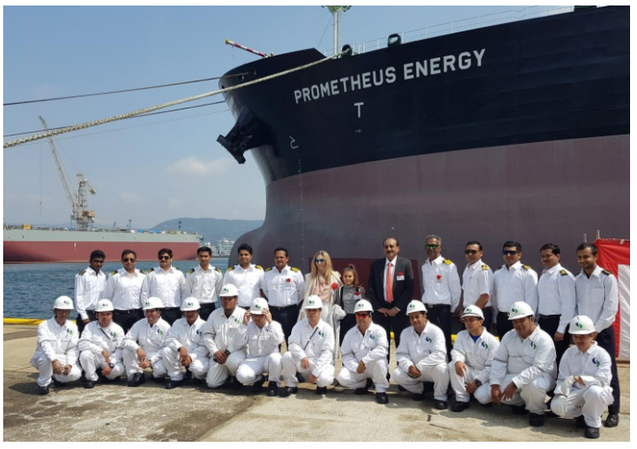
PROMETHEUS LIGHT & PROMETHEUS ENERGY

Sea trial for Prometheus Light was conducted from 26th November 2018 to 5th December 2019 and the vessel was delivered on 23rd Jan 2019.



Sea trial for Prometheus Energy was conducted from 5th March 2019 to 12th March 2019 and the vessel was delivered on 28th March 2019.

NEWSLETTER CONTENTS

1 Delivery of Prometheus Light and Prometheus Energy

2 Crosswords – Engineering and Tanker Practice / Goodwood Social Sunday Initiative

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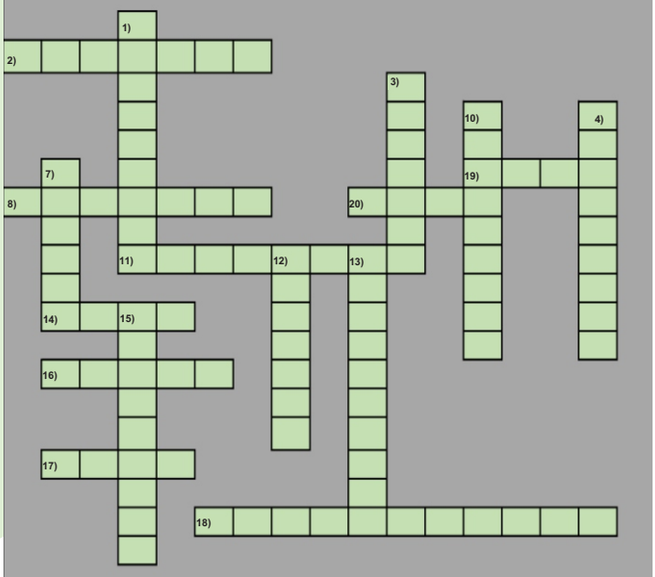
APRIL 2019 EDITION

ENGINEERING - CROSS WORD



Across:

2) Insulation meters on switch boards are in _____ units

8) What causes increses in fuel consumption / reduction of speed (on hull)?

11) Current output in ICCP depends on _____ of sea water

16) Current output in ICCP depends on _____ of ship

17) Current output in ICCP depends on condition of ship's _____ .

18) Current output in ICCP depends on sea water _____

14) Oxidation of metal causes _____

19) Coal, oil or petrol that is burned to produce heat or power

20) A ____ triangle consists of Fuel, heat & Oxygen

Down:

1) MGPS prevents growth of _____ in cooling S.W. pipelines

3) Which factor seperates oil & water?

4) Reference voltage of ICCP is measured in _____ (unit)

7) Which metal anode is commonly used for antifouling in MGPS?

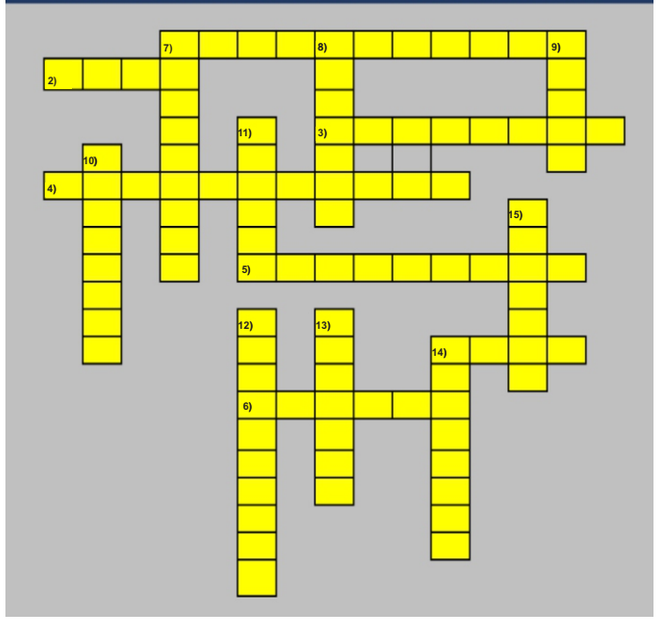
10) Output of ICCP depends directly on the input of _____ cells.

12) Main engine jacket cooling water system needs control of pH, chloloride and _____.

13) Excess of _____(sea water flow) can cause errosion of plates in cooler.

15) Ingress of sea water in DB tanks disturbs _____ of ship?

TANKER PRACTICE - CROSS WORD



Across:

2) Equipment used when decanted water needs to be pumped intoi the sea

3) Space on mooring deck where it is anticipated that a failed mooring rope will recoil

4) A plan that is made to deal with an emergency

5) A harmless chemical added to give LPG a distinctive odur

6) Free space available above a liquid in a tank provided to accommodate expansion of a liquid.

7) Charge payable on space booked on a ship but not utilized by the charterer or the shipper

14) Chief Officer can relax during _____ loading.

Down:

7) A process to permit natural separation of mixtures in a slop tank

8) A pipeline needs to be ..... when a different grade of oil is to be loaded

9) Every deck & engine cadet needs to ..... pipelines on joining his ship

10) Discharge of Oily Water from the tank is monitored by _____.

11) A type of mooring used between FPSO and shuttle tankers

12) The temperature below which wax in oil (crude oil / diesel) forms a cloudy appearance

13) An informal meeting conducted commencing a days work.

14) The process where ships cargo pumps are used to internally circulate 2 cargoes to get a new product designation

15) Delicate spare parts always carry a _____ sticker.

Source: Deck and Engine officers on DHT Peony

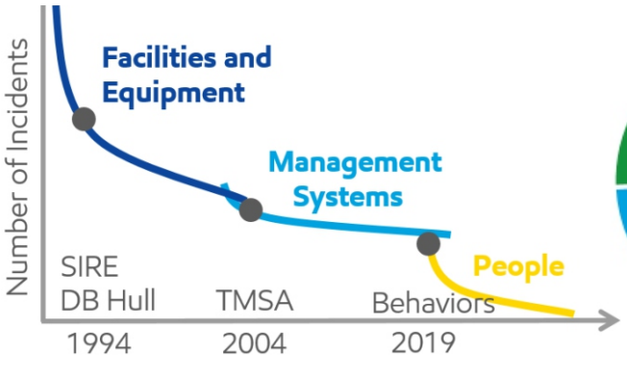
As part of Goodwood's 'Social Sunday' initiative, Goodwood Singapore office recently organised a group hiking activity at the Bukit Timah Nature Reserve for their staff and families.

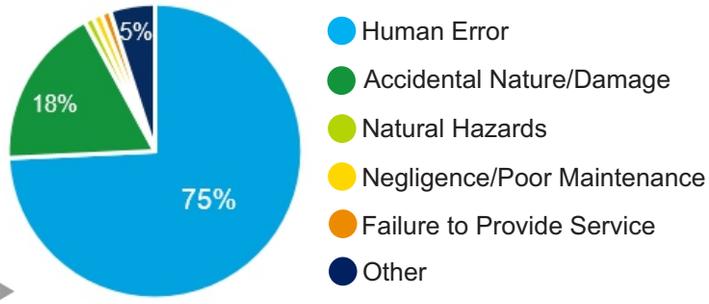
The hike was a fun and healthy activity for all ages, and the lush rainforest provided a lovely setting for the participants to know each other better.

HUMAN ELEMENT IMPACT ON SAFETY CRITICAL ACTIVITIES

Human error plays a significant role in the majority of incidents in the marine industry.

Although there has been a reduction in the number and severity of marine incidents in the past few decades which can be attributed to improved equipment design, robust safety management systems, improved regulations, identification and implementation of best practices, incidents still continue to occur, some with catastrophic consequences.





Industry sectors attribute human error in approximately 80% of incidents. This might lead us to think that people cause incidents. However 80-90% of the time we find that mistakes, actions and decisions are driven by a variety of factors; how we design our work, equipment and control measures, and how leaders influence the culture in an organization. Nobody comes to work with intentions of making a mistake or getting hurt. Everybody comes to work to do a good and safe job. However, statistics reveal that human error is still the biggest cause leading to incidents.

Implementing a culture in which safety is embodied and understood at all levels of the organization starts with leadership because a leader's actions directly impact organizational culture. A leader's response to mistakes directly impacts the culture of both learning and accountability.

- Build a culture in which it's ok to ask for help
- Require people to demonstrate competency, reassess regularly
- Empower crew members at all levels to stop work if unsafe
- Encourage highly collaborative crew, who look out for each other.

SAFETY CRITICAL ACTIVITY is one where any error or failure may result in a bad outcome such as death or injury, loss or damage, or environmental harm.

A **SAFETY CRITICAL SYSTEM** comprises everything needed to perform a safety-critical activity. This includes people, hardware, software, procedures and company culture.

SAFETY COMPETENCY is having sufficient skill, knowledge and experience to identify and understand hazards, and ensure they are being adequately managed. Industry data reveals that human behaviors are often impacted by underlying conditions. Guarding against the impact of these conditions is key to managing safety critical activity and risk tolerant decisions.

The success of tanker operations depends on people carrying out their tasks reliably and safely. Mistakes often result from well-meaning behaviors intended to get the job done. Understanding 'how' and 'why' mistakes occur, can help us prevent them. Identify error-prone situations, report errors and take steps to prevent their recurrence.

Example

- A Master who has berthed the vessel 50 times safely on the SBM fails to do so on the 51st attempt
- An experienced Chief Officer makes an enclosed space entry which results in a fatality
- A leader's response to mistakes directly impacts the culture of both learning and accountability.

Source: International Marine Transportation Singapore Pte Ltd

LIFE OF CHIEF ENGINEER AT SEA

It is often said that there is no rose without a thorn.

Every wonderful thing comes with its own exquisite purpose and its own set of harsh realities and being a Chief Engineer is no different.

To become a diligent and competent Chief Engineer, it is of utmost importance that you face the brutalities of this rank at its very beginning. After all no one becomes a hard core sailor, when the seas are smooth and the waves are calm.

”Age is an issue of mind over a matter and if you don't mind, it doesn't matter.” Regardless of age, the Chief Engineer, is a top management level officer when contacting and communicating with head office and third parties. Apart from this, he is also an operational/maintenance engineer, who works closely with his junior engineers to understand their problems, rectify their mistakes, and to make sure that the crew are happy and do not want for more. Few ranks or professions rival that of the Chief Engineer in terms of workload intensity.

As a seafarer, professionalism our professionalism starts from the very moment we step we step on the gangway of our ship for the very first time. Regardless of rank, from OS to Master or from Wiper to Chief Engineer, we all need to be professionals of the highest order.

As a Chief Engineer you need to be constantly on your toes, because problems don't ring your door bell when they come. They arrive when they are least expected; and a Chief Engineer needs to forget all his personal issues and lead his fellow junior Engineers and team to tackle whatever catastrophic situation that may arise.

Tackling an emergency, motivating his boys, answering queries from office all at one time is a no easy task. Overcoming emergency situations is only possible if you have pride in your job. One has to take pride in whichever job he does and as a Chief Engineer that pride must be of the highest level, because different days bring newer & exotic challenges for which we always have to be ready.

Evaluating the performance of an individual is a vital role in the Chief Engineers to-do list, but he also needs to evaluate himself before evaluating or concluding others performance which includes a little spirituality. The very purpose of spirituality is self discipline rather than criticising others we should evaluate and criticize ourselves. Ask yourself what I am doing about my anger, my attachment, my pride and my jealousy. These are things we should check in our day-to-day lives. Family back at home is always in your sub-conscious mind and its support also plays a major role in a Chief Engineer’s action, or for that matter, in any individual's life.

We all know that, ”Health is Wealth” in our case it certainly is, as we are not getting any younger. A healthy body can lead to a healthy mind which in turn will help in making accurate decision in critical situations. So we recommend spending an hour a day for physical wellness which helps in maintaining a balance between social wellness, spiritual wellness, emotional wellness & Intellectual wellness.

As a Chief Engineer, the highest satisfaction achieved is, when a third party inspector applauds the cleanliness of the engine room, the engine staff for their professionalism and finally, an appreciation email from Office. It's like hitting a century in a cricket match. We Chief engineers feel on top of the world whenever vetting inspections/port state inspections are passed without any deficiencies. Whenever any major job, be it on Main Engine, Generators and purifiers etc, are done successfully and without causing any sort of injury to any crew and Engineer, it feels so good when you leave the engine room flawless. We do find happiness in the smallest of things.

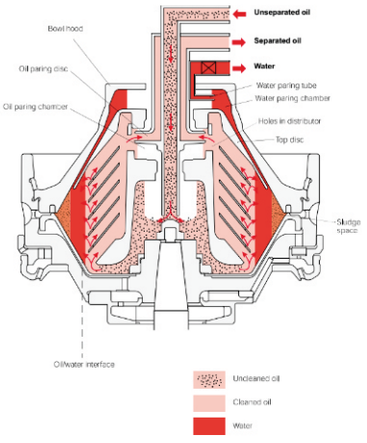
Failures are a part of every profession and there is a saying”If we want to increase your success rate double your failure rate.” Learning is a never-ending journey on the road to excellence. Along with duties of a Chief Engineer, we also wear the Safety Officer Cap. The safety of all the officers and crew is a big responsibility and we need to be vigilant at all times and attend to every alarm to prevent accidents / incidents. Lives are at stake out at sea and as a Chief Engineer, it is very important to maintain a balance between commercial pressures, safety of crew and taking care of their well-being.

The life of a Chief Engineer is filled with different exciting challenges and tasks which I am proud of and I will always take pride in this profession.

Chief Engineer - Mr. Vikram Singh- on board DHT LION

PURIFIER - THE ON BOARD DIALYSIS MACHINE

A purifier, located in one corner or inside a compartment within machinery space, plays very important role in safeguarding moving components in Main Engine and Diesel Generator(s). An efficient purifier will ensure large amount of solid particles and water is removed from the fluid and thus filter before M/E / DG are left to deal with only smaller sized solid particles that could not be separated by purifier. FO Purifier removes large amount CAT fines together with other solid particles contained in FO. Thus purifier is first line of defence for the M/E and D/G.



The purpose of purifier is primarily:

- to remove solid particles from oil,
- to separate two mutually insoluble liquids with different densities (oil & water) while removing any solids presents at the same time

1.0 Separation Principle

Separation of solid particles and water from untreated oil in a purifier takes place using the principle of centrifugal force and centripetal force. In a rapidly rotating purifier bowl, centrifugal force is acting on the water and solid particles contained in the untreated liquid.

2.0 Efficient Separation

The separation efficiency is influenced by several factors such as follows:

Temperature: High separating temperature will reduce the viscosity and that will increase the separation efficiency.

Viscosity: Viscosity is the resistance against the fluid movement. Low viscosity of the oil facilitates better separation. It is important to keep untreated oil temperature at inlet to purifier in the range of 95°C-98°C.

Density difference: To separate water from untreated oil, the greater the density difference between the water and clean oil, the easier the separation. The density difference between two fluids can be increased by heating the untreated oil.

Untreated oil feed rate: Oil feed rate affects the separation efficiency to a great extent. Normally, a lower feed rate means higher separation efficiency as oil is allowed to remain inside the purifier for a relatively longer time. If untreated oil density is high, or contains large quantity of CAT fines, the feed rate to the purifier should be reduced just enough to meet the consumption to remove as much quantity of unwanted solid particles in the oil as possible. If purifier is operated with a low feed rate that is insufficient to meet the daily M/E & D/G, two purifiers can be run in parallel to meet the demand at the reduced feed rate.

3.0 Oil / Water Interface

An interface is formed between the oil and water in the bowl. The interface is formed the moment purifier starts receiving untreated oil feed and is maintained throughout the purification process. The interface position is decided by the use of gravity disc (dam ring). In order to achieve optimum separation of the oil, the interface must be maintained in the correct position by the use of correct size gravity disc, which is between the disc stack and the outer edge of the gravity disc. If the interface moves outside the outer edge of the gravity disc the water seal will break and oil will be discharged with the water. If the interface is positioned inside the disc stack, it will result in water not being separated from oil and water may get carried away along with the oil.

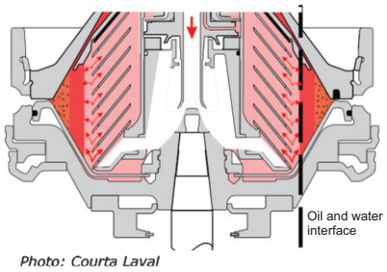


Photo: Courta Laval

4.0 Purification

Untreated liquid is fed into the bowl through the inlet pipe and liquid rises thru channels formed in the disc stack.

Solid particles being heavier than water & the clean liquid are separated from the untreated liquid and get accumulated in 'sludge space' and is removed thru sludge ports during desludging operation.

Water being heavier than clean liquid but lighter than solid particles settles outer side of liquid seal and flows out through water outlet pipe.

Clean liquid travels towards inner space of purifier under influence of centripetal force and flows out through separated liquid pipeline with the help of paring disc located inside top on distributor. Paring disc converts rotational energy of the liquid to pressure head.

5.0 Precautions:

a. Separator must always be started from local panel so that operator can observe the purifier operation, any undue vibration etc. Excessive vibration can be caused by too much sludge in the bowl, foundation dampers cracked, bearings defective.
b. When purifier is running, check ampere meter that current drawn is normal and ampere metre needle steady.
c. Watch keeper should de-sludge the purifier manually once each watch to ascertain full discharge cycle is completed as per maker's recommendations.
d. Before dismantling the purifier for routine cleaning or overhaul, operator must refer to maker's specific instruction manual and familiarize with correct overhaul and operation procedure.
e. Ensure correct size of gravity disc is used as gravity disc governs the location of oil and water interface inside purifier bowl. If gravity disc with larger holedia is selected, water seal interface will move towards bowl periphery and oil will likely overflow into water outlet in case water seal breaks. In case gravity disc with smaller holedia, water seal interface will shift closer to centre of the bowl and water will likely get carried away with oil.
f. While cleaning separator discs, care should be taken to avoid using any hard metal that may scratch the disc surface.
g. Purifier parts such as bowl etc should be handled with care, right tools to be used and parts to be placed on a clean wooden plank to avoid any damage to parts.

Compiled by Mr. Alok Misra - Technical Department

IMO DCS COMPLIANCE
FIRST REPORTING PERIOD OF FUEL OIL CONSUMPTION

Under the IMO Data Collection Scheme (DCS), it has become mandatory for ships of 5,000 GT and above to collect fuel consumption data along with other specified data required to calculate the transport work. This data is used to create an emission report as per IMO Guidelines and same has to be reported to the Flag Administration at the end of each calendar year. The Flag states will subsequently transfer this data to an IMO Ship Fuel Oil Consumption Database, which will help in monitoring the global emission from ships.

From 01st Jan 2019, ships must collect fuel oil consumption data and thereafter following the end of each calendar year and no later than 31st March of subsequent year, the ships must submit to flag or RO the data on fuel consumption. So the first report for our fleet has to be submitted by 31st March 2020.

A key part to generating and submitting an accurate emission report is the proper documentation and reporting of the following parameters:

1. Fuel Oil Consumption
2. Distance travelled
3. Hours Underway

➢ **Fuel Oil Consumption**

IMO has allowed for three methods for the measurement of fuel consumption onboard:-

1) Method using Bunkering Delivery Note (BDN)

2) Method using Flowmeters

3) Method using bunker fuel Oil tank monitoring onboard

For our vessels within the fleet, we have selected the “Flowmeter” method for determining fuel consumption. In case of a breakdown of a flowmeter or if a machinery is not fitted with a flowmeter, then the backup method is “bunker fuel oil tank monitoring”.

The daily fuel consumptions on board are calculated using the flowmeter readings and a record of same has to be maintained on board. In order to ensure proper reporting the following should be complied:

- The flowmeters should be calibrated as per PMS schedule.
- On a regular basis, the tank soundings should be taken to cross verify the consumption recorded using the flowmeter.
- The flowmeter readings should be recorded on a daily basis in the engine room log book.
- The consumption should be accurately recorded in the daily noon/ arrival/ departure reports in PAL, as the final report end of the year will be extracted from PAL.

➢ **Distance travelled**

The distance travelled is the distance travelled over ground and only while the ship is underway using its own propulsion. This means that any distance covered while the vessel is drifting is not included.

The distance travelled should be recorded in the Deck Log book and also reported in PAL in the daily noon/ arrival / departure reports. It is important to note that distance travelled during maneuvering for berthing (EOSP to All Fast) and also after un-berthing (Cast Off to COSP), should also be reported in PAL.

➢ **Hours Underway**

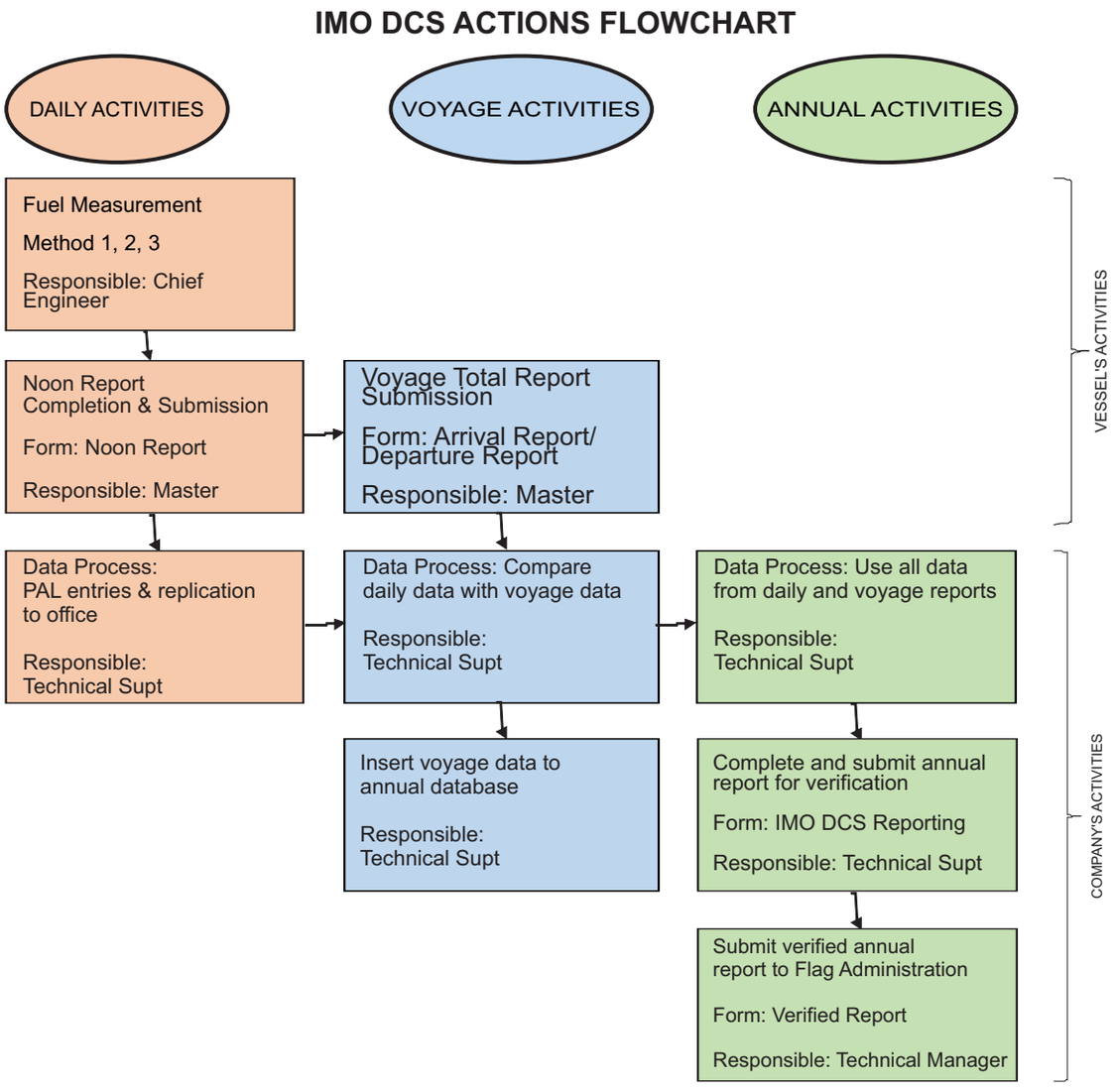
These are the main engine running hours and have to be reported accurately in the daily noon / arrival / departure reports.

➢ **Reports at the end of each reporting period**

At the end of each reporting period, the company will extract the annual data for each vessel from PAL. It is vital that all reports and events are promptly and accurately reported in PAL in order to avoid any gaps in the reports. Some of the key points which will assist in accurate reporting:

1. For bunkering, company procedures should be strictly complied. Any short out-turn should be immediately reported and LOP should be issued if same is not resolved.
2. Records of flowmeters calibration should be maintained on board.
3. Any gap noted and corrected in the reports, should be supported with adequate comments. For example, a vessel finds an error in the bunker ROB and does an “Inventory Adjustment”, adequate remarks should be provided in the report.
4. Distance travelled over ground for maneuvering should also be recorded in the noon reports / arrival reports / departure reports.

Please refer to the IMO DCS Action Flow Chart for better understanding the process flow.



HEALTH ARTICLE

How taking a walk after eating can be beneficial

It has been customary for every seaman working on deck and in the engine room to have a short 'power nap' after having his lunch. Recently a study done by myfitness.com, has highlighted two reasons why going for a short walk around the ship or out on deck after eating a heavy meal could be beneficial to crew members on board.

Why taking a walk after a meal?

1. It can aid digestion

- A study found that walking increased the rate at which food moved through the stomach.
- Other research has found that walking after a meal may improve gastric emptying in patients with longstanding diabetes, where food may typically take longer to digest and empty from the stomach.
- Individuals suffering from digestion problems and discomfort may also see some benefits from walking.

2. It can help control blood sugar levels

- Chronic high blood sugar can cause problems like damaged blood vessels, kidney disease and vision issues. It can also lead to insulin resistance and impaired glucose tolerance, which are risk factors for Type 2 diabetes.
- A study found that walking for 15 minutes after a meal three times a day was more effective in lowering glucose levels three hours after eating compared to 45 minutes of sustained walking during the day.
- Another study of individuals with Type 2 diabetes found that 20 minutes of walking post-meals may have a stronger effect on lowering the glycaemic impact of an evening meal compared to walking before a meal or not at all.

Source: American Diabetes Association

LUBE OIL CAVITATION - A silent killer of the journal bearings in internal combustion engines

I. Introduction

A. Cavitation is the formation of an air or vapour pocket (or bubble) due to lowering of pressure in a liquid, moving through the liquid; also, the pitting or wearing away of a solid surface as a result of the collapse of a vapour bubble.

B. Cavitation can occur in internal combustion lube oil system, as a result of low fluid levels that draw air into the system, producing tiny bubbles that expand explosively at the bearing oil supply outlet, causing metal erosion and eventual bearing damage.

C. This is a particular form of fatigue caused by rapid fluctuation of pressure in the bearing oil film. When the pressure is low, bubbles of vapour or dissolved gas are formed and then collapse as they go into a high pressure region.

D. Vaporous cavitation, where the bubble collapse is much more violent, results in shock waves in the lubricant film that cause fatigue failure in the white metal surface. This differs from normal fatigue in that small pits are formed rather than loose pieces.

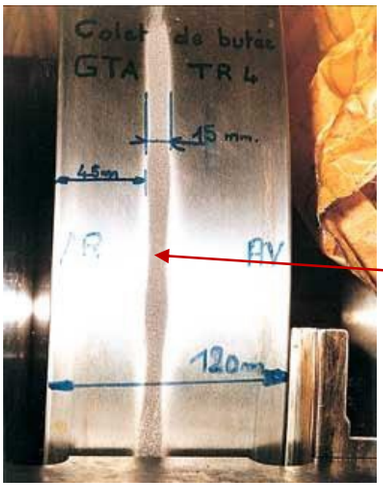
II. Explanation

A. **How cavitation originates**: The cavitation is normally negligible at good operation and good lube oil running conditions. However, the following situations promote the bubble formation to dangerous levels:

1. Noxious acids in the oil.
2. Extreme flow of gases caused by blow-by.
3. Fuel pump leaking fuel into the crankcase.
4. Oil contamination by coolant.

B. **Operating parameters promoting cavitation:** Even at normal running conditions, some of these defects can lead to generate bearing failures:

1. Lower limit running of lube oil pressure frequently.
2. Lube oil filters differential alarms and pressure fluctuations.
3. High oil temperature due to oil coolers chocking or temperature controllers operating erratic.

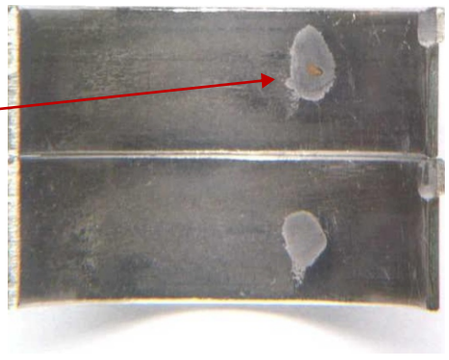


Irregularly shaped babbit voids occurred and can appear as localized erosion. The location of the damage is the criteria to assess the cause of damage. Often called cavitation erosion, cavitation damage is caused by the formation and implosion of vapour bubbles in areas of rapid pressure change. (Filter changeover/ frequent back flushing)

C. **Cavitation due to Vibrations**: At connecting rod and main bearings due to vibrations, lance shaped erosion occurs:

1. Due to excessive bearing clearances.
2. Vibration of cycle rapid motion of pin.
3. Turbulence of oil or impingement of oil at groove to bearing surface.

Vibration of the cycle rapid motion of pin / bearings causes local erosion and cavities.



This is "Cavitation Erosion", on the unloaded half of insert. Vibrations and pressure fluctuations, "Entrained" air bubbles in oil may cause additional lubrication problems.

A vessel generator suffered severe damages in similar manner.

D. **Cavitation promoted by water / moisture presence**:

- Vaporous Cavitation - If the vapour pressure of moisture is reached in the low-pressure regions of a machine, such as the suction line of a pump, the pre-load region of a journal bearing, etc., the vapour bubbles expand.
- Should the vapour bubble be subsequently exposed to sudden high pressure, such as in a pump or the load zone of a journal bearing, the water vapour bubbles quickly contract (implode) and simultaneously condense back to the liquid phase.
- The water droplet impacts a small area of the machine's surface with great force in the form of a needle-like micro-jet, which causes localized surface fatigue and erosion.
- Water contamination also increases the oil's ability to entrain air, thus increasing gaseous cavitation.
- Vaporous cavitation associated with the implosion of water vapour can form honeycomb-like pitting on bearing surfaces. A variety of chemical and electrochemical forms of surface failure have been reported to be caused by moisture in journal bearing lubricants.
- Moisture ingress in the lube oil system is identified with following routes: a) Absorption b) Condensation c) Heat exchangers d) Combustion/Oxidation/Neutralization e) Free water entry.

Here severe cavitation damage of a generator bearing is attributed to chronic moisture

III. **Conclusion and Counter measures to avoid Cavitation failures**:

1) Observe correct operating bearing clearances.
2) Maintain supply oil pressure on higher side of the limits.
3) Filters high differential pressures to be avoided.
4) Oil coolers to be kept clean and high temperatures are not allowed.
5) Oil temperature controllers to be maintained.
6) Prevent moisture entry and treat oil.
7) Eliminate oil flow restrictions (downstream).
8) Maintain correct oil viscosity.
9) Lower the bearing temperature.
10) Observe local vibrations and induced vibrations.
11) Maintain good lube oil pressure at stand by or non-running conditions.
12) Limit low load running to prevent gas blow back/ low scavenge pressure.

Contributed by: Technical Department

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