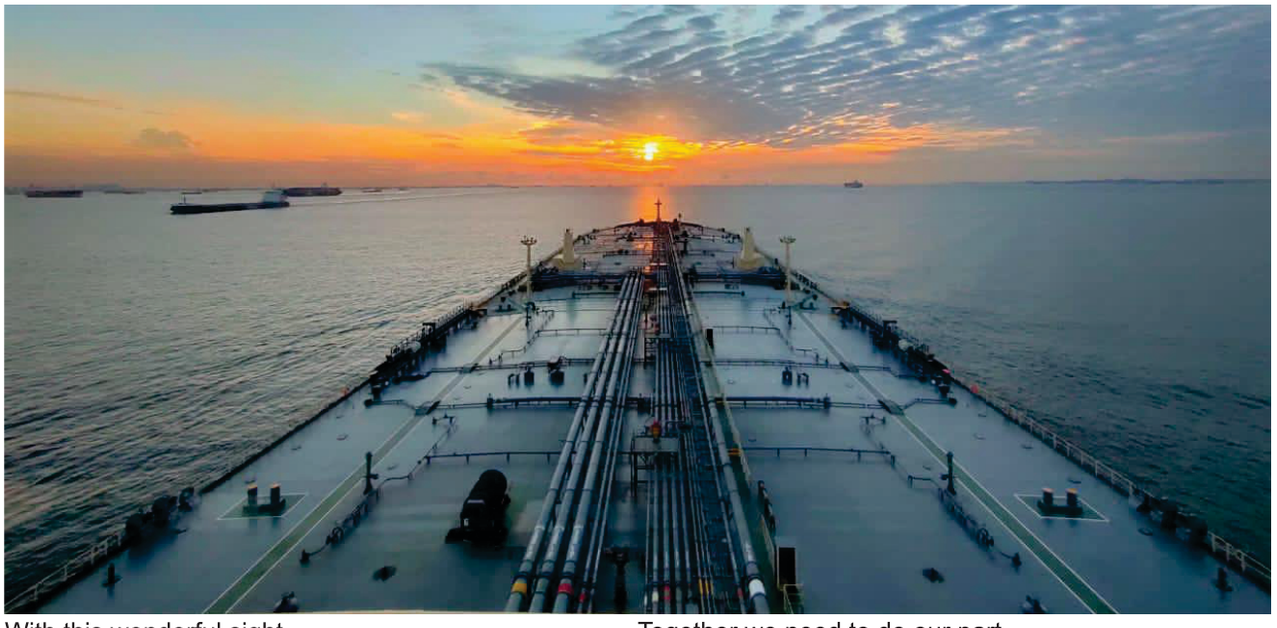



With this wonderful sight,
We sail into the rising light.
Into the rising sun, we sail
Mother nature amazes us, without fail.

As with all mothers, She too is kind.
Despite all our tantrums,
She won't leave us behind.

She urges us to reverse the damage,
Lest we face her wrathful carnage.

Together we need to do our part,
In bringing glory, back to her heart.

Our resolve to clean the seas
Must be firm to bring back her dreams.

Clear skies and calm seas, we long

This sight makes our resolve strong.

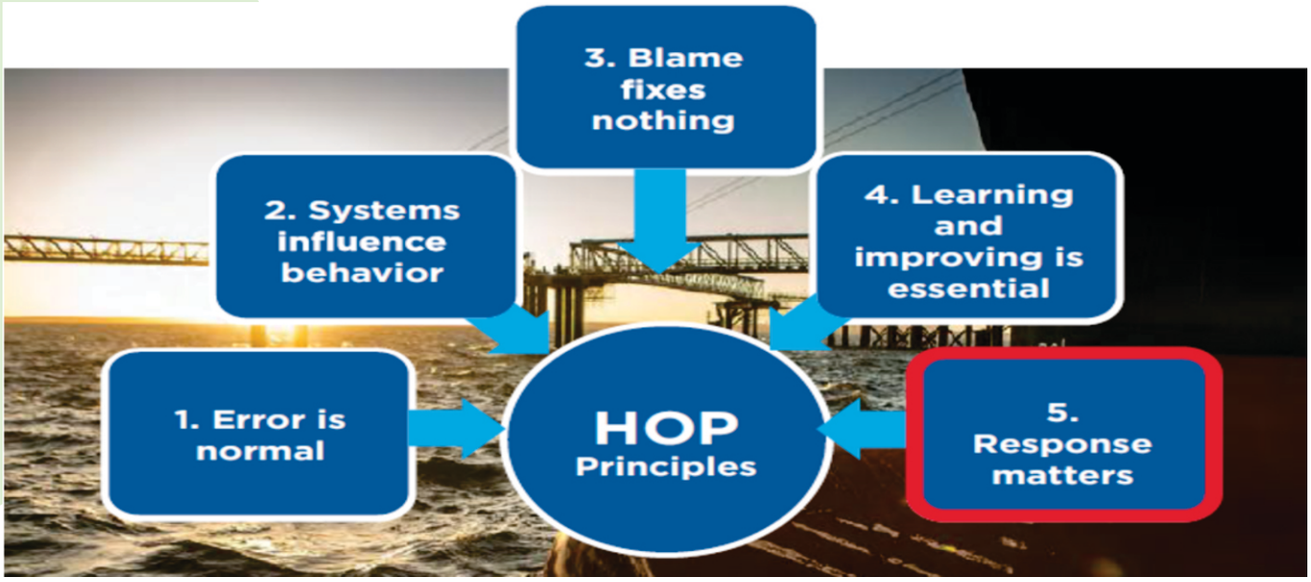
**Contributed by:** Staff on M.T. Maridaki

## NEWSLETTER CONTENTS



JULY 2021 EDITION

## 5 HOP (HUMAN AND ORGANISATIONAL PERFORMANCE) PRINCIPALS




A cadet was given a routine task to cut a stencil. Senior vessel management's 'duty of care' was exercised diligently – work environment was safe (air conditioned, humidity controlled noise free office), job had been done before, there was no time pressure or work related stress, there was no external distraction, the tools provided were in good condition etc. Still the cadet on his 2nd ship tenure managed to drag the paper cutter from the chart paper onto his finger causing a laceration and bleeding.It is not uncommon that Trainees are the ones most affected by injuries at sea. We therefore need to focus more on their activities and work supervision.

The reaction to such an incident will vary from person to person. However, I can confidently state that all seamen feel a sense of remorse and regret when confronted with such a situation at sea. After the first aid and medical advice is obtained as the immediate requirement, after the dust settles many questions cross the mind.

Not a drop of blood to be spilled during your contract. This is the Goodwood mantra. Many contracts go by and one is in compliance. Then one fine day at sea, the inevitable happens.

How to prevent such incidents from the perspective of trainees and junior officers? Experience says that the trainees emulate their ship mates and seniors' actions and routines. What they see is what they do. This extends to all daily activities onboard from donning proper PPE for each job, being punctual and alert on watch, maintaining meal timings, good grooming and positive attitudes. It is the responsibility of the senior staff to set the example and then guide the trainees towards adherence to it. Unfortunately it is also true that a young untrained mind absorbs the easier wrong habits more readily than the harder right habits. Thus this training has to continue during the entirety of his sea service across all ships he works on. Else he is only choosing the ones that suit him and has an ever ready answer 'this is how we did on my last ship'!

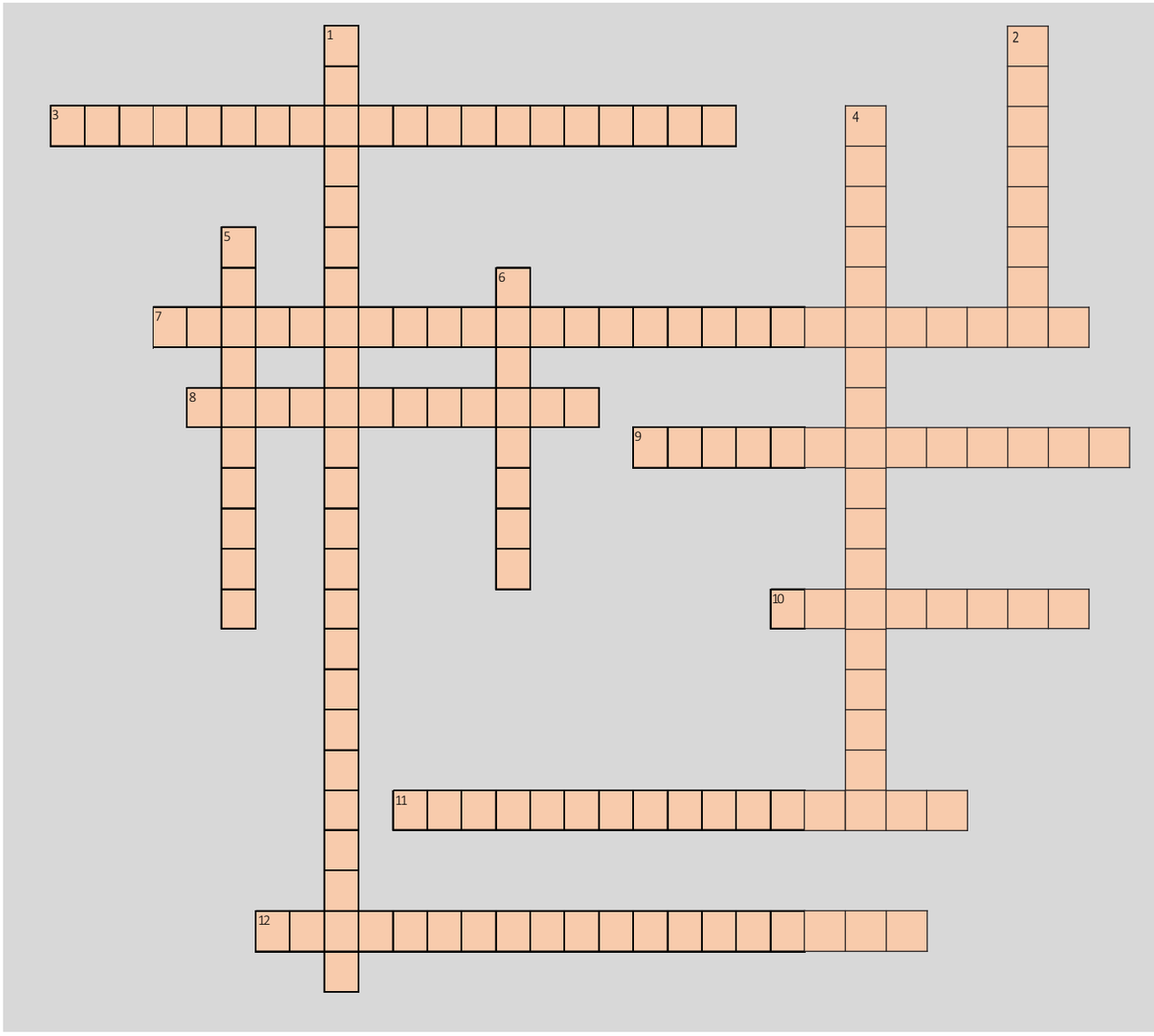
The salient features of the HOP Principals can be summarized in sub-headings;

1. Safeguard Verifications –Spot checking critical equipment helps to identify any latent condition developing which can be resolved before a breakdown or incident.
2. Response Matters – The thoughtful response (as opposed to blame-focused reaction) from the vessel's senior management encourages ship staff to be open the next time. This should be positive.
3. No Blame Culture – The cadet wanted to do a good job. The slip was not intentional. There is no need to get annoyed. As a team we addressed the issue and learned together.
4. Address the issue – When critical equipment has a breakdown and operational readiness is compromised we must address the issue immediately on a priority basis.
5. Learning – How the job was done, not how we think it's done(we know how the job should be done, we want to learn how it was missed) – asking the individual to talk-through the job allows you to learn how it was done.
6. Improve as One Team – Share the incident with the office for potential learning and improvement on fleet vessels and for benefit of our colleagues working there.
7. Zero Error Syndrome – We must ensure that an atmosphere of Zero Error syndrome is not created onboard, because that may lead to non-reporting of incidents to escape any rebuke by the management.

Keep in mind that Safety is never 'attained' but a work in progress.

**Contributed by:** Capt. M.S..Dhaliwal (Master DHT Bronco)

# OCIMF MARINE INJURY REPORTING CROSSWORD



## Across

3. Injury or illness requiring more than first aid treatment by a physician or surgeon
7. A work injury resulting in unemployment at sea but can work ashore
8. Any one-time treatment and subsequent observation or minor injuries
9. Serving onboard 24hrs/Day is called
10. An event not resulting in an injury but could have been
11. Fatalities + PTD + PPD + LWC = ?
12. LTIs + RWCs + MTCs = ?

## Down

1. A work injury resulting in termination of employment on medical grounds
2. An uncontrolled or unplanned event resulting in a fatality or injury
4. Person assigned to another job on a temporary or permanent basis on the day following the injury
5. Any sign or symptom of physical damage resulting from an incident
6. A death directly resulting from a work injury

**Compiled by:** Shrikant Ransing (2nd off) & Madan Koshti (3rd Off) of M.T. DHT COLT

# 10 Reasons why Safety Drills are sub-standard on board ships

**INTRODUCTION:**
With the shipping industry rising to higher standards of safety with each passing day, the need for trainings and the safety standards being maintained on board are ever increasing. One of the key aspects of determining the safety standards on board a vessel is the quality of drills being carried out on board. In addition to the minimum of drills listed in SOLAS, v/Is are very often required to carry out additional drills due to Flag, Certain port requirements, etc. Due to this fact and the added commercial pressures in today's day, the industry is seeing a decline in the quality of the drills being carried out on board.

Over the last few years, the decline in the quality of drills on board can be majorly attributed to the below reasons:

**#1 An exhaustive / excessive number of drills is required:**
With the increase in the number of drills, it becomes harder for the ship's staff to prioritize other ship tasks ahead of drills. Also it becomes a nightmare to finish the paperwork after every drill and not to mention about the effort preparing the same.

**#2 The scenarios exercised are not realistic:**
As drills are performed only on Saturdays onboard, its purpose is not fulfilled as all crew members are well aware and prepared for the drills. Rather it should be performed randomly once a week to give it a more realistic approach.

Also difficult circumstances & conditions should be selected viz., heavy weather, etc for performing drills as emergencies mostly happens during such situations.

**#3 Drill performance criteria are not set:**
Roles and responsibilities should be displayed in the muster lists for all the common drills. Also proper planning to be carried out prior performing the drills. All crew members to be properly trained on their roles and responsibilities during each and every drill. Checklists need to be in place prior performing the respective drills. e.g.,

1. Enclosed space entry checklist to be filled before carrying out “Enclosed space rescue drill”.

2. Pump room checklist to be filled before carrying out “Fire Drill in Pump room”.

**#4 Crew responsibilities are not properly set / defined:**
Prior performing drills, planning is required with a discussion upfront on what the objective is and what is expected from all participants.

At the end of the drill it is important to carry out debriefing, sort out all queries addressed by the crew members and also take feedbacks from all the crew. This will improve the effectiveness of the drill in the future.

**#5 Real-life needs are not addressed at drill plan:**
Prior starting of any drills a group discussion must be carried out, this should include, All real life emergencies, Proper handling of safety equipment for that particular scenario, Following Company SEP and knowledge sharing. Practicing it prior every drill will improve the performance of each crew member and will come of help in real life emergency scenarios which will be holding the surprises of its own and we will be mentally prepared for it.

**#6 The way we execute drills is not in line with ship practices:**
As per SOLAS, every crew member should participate in a fire drill every month. It is not practicable for the crew to go ahead with the same strategy & approach towards every fire drill as we have different scenarios & locations for each and every fire drill. If the crew is not trained for different scenarios and strategies, we cannot expect them to properly perform a real life scenario.

**#7 Industry is having a paperwork approach:**
Auditors, Authorities, Inspectors, etc., are always asking for records of drill as per the schedule / requirements which puts pressure on the Master as it's sometimes not possible to perform drills or maintain records as per schedule / requirements due to increased workload, unforeseen operational circumstances, which can result in a SIRE observation.

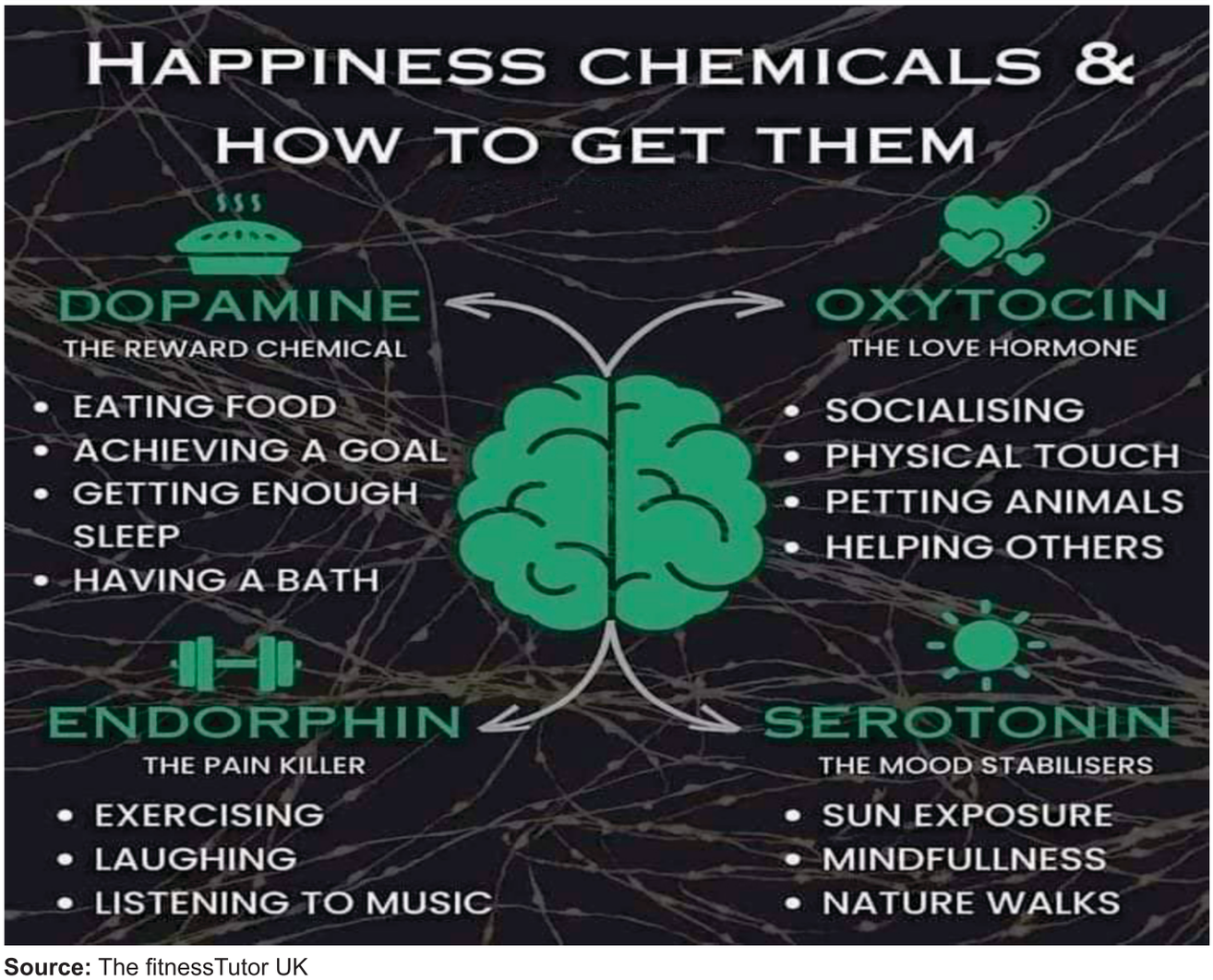
**#8 Paperwork up keeping is a night-mare:**
At times it's a nightmare to maintain drill records as work and rest hours timing doesn't match up with drills timings.

**#9 Drill Performance is not audited in real life:**
Ship managers and Operators auditing the real-life drill and providing effective feedback at frequent intervals will give a bird eye view over the drill performance for ship's member participating in that particular drill and help them finding the mistakes made and correct them. This practice will improve effectiveness of drills as it will be helpful in real life Emergency scenarios.

**#10 No KPIs are set to monitor drill performance:**
Setting up a KPI for drill performance particularly, over work and rest hours, participant's evaluation, Due drills, complications faced during the drill, will avail in proper assessment of the drill from all possible aspects for a long term. This will help to enhance improvement on drill performance across the fleet.

**Conclusion:**
It is of utmost importance that safety and emergency drills are carried out from time to time on a every vessel but it is equally important to ensure the quality of drills rather than the quantity. Nothing can be commented on whether the current scenario would change or not in the future and that concerned organisations or authorities would wake up to this fact, it is up to each of us that we ensure that on board drills are carried out to the highest standards and as close to actual reality.

**Contributed by:** Internal Auditors and On board Trainers




**Source:** The fitnessTutor UK

| Across | Down | Across | Down |
|---|---|---|---|
| 3. MEDICAL TREATMENT CASE | 1. PERMANENT TOTAL DISABILITY | 9. EXPOSURE HOURS | 5. WORK INJURY |
| 7. PERMANENT PARTIAL DISABILITY | 2. INCIDENT | 10. NEAR MISS | 6. FATALITY |
| 8. FIRST AID CASE | 4. RESTRICTED WORK CASE | 11. LOST TIME INJURIES | |
| | | 12. TOTAL RECORDABLE CASE | |

**ANSWERS TO OCIMF MARINE INJURY - CROSSWORD PUZZLE**

# TIGHTNESS OF HATCH COVERS ON BULK CARRIERS

Approximately one third of all P&I claims are cargo-related. A significant portion of cargo claims is caused by water damage, of which numerous cases relate to ingress of sea water via the hatch covers of dry cargo vessels.

In sailing vessels the cargo hatches used to be small, as small as possible, in order to preserve the integrity of the hull. In the bulk carriers of today in order to permit speedy loading and discharge operations warranted the need for larger hatch covers. Manufacturers have designed and built strong enough steel covers and closing devices to ensure water tightness during a sea voyage, but as the vessel's age, the hatch covers are prone to suffer from wear and tear, poor maintenance regimes and problems of water tightness arise.

A ship's liability for cargo damage relating to sea water ingress via the hatch covers often depends on whether he can demonstrate that he exercised due diligence to make the vessel seaworthy before and at the beginning of the voyage. In the following paragraphs we look at some major points related to the tightness of cargo hatch covers of dry cargo vessels.

**WEATHERTIGHT OR WATERTIGHT**

The International Load Line Convention contains principles for assigning minimum freeboard to ships, limits to how deep vessels are allowed to be loaded to perform a safe voyage. It also includes regulations on how to construct and equip vessels to avoid ingress of sea water through various openings. It addresses primarily the safety of the vessel, not the safety of the cargo. The convention requires hatch covers to be “weathertight”, which may lead to arguments on how tight the hatch covers really need to be, as the word “watertight” is not used. However, the Load Line Convention itself states that “weathertight” means that in any sea condition water will not penetrate the ship. When hatch covers are leaking, the rubber gaskets are the first to gain attention. Rightly so, because many problems are directly linked to their condition, and the crew may be able to change the gaskets themselves. Regrettably, however, some owners limit hatch cover attention to replacing the gaskets when worn out and miss out on the finer points of hatch cover maintenance.

**LEAKING HATCH COVER CAN CAUSE CARGO DAMAGE**

When hatch covers are leaking, the rubber gaskets are the first to gain attention. Rightly so, because many problems are directly linked to their condition, and the crew may be able to change the gaskets themselves. Regrettably, however, some owners limit hatch cover attention to replacing the gaskets when worn out and miss out on the finer points of hatch cover maintenance.

Most hatch covers have movable parts like hinges, hydraulic cylinders, wheels, cleats, all exposed to wear and tear over time and having an influence on how well the hatch covers work.

**Rubber gaskets**

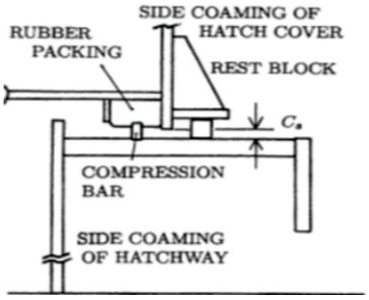
When leakages occur, the rubber gaskets of the hatch covers are usually hard, deeply and permanently compressed, chafed or loose, and may even have sections missing. Gaskets may be of solid rubber, or have a hollow or sponge core.

The point is to have gaskets of sufficient resilience to achieve tightness when resting against compression bars of hatch coamings. The design compression for common gasket types is usually in the range of 10-15 mm, depending on the thickness. Thumb Rule is to replace the packing when a permanent impression reaches half the design value.

**Retaining channels –** The gasket retaining channels are among the weakest construction parts of the hatch covers. Their maintenance is often neglected and retaining channels are often reduced by corrosion and not able to provide sufficient support of the gaskets. When gaskets are replaced, one should always use the opportunity to clean the retaining channels for rust and have them thoroughly coated. Retaining channels may be so reduced by corrosion that as the rust flakes are removed the new packing will fit in too deeply.

**Resting pads(Steel to steel contact) –** One thing is fundamental to a good result when changing gaskets and that is to check the steel to steel contact between the hatch covers and the hatch coaming top. Good and original gaskets may be rapidly damaged by over- compression if this steel to steel contact is not achieved. We all think that the hatch covers float on the gaskets alone and even damage the gaskets further by increasing the force of the vertical periphery cleats. The full weight of the hatch covers is not supposed to be borne by the gaskets alone, only to the extent that the correct design compression of the gasket is achieved and then limited by the hatch cover resting pad on the coaming top. For older vessels the steel to steel contact will often be affected by wear and corrosion of the resting pads.

**Compression bars**

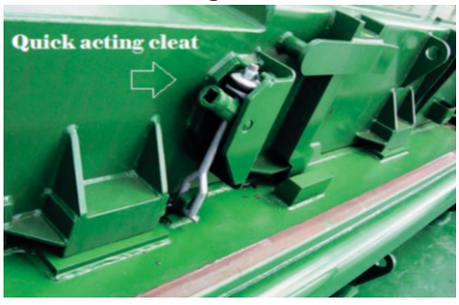



The compression bars on hatch cover panels and on hatch coaming tops need to be straight and the top edge must be well rounded and have an even surface. The compression bar consists of a stainless steel bar, welded to the top of a supporting flat steel. Such compression bars must always stay smooth and even.

**Gutters and drainpipes –** Gaskets in good condition and regular maintenance and tightness tests of the hatch covers are a must to avoid water ingress into the cargo holds, but in the event that some sea water may penetrate the gaskets during heavy weather, it is important that the water does not enter the cargo hold, but drains out again. Cross-over joints between panels will have gutters fitted underneath the packing to catch small amounts of water penetrating. These gutters will drain the water to the hatch coaming gutters, and it is important to check that they are not fractured or damaged at the ends, so water doesn't drain down the into the hold. The hatch coaming gutters will drain the water aft to drain pipes. These gutters are not always well maintained and may have layers of corrosion. They should be kept clean and coated in order to ease the flow of water, and all remains of cargo should also be removed before closing down the hatch covers. Often the inner edge of the gutters, being the top of the vertical hatch coaming plate, may have been chafed by wires, hit by grabs or reduced by corrosion. Such damage will allow the water to overflow to the cargo hold instead of being drained to the drain pipes, and should be repaired and always kept in good condition.

The drain pipes aft are often of small diameter, and are easily clogged up. The pipes need to be fitted with a non-return device, in order to avoid that sea water on deck to find its way into the cargo hold through the drains. Non-return valves easily clog up, so that they must either be frequently opened up for cleaning.

**Means of securing –**




There are various ways to secure the hatch covers once they are in place, depending on the type. Modern covers may be self-cleating or secured by hydraulically operated cleats or wedges, but the most common type on older vessels is the manual quick-acting cleat, having a cam at the upper end, which is forced onto a snug on the hatch cover panels.

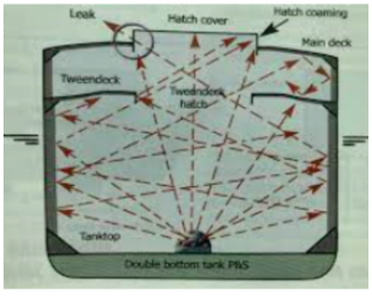
A rubber disc between two steel washers at the lower end of the cleat has enough elasticity for the cam to be placed on the snug by using a portable lever. Thus the hatch covers are restrained from lifting, but are allowed some movement on the hatch coaming in the transverse and longitudinal directions.

**TIGHTNESS TESTS**

**Chalk test -** All compression bars are rubbed with a piece of chalk, thereafter the hatch covers are put in place and secured, and then opened again. If there has been insufficient compression between the compression bar and the hatch cover gasket, there will be a lack of or incomplete chalk marks on such areas of the gasket. The advantage of this test method is that one can see exactly where the problem is. Also, it is clearly seen from the chalk marks if the gasket lands off-centre on the compression bar.

**Hose test –** This test is the traditional way of testing hatch covers and it is not recommended to be carried out on loaded vessels – more than once the hose test itself has caused water damage to cargo

**Ultrasonic test -**

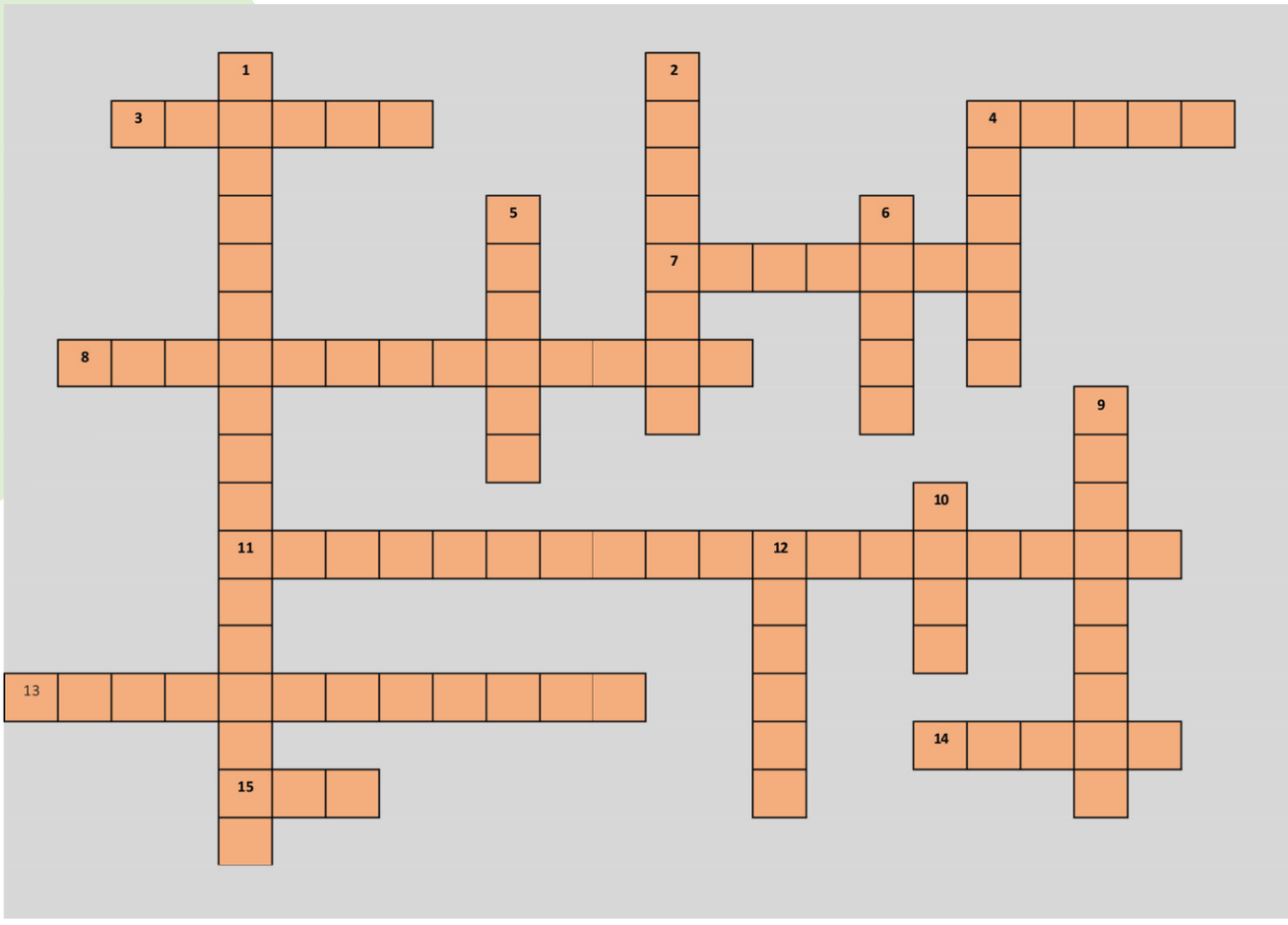



The latest and most accurate way of testing hatch covers is by using an ultrasonic apparatus. A unit emitting ultrasound is placed inside the cargo hold and the operator registers "leakages" of ultrasound through the hatch covers using a handled detector.

Normally one will first measure "open hatch" values and establish 10 per cent of such as the lower acceptable limit with hatch covers closed down. The ultrasonic test method is easily carried out by a hired operator, and the location and importance of leakages are clearly identified in his report. The method has the great advantage that it can also be used on loaded vessels, by placing the transmitter on top of the cargo. Another advantage is that it can be used in cold weather. Major steel exporters may require satisfactory ultrasonic tests carried out on all ships, to reduce risk of damage to cargo.

**Source:** Swedish club and amended by HSQE

# BALLAST WATER TREATMENT PLANT – CROSSWORD




**ACROSS**

3) Hydrogen gas from degas system separator unit is discharged to safe area on deck by _____.

4) It is recommended to fill the filter unit with _____ water between ballasting operation

7) The indicator reagent reacts with any _____ to create a pink colour

8) If temperature of seawater feeding to electrolysis unit is below 10 degree celcius , system uses _____ to satisfy required temperature.

11) Electrolyzer produces ___ through electrolyzation of sea water.

13) When the differential pressure between the inlet and outlet of filter unit reaches its preset value_____ starts automatically.

14) Total chlorine indicator should be renewed after every _____ months.

15) Ship conducting ballast water management in accordance with D2 regulation shall discharge less than ___ viable organisms per cubic meter greater than or equal to 50 micrometer in minimum dimension

**DOWN**

1) A chemical used for nuetralization.

2) Which gas is produced as a residual during electrolyzation?

4) Unit which removes large size of marine organisms and sediments during ballasting

5) Flashing red light on TRO cabinet means _____operation.

6) _____ components means those components that directly affect the ability of BWTS system the performance standard described in regulation D-2.9) An enclosure containing transformer, power switching devices etc to supply power to electrolyser module.

10) During flow test of TRO , ____message means no adjustment required.

12) This acid can be used as a cleaning agent for cleaning filter element (candles).

**Contributed by:** Staff on DHT Leopard

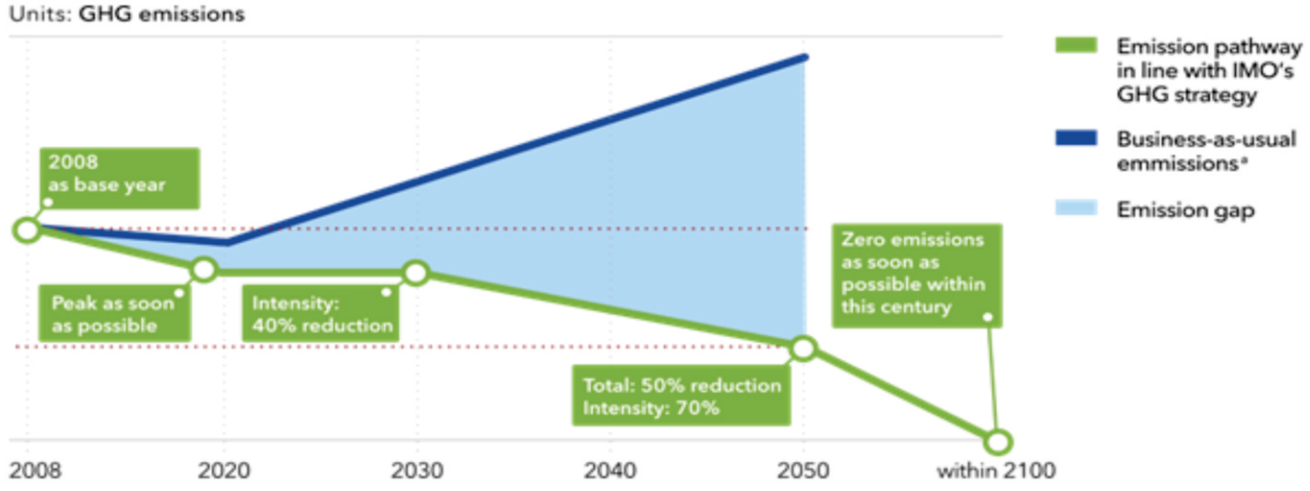
# DECARBONISATION

**Now DECARBONISATION is not a matter of choice, it is an imperative!**

Regulators and other stakeholders in the maritime industry are intensifying their efforts to cut greenhouse gas (GHG) emissions from shipping. The IMO, as the international regulatory body, set a Greenhouse Gas Reduction Strategy in 2018. With 2008 as a baseline year, this strategy aims to reduce with at least 50% total GHG emissions from shipping by 2050, while at the same time reducing the average carbon intensity ($CO_2$ per tonne-mile) by at least 40% by 2030, and 70% before mid-century.

The IMO is following a two-tier approach to implementing decarbonisation measures, focusing first on a limited set of short-term measures, before embarking on more comprehensive medium and long-term measures.

The target is to reduce GHG emissions by improving vessels' energy efficiency as well as introducing new technologies and low or zero-carbon fuels.




In June 2021, the IMO adopted extensive new CO2 regulations applicable to existing ships. The Energy Efficiency Existing Ship Index (EEXI) addressing the technical efficiency of ships, the Carbon Intensity Indicator (CII) rating scheme addressing the operational efficiency, and the enhanced Ship Energy Efficiency Management Plan (SEEMP) addressing the management system.

The EEXI is a framework for determining the energy efficiency and CO2 emissions of in-service vessels over 400 GT. Adapted from the Energy Efficiency Design Index (EEDI) for new builds, the EEXI requires owners to assess and measure their ships' CO2 emissions by design against specific emission reduction factors for each vessel type. To set $CO_2$ emissions standards, the EEXI uses the same methodology as the EEDI. Carbon emissions are described per cargo ton and mile; they determine standard $CO_2$ emissions related to installed engine power, transport capacity and ship speed. The standard emissions are a function of fuel oil consumption, the main engine's and auxiliaries' installed power, and a conversion factor between fuel and the corresponding $CO_2$ mass. This new index is scheduled to come into force on January 1, 2023.

The CII measures how efficiently a ship transports goods or passengers and is given in grams of CO2 emitted per cargo-carrying capacity and nautical mile. The ship is then given an annual rating ranging from A to E, whereby the rating thresholds will become increasingly stringent towards 2030. The CII will be used to rate ships on a 5-grade scale: A, B, C, D and E—from best to least performing. Ship design upgrades or significant operational improvements will be required of any vessels receiving a "D" rating three years in a row or for vessels receiving a grade of "E" during any annual review. As a result, ship owners and managers must determine their vessels' carbon intensity profiles and optimize their SEEMP by the end of 2022.

While the EEXI is a one-time certification targeting design parameters, the CII addresses the actual emissions in operation.

These new requirements for existing ships will be reviewed by the end of 2025, with particular focus on the enforcement of the carbon intensity rating requirements. The purpose of these new IMO ratings is to steer ships closer to Paris Agreement targets.

**Medium and Long-term Measures**

While the proposed short-term measures should be adequate for reaching the 2030 goals, further measures, or increased stringency of the short-term measures, are needed to achieve the 2050 ambitions. MEPC 76 recognized the urgent need to progress the establishment of mid and long-term measures and agreed on a working plan to this end. The work will include consideration of MBMs (market-based measures), as well as further discussion on measures to catalyse a fuel transition, including a potential GHG footprint requirement for fuels.

**Contributed by:** HSQE Department

# LIFE OF AN ETO AT SEA

"Individually, we are one drop. Together, we are an ocean. "

Every rank / resource in an organization plays a key role in itself and in the Merchant Shipping there is no exception.

An Electro Technical Offcer (ETO) is a maintenance / operation engineer, who plays a key role in maintenance of Electrical, Electronics, Hydraulic, Refrigeration, Pneumatic, Communication & Navigation Equipment and all other Automation & Safety systems on a ship.

Working conditions on merchant ships are challenging / demanding. One has to be extra vigilant while on the job.

The scope of work of an ETO is not restricted to a particular area. ETO is like a synergist between all the departments on ship. Hence it becomes essential for an ETO to be updated about all the new technologies, new processes and changes in every area of the ship.

ETO must ensure he has adequate knowledge of his job and do a detailed study of the same. In your field, you are the only one to take necessary action and get things under control. ETO's best friends on board are his measuring & testing instruments and electrical drawings. He need to be familiar with various drawings and review them frequently to avoid any delay when trouble arises.

As a seafarer, ETO's job starts as soon as he steps on the gangway of ship. He needs to be well prepared to handle any kind of emergencies. He needs to maintain a positive attitude, calm & collective approach and level headed thinking towards solving a problem.

An ETO's typical day at sea begins at around 6am with his regular refreshing and recreational activities. Reports at the ECR at 7.30 am to participate in the toolbox meeting.

Discuss with C/E on the PMS jobs planned, review Work Permits and Risk Assessments for the required jobs. There after he will take Engine room rounds to check and closely monitor performance of each equipment. It includes a visual inspection, checks for any abnormal noise and vibrations generated by various machineries.

After accomplishing the jobs assigned for the day, he prepare a job closure report (highlight if any pending issues or any abnormalities which yet need to be resolved) with photo evidence and upload in the PMS as required, discuss with CE and plan for the jobs / works for the next day.

Tea break times is when we all meet and share our professional experiences, work progress and gather suggestions from our colleagues.

As an ETO, when we come across numerous complicated problems we have to spend a lot of time to review and understand various engineering drawings, operational logic, carry out some trials tests to identify the root cause. There is no room to make a mistake. When you successfully troubleshoot a problem after working on it for long hours and is the happiest moment in any ETO's life on ship.

Every seafarer requires a combination of good communication skills, leadership, pragmatic approach and safe working culture. Mental and physical health is very important to fulfill your time onboard safely. A salute to every colleague who keeps a motto of, "SAFETY FIRST". Learning never stops on ship. During every contract there is something new to learn and strived to make myself better prepared and stronger. There are so many challenges, practical work experience in this field and I enjoy my job.

Prevention is better than cure. I believe preventive maintenance is very much important to avoid breakdown of machineries. ETO must check and evaluate machinery regularly and inform the Chief Engineer of any irregularities. ETO needs to carry out various checks and safety test in regular interval for healthy operation of machinery and to maximize operational safety & efficiency of the vessel. Preparing requisitions, record keeping, familiarization with regulations and safe working procedures is equally important.

After fifteen years in this field and working with well-known shipping companies, one thing I learnt is that life of a seafarer on merchant vessel depends on company you are working with, age of the ship and your shipmates. 'Goodwood Ship Management' makes me feel proud and special.

**Contributed by:** ETO – Mr. Siddhesh M Chitnis – on board DHT PUMA

**ANSWERS TO BWTS - CROSSWORD PUZZLE**

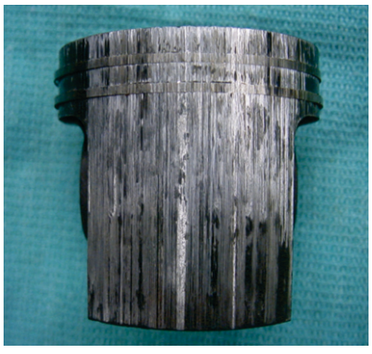
| Across | Down | Across | Down |
|---|---|---|---|
| 3. BLOWER | 1. SODIUM THIOSULFATE | 11. SODIUM HYPOCHLORITE | 6. MAJOR |
| 4. FRESH | 2. HYDROGEN | 13. BACK FLUSHING | 9. RECTIFIER |
| 7. OXIDANT | 4. FILTER | 14. THREE | 10. GOOD |
| 8. HEAT EXCHANGE | 5. BY PASS | 15. TEN | 12. CITRIC |

# MACHINERY FAILURE CAUSED BY CONTAMINATION

A vessel was in ballast and at anchor, awaiting further instructions. After seven days the weather deteriorated and the vessel's anchor dragged. The anchor was heaved up and the vessel started to slow steam in the area. After about 24 hours, the differential pressure alarm of the main engine duplex lubrication oil filter sounded in the engine control room. The crew found aluminum and other metal inside the lubrication filter and in the crankcase of the main engine, metal particles were found.

**Serious Damage to the Medium speed 4-strokeEngine**

The subsequent investigation alongside revealed that the metal particles found in the lubrication oil filters emanated from piston rings and piston skirts. Three pistons had almost seized. The main engine, a six cylinder medium speed type had severe damage and the following parts had to be renewed: all cylinders liners, three complete pistons, piston rings on all cylinders, all main and connecting rod bearings.



In addition, the turbo charger had to be overhauled as the nozzle ring was broken. The complete lubrication system had to be carefully cleaned and flushed. The vessel was off hire for almost two weeks.

The pistons in cylinder units' No. 1 and No. 3 were melted down in certain areas and the skirt in No. 4 was torn. Liners were scuffed as a result of the above. The cylinder lubrications channels were found clogged and so cylinder lubrication has been inactive. The lubrication oil pump was found deteriorated due to the hard impurities in the lube oil system.

**Lubrication Oil Contaminated for Some Time**

It was obvious that the engine had been operated on a high thermal load for a long time and that the turbocharger efficiency has been affected by fouling. The lubrication oil had actually been contaminated for some time.

There had been indications that something had gone wrong, for example it was written in the log book that the auto filter had been shooting up to 609 times a day.

**Facts revealed during the Investigation**

- ❑ Fuel oil samples before and after purifiers were taken and analysed. The result indicated that the purifiers were working satisfactorily. All fuel oil analyses from bunkering were within specification.
- ❑ Several samples of the damaged piston rings were sent to a laboratory. The conclusion was that the excessive wear of liners and pistons was not caused by catalytic fines.
- ❑ The cylinder liner lubrication system was tested and was found to work properly.
- ❑ At the time of the casualty the main engine, including turbo charger, had been running 7,300 hours since its previous major overhaul. This overhaul had been carried out 18 months previously.
- ❑ Investigation of the maintenance records showed that maintenance had been carried out in accordance with manufacturer's instructions.
- ❑ When reviewing the monthly main engine reports it became obvious that the main engine exhaust temperatures of all cylinder units had increased 30°C – 40°C for the previous six months.
- ❑ The turbo charger revolutions had dropped from about 14,500 rpm to 12,000 rpm at 85% load as had the charge air pressure from 1.7 bar to 1.2 bar. These changes also began to appear in the past six months.
- ❑ Due to high exhaust gas temperatures, the engine was under a high thermal load, which finally caused it to break down.

**What Can We Learn?**

- A first step to avoiding damage is to have a well implemented and proper management system. This implementation can only be assured with proper training and education for the crew and providing them with the essential knowledge and experience required for ordinary daily work and maintenance according to company procedures.
- Always take engine alarms seriously, for example oil mist detection, and investigate thoroughly. A fully functional alarm system is essential for the safe operation of the main engine.
- Implement robust on board fuel and lubrication oil management systems.
- At regular intervals, carry out system checks of purifiers and filters for both fuel and lubrication oil systems.
- Emphasis on sincere watch keeping and correct entry of parameters in the Log Book. All the entries must be reviewed for consistency and compared with Maker's recommendation.
- It is important to periodically check performance of M/E and A/Es and compare with previous performance checks to establish any change in engine thermal load.

**Source :** 'The Swedish Club Casebook' and amended by Goodwood HSQE


Goodwood Ship Management Pte Ltd

20 Science Park Road
#02-34/36 Teletech Park
Singapore 117674

Ph +65 6500 4040
Fax +65 6500 4050

Goodwood Marine Services Pvt Ltd
(Manning office in India)

Unit 905, 9th Floor
and Unit 1222, 12th Floor
Hubtown Solaris
N. S. Phadke Marg,
Andheri (East),
Mumbai - 400069
Maharashtra, India

Ph +91 22 6720 0400
Fax +91 22 6720 0404

application@goodwoodship.com

www.goodwoodship.com


Goodwood