**

If the weight of a hatch panel is sufficient to cause distortion of its side plate (hatch skirt), then landing pads are fitted to the panel to transfer the weight evenly across the coaming top.

- **Hatch covers will always leak in heavy weather.**

Hatch covers are designed to withstand the rigours of the sea. Provided the

cleats are correctly adjusted, hatch gaskets are in good condition and the construction material sound, then hatch covers should not leak, regardless of the weather.

■ **Screwing cleats down hard will ensure weathertightness.**

No amount of tightening of cleats beyond their correct position will improve hatch cover weathertightness. Hatch cover manufacturers usually test for weathertightness without engaging cleats. The weight of a hatch is sufficient to create the required gasket compression.



■ **The use of hatch cover tape will ensure watertightness.**

The use of sealant tape gives a false sense of security. Hatch cover tape is a short-term temporary measure that can be used to stop water from entering cross or side joints. However, the prolonged use of tape increases corrosion in the cross-joint and side plate. In bad weather, sealing tape can and does wash off. Even when sealing tape is used with success a hatch cover will only be weathertight.

■ **Drain valves are not important; it does not matter if they are blocked.**

Drain valves are an essential feature of the double drainage system as they allow water that has penetrated the hatch gasket (rubber packing) to drain away. If the valve is blocked or closed, water will spill from the drainage channel into the cargo hold.

■ **When carrying a cargo on top of a hatch cover it is not necessary to fasten cleats.**

Cleats prevent excessive movement of the hatch cover as a ship bends and flexes in a seaway. They allow limited movement to ensure correct contact between the cover and its coaming, preventing hatch cover damage. Cargo loaded on the hatch does not secure the hatch cover to its coaming.

■ **Tween deck cleats are not essential because the tween deck covers are not weathertight.**

Cleats on tween deck covers should always be engaged when the covers are closed. This is because they stop tween deck panels from jumping when a ship pitches, ensuring maintenance of tween deck strength. When cargo is stowed on a tween deck panel, the panel must be secured to the ship's structure.

■ **Any rubber gasket can be used provided the gasket fits the channel.**

No, use only the gasket type recommended by the hatch cover manufacturer.



# 04 LEAKAGE PROBLEMS

Most leakage problems occur because of poor maintenance. Although robust, hatch covers will leak if compression surfaces are not aligned correctly, if gaskets are damaged or worn, if there are cracks or holes in the plating and if there is permanent overall distortion of the covers.

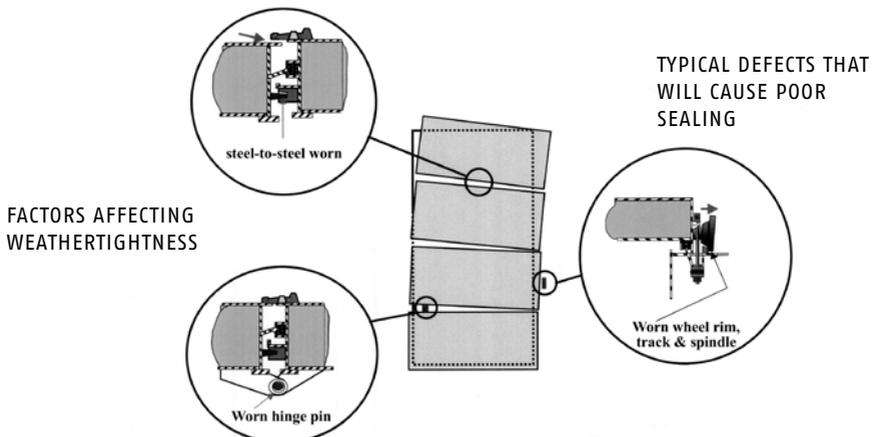
## MAINTENANCE OF THE HATCH COVER STRUCTURE

Corrosion reduces the strength of a hatch cover. Reduced strength gives rise to increased deflection and possible loss of the steel-to-steel contact when a cover is loaded (green seas or cargo). If advanced, corrosion can weaken a hatch cover to the point when normal loading causes permanent deformation and permanent loss of the steel-to-steel contact. Good contact is an essential prerequisite for

weathertightness. Accelerated pitting corrosion leads to holes in the top plate.

## MAINTENANCE OF THE STEEL-TO-STEEL CONTACT SURFACES

Hatch covers are designed to make steel-to-steel contact between a defined part of the hatch cover and coaming when closed. This steel-to-steel contact determines the amount of compression between the hatch gasket and compression bar. Contact might be



nothing more than the hatch skirt sitting on the horizontal coaming plate, although some hatches are fitted with metal landing pads.

When the horizontal coaming plate or hatch landing pad is worn, pressure on the hatch gasket (rubber packing) increases. If this wear is greater than 4mm, increased pressure on the gasket will cause damage. Landing pad repair is essential.

### MAINTENANCE OF RUBBER PACKING – SURFACE DAMAGE

Rubber packing that is physically damaged, cut or chafed should be renewed immediately. The minimum length of replaced packing should be one metre.

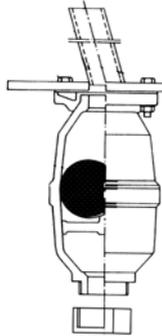
### MAINTENANCE OF RUBBER PACKING – PERMANENT SET

Rubber packing that is permanently impressed to 75% of its design compression should be completely replaced. The manufacturer will provide details of the design compression. A rule of thumb to estimate design compression is to use 30% of the packing's thickness. Permanently impressed rubber packing indicates worn steel-to-steel contact surfaces. Never replace permanently impressed gaskets without checking the steel-to-steel contact points for wear and doing repairs if they are worn.



### MAINTENANCE OF RUBBER PACKING – AGED GASKETS

Ozone will age rubber. It becomes hard and loses elasticity. The entire length of aged gasket should be replaced.



TYPICAL NON-RETURN DRAINAGE VALVE.



THE DOUBLE DRAINAGE SYSTEM.

### MAINTENANCE OF THE DOUBLE DRAINAGE SYSTEM

Hatches are designed to drain away water that has penetrated the gasket. Drainage channels should always be cleaned before hatches are closed, and kept free from rust scale and cargo debris. Damaged channels should be repaired immediately and then painted



to prevent corrosion. Drainage channels are located along the cross-joint and on the coaming between the compression bar and the inner coaming.

### **MAINTENANCE OF NON-RETURN DRAIN VALVES**

Hatch coaming non-return drain valves are an essential feature of the hatch double drainage system. They let water that has come through the hatch cover drain away. Damaged, missing or defective non-return drain valves should be repaired or renewed.

### **MAINTENANCE OF RUBBER SEALS ON HOLD ACCESS DOORS, ACCESS HATCHES AND VENTILATORS**

Water can enter the cargo hold through access doors, hatches and

ventilator covers. Maintain them in the same way as you would hatch covers.

### **MAINTENANCE OF HATCH CLEATS**

Cleats and wedges hold the hatch in position with adequate gasket compression. (Cleats are fitted with a rubber washer or 'grommet' to aid compression). Compression of the washer determines tension in the cleat. Washers are prone to both physical damage and age hardening (weathering). When damaged or aged the washer loses its elasticity and should be replaced. Some operators protect the washer and screw threads with a layer of grease or by application of 'denzo' tape.

### **MAINTENANCE OF HATCH WEDGES**

Cross-joint wedges require less

maintenance than cleats and provided the wedge sidespring is in place the wedge will work efficiently. Check the springs regularly and replace them if they are damaged or missing. On a closed hatch, the wedge should make contact with its strike plate on the opposite hatch panel. If there is a gap, it is likely that the panel is distorted. The steel-to-steel contact may be worn. Repair and alignment of the hatch panel is necessary. Never repair the strike plate by building it up with weld metal above its original design height.

### MAINTENANCE OF LANDING PADS

The size and dimensions of a landing pad are dependent on the size and weight of the hatch cover. Landing pads are normally located adjacent to cleats. The pads are fitted to the top of the coaming and to the side of the hatch panel. Landing pads should always be repaired to their original design height. Correct adjustment of them can only be achieved during repair when the ship is out of service. Some ships are provided with cassette type landing pads, which are easily replaceable.



WORN 'STEEL-TO-STEEL' CONTACT POINTS.

# 05 LEAK DETECTION TEST

The two most common leak detection tests are the water hose test and the ultrasonic test. Ultrasonic testing is the preferred method because areas of inadequate hatch sealing are accurately located. Chalk testing (another hatch test) gives only an indication of poor compression and potential leaks. Chalk testing is not a leak detection test. Light testing is also effective but is potentially dangerous because personnel are in a closed, dark hold looking for light infiltration between panels. If hatches are found to leak during a test, make the necessary repairs, then test again.

## WATER HOSE LEAK DETECTION TEST

Water hose tests are used to determine weathertightness of hatch covers. If correctly performed, hose testing will show hatch joints that leak.

The general procedure for hose testing is to apply a powerful jet of water from a 20-50mm diameter hose fitted with a 12mm diameter nozzle held at a distance of 1-1.5 metres from a hatch joint, moving along the joint at a speed of 1 metre every 2 seconds.

The drawbacks of hose testing are:

- the hold needs to be empty;
  - it cannot be performed in sub-zero conditions;
  - it requires the deck scupper drains to be open (potentially causing pollution);
  - the test cannot pinpoint leaks on the cross-joint or side joint accurately;
  - two people are needed to supervise the test.
- Care should be taken to avoid excessive nozzle back-pressure.

### ULTRASONIC LEAK DETECTION TEST

Ultrasonic leak detection is a viable alternative to the hose test for testing hatch covers, access doors and access hatches for weathertightness, as it accurately locates potential points of leakage. This test should only be carried out using class approved equipment and approved test procedures.

The test involves placing (with hatches closed and secure) an electronic signal generator inside the cargo hold. A sensor is then passed around the outside of all compression joints. Readings taken by the sensor indicate points of low compression or potential points of leakage.

Ultrasonic testing overcomes the majority of limitations associated with hose testing and can be carried out when holds are loaded.

The drawbacks of ultrasonic leak detection tests are:

- the equipment requires an experienced and specialist operator to interpret the readings;
- the equipment requires regular calibration;
- the equipment is not normally part of the ship's equipment.

### CHALK TESTING

When performing a chalk test, the top edge of every compression bar is covered with chalk. Hatches are then fully closed and reopened. The rubber packing is examined for a chalk mark, which should run continuously along the packings centre. Gaps in the chalk mark indicate lack of compression. Chalk testing merely indicates if hatch panels are aligned and compression achieved. It will not show whether compression is adequate and therefore it is not a test for weathertightness.

# 06 MONITORING AND INSPECTION

Hatch covers and their fittings should be inspected at the end of every cargo voyage and all findings recorded. The pro forma checklist (Appendix 2) can be used.

Inspections should be planned and held in time for repairs to be completed before the next cargo voyage. Empty cargo spaces of all cargo and combustible material if welding torches are used.

## INSPECT AND CHECK:

### ■ CONDITION

Covers and coamings should be well painted and free from significant corrosion, cracks and distortion.

During an inspection look for:

- holes and permanent distortion in the plating
- distortion of beams and/or stiffeners on the underside of the top plate
- corrosion around welded connections of beams or stiffeners
- cracking of connecting joints and welds

### ■ HATCH MOVEMENT

This should be smooth. If violent movement is observed, investigate and remove the cause.

### ■ TOWING AND BACKHAUL WIRES

These should be free of kinks or broken strands. Repair or replace damaged or worn wires. Use extreme care when handling wires to avoid injury.

### ■ HYDRAULIC SYSTEM FOR LEAKAGE.

### ■ HINGE PINS

Look for wear, particularly at cross-joints and hydraulic cylinders. Worn hinge pins can cause hatches to slew and misalign at the cross-joint(s). Misaligned hatch panels will leak.

### ■ DRIVE CHAIN TENSIONERS

Check their condition and adjustment.

### ■ CLEATS AND WEDGES

Check for physical damage, corrosion and tension when locked.



WHEN CLOSED THE TOP OF A HATCH PANEL SHOULD BE IN LINE WITH THE NEXT PANEL.

### **DRIVE CHAINS; CHECK THEIR LENGTH**

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Drive chains and associated equipment are fitted in pairs, opposite one another. The side towing chains, sprockets and hydraulic cylinders on opposite sides should match. Adjust the tension of chains between panels so that the chains on both sides are exactly the same length. Do this by removing or adding chain links. If the entire length of chain needs to be replaced, then replace the chains on both sides at the same time. Always consult the hatch cover manufacturer for details of chain length. As a rule, chain sag, measured from the assumed horizontal at mid-point along the chain, should be a fist wide.

### **STEEL LANDING PADS; CHECK FOR WEAR**

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Worn landing pads will damage hatch gaskets and cause hatch leakage. When newly fitted and closed in the sea position, the top plates of adjacent hatch panels should be level. Any deviation from level is an indication of landing pad wear or permanent distortion. If noted, investigate fully and repair immediately.

### **END STOP PADS; CHECK FOR DAMAGE**

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End stop pads prevent hatch panels from overrunning when hatches are fully open. Look for physical damage.



TWO PANELS SHOWN OUT OF ALIGNMENT.

### **HATCH WHEELS; CHECK FOR ALIGNMENT**

Hatch wheels should align squarely with the hatch trackway. If the wheel axle is worn the wheel will loll. If it does, repair immediately.

### **RUBBER SEALS; CHECK FOR ELASTICITY, MECHANICAL DAMAGE AND PERMANENT DEFORMATION**

When hatches are opened, rubber seals should regain their original shape. If they do not, check for ageing. Permanent deformation should not exceed 75% of the design compression.

### **LOCKING DEVICES AND HYDRAULIC CUT-OUTS; CHECK THAT THEY OPERATE**

Locking devices are often pins or hooks, these should engage when the hatch is open. Look for physical damage, rusting and seizure. Hydraulic cut-outs should move freely.

### **SPARES**

Rubber packing and adhesive has a limited shelf life, so check the date stamp and discard if beyond the use-by date. There should be sufficient spare parts (cleats, wedges and gaskets) to complete planned routine maintenance. Always use manufacturers' approved spare parts.

# 07 MAINTENANCE AND REPAIR

Poor maintenance of hatch covers causes leakage leading to cargo damage and represents a hazard to the ship and its crew. Although hatch covers are simple and durable, their sealing gaskets are easily damaged. The quality of sealing is affected by lack of alignment and poor gasket compression. When hatch covers are opened at the end of an ocean voyage, look for signs of leakage such as rust staining or drip marks.

Regular adjustment and repair, by ship's staff, will reduce the overall cost of maintenance. Painting double drainage channels will help to prevent corrosion.

Always keep a detailed record of maintenance. Take care during extensive hatch cover repair to avoid cover distortion.

## RUBBER GASKETS

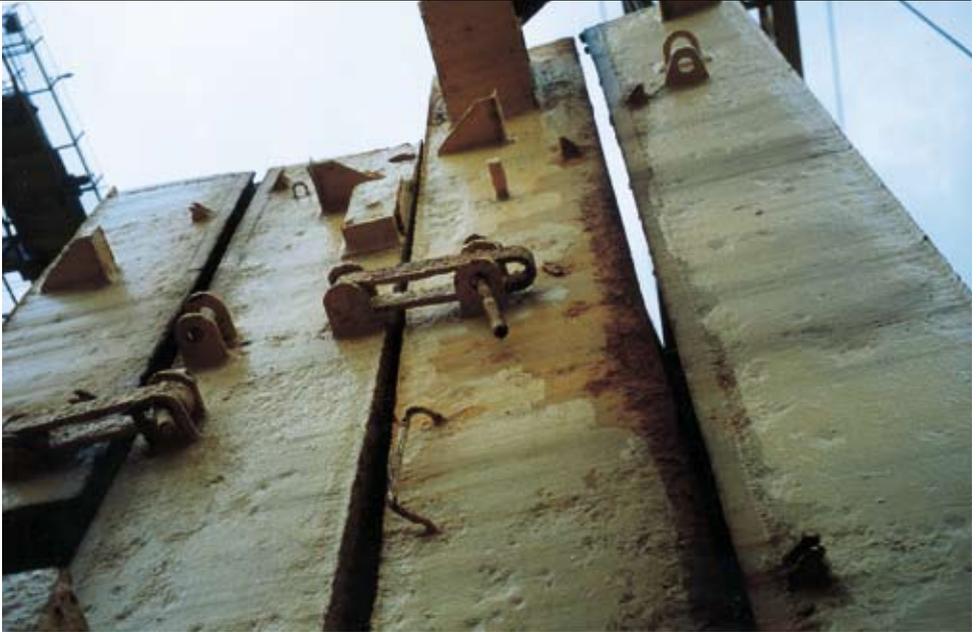
Keep clean and free from paint. If physically damaged, permanently set-in or aged, replace with minimum one metre lengths. Always follow the manufacturer's instructions when renewing gaskets.

## GASKET CHANNELS

If gasket channels are badly corroded, causing the hatch packing to hang loose, the packing should be removed and the channel repaired by welding new metal strips which should be painted before fitting new rubber. Always follow proper fire prevention safety procedures. Make sure that cargo spaces are free of cargo and combustible material. When conducting extensive structural repairs, remove the hatch covers to shore.

## HATCH COVER STRUCTURE

Repair or replace any damaged, worn or defective hatch covers or coamings. Consult with the ship's classification society before commencing repair. Paint new structure immediately.



### COMPRESSION BARS

Effective sealing is only possible with a straight, undamaged and non-corroded compression bar. Compression bars which are not in this condition should be repaired or replaced, taking care to align the bars properly.

Remember to carry out a chalk test to check alignment, both during and after repair.

### LANDING PADS

Hatch sealing is arranged by design to give the correct compression of the gasket when there is metal-to-metal contact on the hatch landing pad, side plate, or inter-panel block. If landing pads are reduced in height (check with manufacturers' drawings) because of wear, repair is essential.

### HATCH WHEEL TRACKWAYS

Trackways can corrode. They are weakened by abrasive wear and tear. When weakened, trackways can distort and break, affecting hatch movement and alignment. Deterioration is visible to the naked eye. Repair by replacing the worn or damaged material with sufficient new material to restore strength. Always keep hatch wheel trackways clean and painted.



### HATCH COAMINGS

Look for cracks at coaming corners. If any are found, consult the ship's classification society before commencing repairs in case the coaming needs to be reinforced.

Examine coaming support brackets for corrosion where they connect with the ship's deck. Make sure coamings and their support brackets are painted.

Coamings can be damaged by cargo equipment during loading or discharge. Look out for damage and repair if found.

### HATCH CLEATS AND WEDGES

It is important for compression washers to be adjusted correctly. A locking nut for adjusting compression is situated at the base of the cleat. The procedure to alter compression (see illustrations) is as follows:

- close hatch and secure for sea;
- place the cam of the cleat in the hatch socket as if to lock it, but leave it unlocked (the cam should move freely and fit snugly in its housing);
- adjust the locking nut until the compression washer touches the underside of the hatch coaming or its steel washer;
- turn the locking nut one full turn to achieve the desired tension;

- do not over-tighten;
- protect the thread on completion.

When closing and securing a hatch for sea passage, check the tension in side cleats.

Cleats should never be adjusted in isolation, adjust all cleats along the hatch skirt at the same time.

### HATCH CROSS-JOINTS

It is essential for the cross-joint to be in good condition and properly aligned.

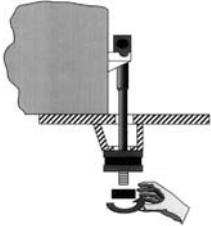
Maintenance and repair should focus on:

- examination of the cross-joint structure for corrosion.
- examination of joint hinges for pin wear, blade cracking or weld failure. (Re-grease the hinge pin bushes making sure grease reaches the hinge pins).
- examination of the steel-to-steel inter-panel blocks and locators for wear. (Check the top plate of hatch panels, they should be level when closed).
- checking the gap between panels when they are closed. Misalignment could be caused by an incorrectly adjusted cylinder or the wheel tracks could be worn.

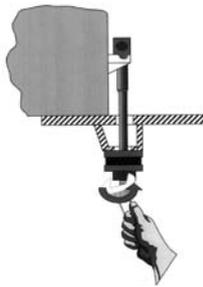
## HATCH WHEELS

Hatch wheel spindles and bearings (where fitted) need to be greased regularly. Check the wheel spindle for wear and the wheel housing for physical damage. Repair if the spindle is worn or if the wheels are out of alignment.

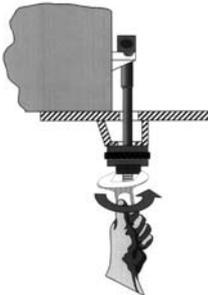
## PROCEDURE TO ADJUST A QUICK ACTING CLEAT



**A**  
ASSEMBLE CLEAT IN  
SNUG & CRUTCH



**B**  
SCREW NUT ON  
SPINDLE UNTIL IT  
TOUCHES WASHER



**C**  
TIGHTEN ONE  
COMPLETE TURN OF  
THE NUT



**D**  
DISENGAGE CLEAT  
WITH QUICK RELEASE  
LEVER

## DRAIN CHANNELS AND NON-RETURN VALVES

Clean coaming tops and cross-joint channels by removing any loose scale or cargo residue by brushing or hosing. Clean coaming drain holes and check that the non-return valve is functioning.

## GREASING

Wheel spindles, cleat spindles, hinge pins, hydraulic cylinder protective sheaths, cleat wedges, drive chain sprockets, toothed rack and cylinder spherical bearings need to be kept well greased. Re-grease every month if necessary, and always apply new grease after the ship has passed through heavy weather.

## PAINTING

Corrosion occurs mainly at the panel ends along the cross-joint or where access is difficult, but it can also occur on the underside of a panel, especially along hatch beams. Regular painting will be necessary.

## INERT GAS

Hatch covers with a double skin, in the form of a closed box, are filled with inert gas. After structural repair, the inner spaces must be re-inerted. This is done by inserting special tablets (available from the hatch cover manufacturer) into the space and welding shut. Never allow water to penetrate the box construction.

## HYDRAULIC SYSTEMS AND COMPONENTS

The cleanliness and viscosity of hydraulic oil must be checked. Samples of the oil should be sent to a chemist for testing (use the same company that checks and tests your fuel and lubricating oil). The hydraulic system is provided with bleed points from which samples can be taken.

Hydraulic oil should be changed every five years or after there have been significant repairs, such as piping or cylinder replacement.

Hydraulic oil filters should be changed every twelve months. Do not contemplate repairing the hydraulic system without the proper components and skilled fitters.

## USE OF SEALING TAPE AND FOAM FILLERS

The use of sealing tape and foam fillers should be limited to:

- emergency use. When hatches are known or thought to be leaking and there is insufficient time to complete permanent repairs;
- charterers' requirement. Charterers may require owners to apply sealing tape when highly water-sensitive cargoes are carried;
- fumigation tape is usually applied to hatch covers during fumigation. The tape is not heavy duty and should be removed when fumigation has finished.

Foam fillers can be used to fill the air space which is formed along the cross-joint of two closed panels. In heavy weather foam fillers may be washed away, their use should never be solely relied upon to prevent water ingress.

# 08 HEAVY WEATHER PRECAUTIONS

The following precautions should be taken if rough or heavy weather or when high swells are expected or when it is likely that water will be shipped on deck.

## PRIOR TO ROUGH WEATHER:

- check that hatch cleats are properly secured and adjusted. In rough weather, hulls are subjected to high racking forces, so it is essential that hatch covers are held in place but allowed to flex.
- check that all drain valves are operating correctly and that they are open. Drain valves are the last defence against water entering the cargo space. The drainage system will be needed during heavy weather, so it must be fully operational.
- as a precaution, briefly pressurise the hydraulic system to ensure that it is fully charged and that the piping is filled with oil. This has two benefits, first, it prevents the possibility of seawater entering loose couplings or seals, and secondly, it eliminates any creep which may have occurred.

## AFTER ROUGH WEATHER:

- Inspect all cleats, drain valves, guides and hydraulic components for damage. If hydraulic components have been damaged, do not attempt to open the covers. The emergency opening procedure should be followed until the hydraulic components have been checked and tested.
- check hatch covers for buckling or distortion.
- when opening the hatch covers check for uneven movement and any unusual noises that may indicate damage.
- check all grease points and re-grease.



UNSAFE SITUATION, WALKING ON HATCH COAMING WHILE HATCH COVERS ARE OFF.

# 09 SAFETY WHEN WORKING WITH HATCH COVERS

The avoidance and prevention of injuries is of paramount importance. Before working on a hatch, a risk assessment should be completed to identify all hazards. Control and safety procedures should be examined and modified so that hazards are reduced to minimal levels.

## THE FOLLOWING POINTS SHOULD BE BORNE IN MIND:

- always wear the correct protective clothing, boots and hard hats;
- always test the hold atmosphere before entering;
- never stand on a moving hatch cover;
- never stand on a hatch coaming when the hatch is open;
- never work on a hatch cover when the locking pin or hook is not fitted and secure;
- never open or close a hatch cover without ensuring the coaming is clear of debris and checking that all personnel are clear of the moving hatch and its channels or wires;



- when opening or closing a hatch never attempt to clear an obstruction with your hands;
- when hatches are opened at sea always secure them to the coaming top by lowering the wheels into a guide pocket, or by fixing restraining wires.

## APPENDIX 1

# PROCEDURES TO OPEN AND CLOSE HATCH

Prior to opening or closing a hatch, the watch officer should be informed and the condition of the hauling wires or chains checked; the hydraulic system should be topped up. Never open or close more than one set of hatch covers at a time.

### OPENING PROCEDURES

- check that the hatch cover panel stowage area is clear of people, equipment and dunnage;
- disengage all cleats;
- attach towing or hauling wires; switch the power on and ensure the controls are in neutral;
- ensure that all personnel are clear of the hatch and its tracking. Position crew-members to observe both sides of the hatch;
- raise hatch covers to the roll position by jacks or by raising the lifting system. (The panels need to clear the hatch guides);
- check that towing chains are free and do not foul tracks or the coaming top;
- start to open the hatch, slowly at first, then at normal operating speed until the hatch is almost open and then reduce to slow speed until fully open. Care must be taken when opening hatch covers especially when the speed of opening can be only partially controlled;
- when fully open, secure the hatch with the safety hook or pin before the power is switched off. If applicable, remove the towing and hauling wires;
- install portable safety rails, if supplied.



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## CLOSING PROCEDURES

- check that the coaming top is clear of cargo or debris;
- check and clear drain channels and entrances to the drain valves;
- check that any damaged wheel tracks, compression bars and landing pads have been repaired;
- ensure that the hold is clear of people and that access hatches or entrance doors are open. Check towing chains are free;
- attach towing or hauling wires, switch the power on and ensure the controls are in neutral;
- remove portable handrails;
- release hatch locking pins or hooks;
- avoid injuries by ensuring that all personnel are clear of the hatch. Position crewmembers to observe both sides of the hatch;
- check that towing chains are free and do not foul tracks or the coaming top;
- start to close the hatches slowly at first with the speed of closure being gradually increased to the normal operating speed. As the hatch reaches the closed position the speed should be gradually reduced. Great care must be taken when closing hatch covers;
- lower hatch covers into guide pockets using jacks or lifting cylinders. Some hatches are lowered automatically;
- attach cleats before removing the towing wire or switching power off;
- finally, check no one is in the hold before closing hold access hatches or other hold entry points.

## APPENDIX 2

# HATCH INSPECTION CHECK SHEET 01

MV	Date	Port
<b>Hatch No:</b>		
Items	Condition	Action
Hatch Structure (Outer)		
Hatch Structure (Inner)		
Coaming Structure		
Opening/Closing Mechanism		
Hydraulic Jacks		
Hydraulic Pipes		
Stacking Mechanism		
Retaining Hooks		
Wheel Trackway		
Panel Alignment		
Steel-to-Steel Contact Points		
Coaming Cleats		
Coaming Compression Bar		
Coaming Double Drainage Channel		
Coaming Non-return Valves		
Comments		

Signed: .....

Signed: .....

Master

Superintendent

# HATCH INSPECTION CHECK SHEET 02

MV	Date	Port
<b>Hatch No:</b>		
Items	Condition	Action
Panel Side Gaskets		
Panel Cross- Joint Gaskets		
Panel Edge Gaskets		
Panel Wheels		
Cross-Joint Wedges/Cleats		
Cross-Joint Compression Bars		
Cross-Joint Drainage Channel		
Evidence of Leakage		
Quality & Condition of Spaces		

Action Plan

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Signed: .....

Signed: .....

Master

Superintendent



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