LIGHT HOUSE

R.L. INSTITUTE OF NAUTICAL SCIENCES

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How to Operate an Oily Water Separator (OWS) on Ship?

- Lohit kumar Moger - GME

An oily water separator clears the bilge water of oily content to bring it inside the acceptable range to discharge it overboard. An oily water separator is a machinery for such importance that it is handled by only the 2nd or chief engineer. (However, the duty engineer might also be asked to operate under supervision)

Operating an Oily Water Separator

An oily water separator can only be operated when the ship is sailing and en route. According to MARPOL, the oil content of the effluent must be less than 15 ppm and the ship has in operation an oil discharge monitoring and control system and oily-water separating/filtering equipment.

In case of failure to follow any of the above mentioned rules, the ship will be fined and stopped, and the chief or 2nd engineer can even be imprisoned.

Because of such high risks, operating an oily water separator should be done with utmost precision to minimize the risks of marine pollution. Though a “How to Operate?” guide is always posted near the oily water separator, there are few points to be kept in mind and followed to prevent any mistake.

Operating Procedure

The following points are to be followed while operating OWS.

1) OWS overboard manual discharge valve is to be kept locked and keys are to be kept with the chief engineer. Open the lock and overboard valve. Open all the other valves of the system.

2) Open the desired bilge tank valve from which the oily water mixture is to be discharged from OWS.

3) Open air if the control valves are air operated.

4) Switch on the power supply of the control panel and OCM unit.

5) Fill the separator and filter unit with fresh or sea water to clean up and prime the system till the water comes out from vent of second stage.

6) Start the OWS supply pump which is a laminar flow pump and one that will supply the oily water mixture to OWS.

7) Observe the OCM for ppm value and keep checking sounding of bilge tank from where OWS is taking suction and of the OWS sludge tank.

8) A skin valve/sample valve is provided just before overboard valve and after the 3-way valve. Keep a check on the sample for any effluent and clarity.

9) Keep a watch on the ship side at the overboard discharge valve.

10) After the operation, Switch off the power and shut and lock the overboard valve. Keys to be handed over to the chief engineer.

11) Entry to be made by chief engineer in the Oil Record Book (ORB) with signature of operating officer, chief engineer and the master.

Courtesy : marine insight

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Low-Cost Batteries for Inland Waterway Propulsion

-Madan Knagaraj - GME

USCG file image

The development of battery electric maritime propulsion has involved using lithium battery technology that incurs high cost per kilowatt hour. An alternative liquid metal battery technology that incurs much lower cost per kilowatt-hour offers competitive application for short-distance propulsion along inland waterways.

Introduction

Efforts and initiatives aimed at reducing carbon emissions have prompted the maritime sector to develop battery-powered vessels for ferry and tugboat service. While the present cost of lithium battery technologies is currently around $400 per kilowatt-hour ($/kW-hr), future costs are expected to decline to $250 to $300/kW-hr between 2030 and 2035. A competing liquid metal battery technology developed by MIT for stationary application incurred a prototype limited-production cost of $180/kW-hr. Full scale production versions of the liquid metal battery are expected to drop to below $35/kW-hr between 2030 and 2035, with both stationary and mobile applications.

The liquid metal battery is housed in a container that measures eight feet wide by 10 feet long and 10 feet tall, with storage capacity of 1,000 kilowatt-hours that can be delivered at up to a steady 250 kW over four hours. The container weighs up to 60,000 pounds. Repeated deep cycle discharge of small-scale versions of the liquid metal battery technology has revealed minimal fade over 20,000 full-depth cycles, with the battery having withstood 100,000 deep drain cycles. The battery combines low initial cost combined with extended usable service life.

On the Water

The coupling of standard size barges into trains (tows) provides possible application for short distance propulsion using liquid metal battery technology. While it is possible to install liquid metal battery containers into the construction of a tug, it is also possible for standard-size barges built to 195 feet length by 35 feet width to carry the weight of multiple liquid metal battery containers that each weigh 60,000 pounds. An empty barge typically weighs 280,000 pounds and with water density at 62.4 pounds were cubic foot, would cause the barge to displace 8 inches depth of water.

The combination of barge weight plus that of 40 battery containers (40 x 60,000 = 2.4 million pounds) spread in an array on the barge would displace water to a depth of 6 feet 4 inches. An array of 48 battery modules on the barge would displace water to a depth of 7 feet 5 inches, while an array of 52 battery modules would displace 8 feet of water depth which is the typical navigation depth of barges that operate along American inland waterways. The barge would require a cover for reasons of weather protection and water that could splash into the container area.

Onboard Energy Storage

Each battery container would hold 1,000 kW-hour of electrical energy. A barge carrying 40 battery containers would offer 40,000 kW-hour of energy, or up to 10,000 kW (13,400 horsepower) over four hours duration.

Some of the largest tows along the Mississippi River have involved barges coupled 9 lengthwise by up to 7 abreast for total of 63 barges, pushed by a tug of 10,000 horsepower (7,460 kW). If the last row of barges were battery barges offering 280,000 kW-hour to 364,000 kW-hour of energy, a battery tug could push the tow for between 35 hours and 45 hours. The less powerful tugs on the inland waterway develop 3,500 Hp (2,610 kW) to 4,200 Hp (3,200 kW), allowing a battery barge converted to a tug to push a tow of barges for 12 to 14 hours.

Deeper Waterways

Battery electric tugs built to 40 feet wide by 220 feet long could push barges of containers from the Port of Newark to a container terminal at the Port of New York. A new container terminal is being built east of Montreal, on the south side of the Lower St. Lawrence River. There may be scope for battery electric tugs to each push a barge laden with containers between Port of Montreal's new terminal and a container terminal on the south side of the island of Montreal. Battery electric tugs could shuttle barges of containers between terminals at Port of Singapore and nearby Malaysia.

The St. Lawrence River and Seaway allows a navigation depth of over 20 feet. A vessel weighing 360,000 pounds and built to the dimensions of a Mississippi standard barge could carry 72 battery containers, displace water to a depth of 11 feet and hold 72,000 kW-hour of energy. It could carry 144 battery containers on 2 levels and displace water to a depth of just over 21 feet while holding 144,000 kW-hour of energy.

Future Power Generation

Political efforts to convert the commercial transportation sector toward greater use of electrical propulsion would require construction of multiple new power stations in several nations, with nuclear conversion being the prime candidate. Development of new power stations requires massive investment over the period of at least a decade and longer. Progress is slow and steady in the area of energy conversion using tidal currents and ocean waves. While the cost of solar power and wind power conversion has been declining, there is emphasis on making newer versions of both technologies more recyclable.

Conclusions

Unlike electric road transportation vehicles that require expensive lithium-ion battery technology to travel for multiple hours, electrically powered large-scale maritime transportation vehicles may use large grid-scale batteries that offer up to 20,000 full-depth discharges that when in full-scale production, incur a cost of around 1/10th per kilowatt hour of lithium-ion battery technology. Some lithium iron phosphate batteries can deliver up to 3,000 full-depth discharges. Lithium-ion batteries are best being rarely fully depleted and can achieve 1,500 cycles when repeatedly discharged from 100% down to 20%, or up to 3,000 cycles when repeatedly discharged from 100% down to 50%.

In tug barge operation along inland waterways, the battery barges would be coupled at the back of the main tow and sail in the hydraulic shadow of the barges coupled immediately ahead, thereby reducing parasitic hydraulic drag. As batteries approach depletion, the battery barges might be exchanged at prearranged locations for barges carrying fully recharged batteries. In battery electric maritime operation, the liquid metal battery, the iron air battery, the aluminum air battery and large-scale lithium-ion batteries would each occupy distinctive market niches within the electrically powered maritime sector.

Courtesy : The Maritime Executive.

Methanol-Fueled Ships Require New Fire Safety Measures.

- Joseph Derwin - ETO

While the growing interest in methanol-fueled vessels has been growing exponentially as a means of addressing the emissions, new fire safety research reports that the existing fire-fighting methodologies and regulations are not yet ready for methanol vessels.

Per Survitec, which had conducted exhaustive fire tests on the dual-fuel marine engines with diesel oil (abbreviated as the DO) and methanol, existing fire-fighting methods used for extinguishing the machinery space spray and pool fires on conventionally fueled vessels are not adequate when dealing with methanol-based fires.

The tests also confirmed that traditional water mist fire suppression models do not perform as expected on methanol pool and methanol spray fires, explained Michal Sadzynski, the Product Manager of Water Mist Systems at Survitec. Methanol fires are much more aggressive than fires involving conventional hydrocarbon fuels.

Methanol fires tend to have physicochemical properties, so they cannot be extinguished quickly or with the same approach.

Methanol is methyl alcohol (CH3OH). It burns differently than hydrocarbon fuels and has a significantly lower flashpoint of 12°C, per Survitec. They have also reported that the testing has discovered that when the water mist systems are highly effective in absorbing the heat and displacing the oxygen on diesel fires, they do not produce the same results on methanol fires.

Survitec says the concern regarding fire-fighting and protocols may be particularly significant as the shipping industry starts considering converting existing vessels to methanol. At the moment, there are only a relatively few methanol-fueled vessels in service, with a key focus on new builds specifically designed for alternative fuel.

Now, the industry is starting to explore retrofits. Maersk, for instance, has also scheduled the first-ever refit of a huge containership for the summer in a demonstration assignment to take a decade-old vessel that operates on traditional fuels and convert it for dual-fuel methanol operations.

According to the firm, the testing results demonstrate that if existing vessels are retrofitted to operate on methanol, they will need to overhaul and entirely redesign the fixed fire-fighting model.

Sadzynski explained that the tests reflect that the standard discharge devices don't properly extinguish methanol pool fires in the confined bilge area. He also cites that, as an instance of the issues, the range required for nozzle installation height is significantly lower than that needed to put out a diesel fire. The hour needs to completely reimagine nozzle spacing, placement, and other factors to make water mist suppression effective on the methanol.

Survitec also highlights that while some fire safety regulations and testing standards exist for diesel fuels, precise test mechanisms for alcohol-based fuels such as ethanol and methanol have yet to be developed. According to Sadzynski, this is believed to be a high-risk scenario that requires immediate action.

The firm has been calling on regulators and stakeholders to address methanol's fire risks and create standards, new testing protocols, and updated stringent safety regulations for methanol.

Courtesy : marine insight

Shipping faces a long haul with the Red Sea crisis

- M.Muthukumar, Senior Faculty.

For anyone other than those on the receiving end of containership freight rates, the dawn of each new day brings an absence of good news in this increasingly hazardous world.

The first deaths and serious injuries among merchant seafarers from Houthi missile attacks have been recorded, something that seems quite inevitable as the armed gangs improve their techniques. The crew of the Galaxy Leader remain hostages in rebel-held Yemen, more than five months after they were captured.

Attacks by drone, missile and remote-controlled craft continue to be inflicted on those ships which brave the waters of the lower Red Sea and Gulf of Aden, despite the US and UK air strikes on the perpetrators and brisk defence by warships.

And as if this was not misery enough for mariners on their lawful business, ships have been attacked and captured off the Somali coast in what seems to be a resumption of offshore piracy and hostage taking. The revenues from the Suez Canal, upon which so much of the fortunes of Egypt rest, are being rapidly eroded.

Just a few months ago, to compose such words as those above would have suggested that the writer was out of his mind, such has been the speed of this deterioration in world affairs. But it now seems clear that this will be no short-term breakdown in normal commercial operations, but a long-haul for east-west shipping, regardless of whether owners elect to hazard the lives of their crews, or go the long way around Africa.

The Red Sea is going to remain dangerous and the safety of merchant shipping is going to depend increasingly upon the political willingness of those with naval assets available, to protect them.

It also seems obvious that there are insufficient escorts of the right capability to ensure that passing merchant ships will not be attacked, regardless of their flag or alleged ownership.

It might seem a relatively small area on a world map, but these are long coastlines and a lot of water for warships to patrol. And despite the Houthis' successes, and the voices of outrage from shipping and governmental interests, only the US and UK have been prepared to act in anything other than a defensive role and take the fight to those launching the drones and missiles. Considering that these rebels managed to maintain their fierce resistance for several years against everything the Saudi Arabian armed forced could throw at them, success at permanently degrading their abilities to interfere with shipping is certainly not guaranteed.

How long will the loose coalition that isn't for armed protection be maintained, bearing in mind the costs of firing hugely expensive missiles against cheap mass-produced drones and keeping ships on station in a permanent state of readiness? The patience of taxpayers cannot be entirely guaranteed in many of the countries supplying warships, particularly when domestic pressures become acute in election years, or when finances for defences are squeezed.

It is not unreasonable for the shipping industry to emphasise that these are their ships, feeding and fuelling the world, which are being attacked and deserve the protection of right-thinking nations with naval assets available. But with the curious structure of the modern merchant fleet, there is a disconnect between the people expected to pay the bills for warships and the ownership, flag flown, the nationality of the seafarers involved and the invariably convoluted financial ownership of the ships themselves. To most people other than in the manpower-supplying nations, there is no getting away from the fact that these are “foreign” ships, for which they can feel no real affinity.

It was so much simpler, we might reflect, before the flags of convenience became so firmly established upon the world's oceans. But there should be no concern about the ability of the world fleet to deliver the goods; the Suez Canal has been closed twice before, for extended periods. And in the absence of peace suddenly breaking out, a longer, and more expensive haul, may well become the norm.

courtesy:sea trade-maritime.com

THOOTHUKUDI PORT VISIT
SREESHA KARGADI GANESHA DUPUA-GME

About Chidambaranar Port:

V.O. Chidambaranar Port is located in Thoothukudi, Tamil Nadu, and is one of the 13 major ports in India. It was declared to be a major port on 11th July, 1974. It is the second largest port in Tamil Nadu and the third largest container terminal in India. V.O. Chidambaranar Port is an artificial port which is the third international port in Tamil Nadu and is the second all-weather port. The VOC Port, in Thoothukudi, has surpassed the cargo target set by the Ministry of Ports, Shipping and Waterways. During the 2022-23 fiscal year, the port handled 38.04 million tonnes of cargo, a growth of 11.50% over the previous year's performance of 34.12 million tonnes. Of the total cargo handled, 28.60 million tonnes were imports, 8.95 million tonnes were exports, and 0.49 million tonnes were transshipment.. It has services to USA, China, Europe, Sri Lanka and Mediterranean countries. The Station Commander, Coast Guard Station Thoothukudi is located at V.O. Chidambaranar Port Authority, Tamil Nadu under the operational and administrative control of the Commander, Coast Guard Region (East), Chennai. The Coast Guard Station at V.O. Chidambaranar Port was commissioned on 25th April ,1991 by Vice -Admiral SW Lakhar, NM, VSM, the then Director General Coast Guard. The Station Commander is responsible for Coast Guard operations in this area of jurisdiction in Gulf of Mannar.

About Visit:

We started our journey from R. L. Institute of Nautical Sciences to V.O. Chidambaranar Port, under the guidance of Mr.Balasubramanian, Mr.Samson and Mr.Ramasamy, on 11th March, 2024 at 09:00 hrs. Fifty five students from GME and GP Rating-C section and three staff members visited the port. The bus reached V.O. Chidambaranar Port around 12:00 hrs. Then students had lunch from 12:00hrs to 13:00hrs.

Then we entered harbor at 13:15 hrs and visited ANKA SKY (IMO 9145126) ship.

We completed the ANKA SKY ship visit and came out at 14:45hrs and then we visited

JSWMANIKAD (IMO 9891074) ship.

Then we visited **KASTELLI WAVE (IMO 9453389) ship.**

We completed the visit at around 16:30hrs. In the evening we gathered lot of information from the Chief engineer and had a wonderful learning experience by getting feedback from the officials. The bus started from Tuticorin around 17:30 hrs and reached R. L. Institute of Nautical Sciences at 20:30 hrs.

The visit was really beneficial and gave us a good learning experience. The staff and students were thankful to the V.O. Chidambaranar Port Authority and R. L. Institute of Nautical Sciences for granting the permission to successfully complete the educational tour.

THE SAILING EPISODES
- Nagendran Nachiyappan - ETO

For the maritime industry, the year 2020 has brought in one of the most crucial implementations called IMO Sulphur Cap. The rule that is predicted to curtail pollution to a great extent, came into play on 1st January, 2020. While the industry has been turning to different available options of compliance, we had an opportunity to record the first-hand experience of a sailing Chief Engineer on the IMO Sulphur Cap 2020- its compliance and challenges, Long Stroke Engines and topics alike.

WHAT IS THE FIRST STEP TO COMPLIANCE WITH THE SULPHUR CAP 2020?

On the vessel I sailed, the first step involved cleaning of tank and that is where we faced challenges. Multiple cases of injury had been reported while cleaning the tank which is nothing but a hazard. This has also increased the utility of manpower, because in our case the tank cleaning was done by ship staff. Some vessels have got the luxury of having two sets of fuel oil settling and service tanks that facilitate separate storage of fuel that gets blended only in the pipeline not in the tanks. Since, compatibility is the biggest issue we are facing with these fuels, it has to be ensured that the remaining fuel is not mixed with the new oil. As of now, 2 types of Low Sulphur Fuel have been made available of which one is produced and supplied by the oil majors and is more stable and compatible. The other one is a blended fuel which will always possess compatibility issue risks because the ratio of blending is different in all places. The price of Low Sulphur Fuel has now doubled and considering this, the companies are ready to go with LSMGO.

WHAT OTHER CHALLENGES ACCOMPANY BUNKERING WHEN IT COMES TO COMPLYING WITH THE REGULATION?

Another challenge that I foresee is the Port State Inspections which is expected to turn very stringent. During an inspection, the sulphur content of the fuel is checked for less than 0.5% but IMO permits for the extension of Sulphur Content to 0.53%. The big players have opted for the scrubber retrofits, it has costed them the installation but the operational cost has reduced. Then comes logistics involved in fuel change, on which port the change has to take place and where the bunker has to be bought from. A ship staff is then required to monitor the temperature and parameter during the change over. So, fuel change is now a critical procedure until the fuel doesn't come in line.

THE CHINESE AUTHORITIES RECENTLY CAUGHT 2 VESSELS VIOLATING IMO SULPHUR CAP 2020, ARE WE LIKELY TO WITNESS SIMILAR CASES IN TIMES TO COME?

Lately, there have been some cases in China wherein the fuel was found to have the sulphur content more than 0.55%. This happened because they probably made a change at the last moment. So, it takes time for the compliant fuel to come to the line get consumed and get into the system. Talking about such cases in future, I would say as an operator we try our best to comply with the regulation, we buy fuel from the supplier that is above BDN (Bunker Delivery Note) based on fuel quality analysis report. But the issues during inspection will continue to prevail if the aim is to harass the ship staff.

WHAT MEASURES ARE IN PLACE TO ENSURE COMPLIANT BUNKERING PROCESS?

The companies have adopted a system called Ship Implementation Plan (SIP) under which the companies declare about the arrival of fuel, one year ago. As per SIP, the ship staff is required to maintain a file with a check list of tank cleaning schedules, the bunker intake, pictures of the tank and change over routine to manifest compliance with the Sulphur Cap 2020.

CAN YOU TAKE US THROUGH THE EXPECTED OUTCOMES OF OLD OIL GETTING MIXED WITH COMPLIANT FUEL?

Normally, it takes 2 hours for a tonne of fuel to get consumed in the line and compatibility issues are faced only in the tanks, not in the pipeline. But if the fuels get mixed in the tank, it causes major engine break down further leading to wear down of liner, piston ring, fuel nozzle and fuel

pump damage because of cat fines. In many cases, the fuel that was bought was debunkered as well, because of compatibility issue, incurring extra cost to the owners or charterers.

HOW DOES WORKING ON LONG STROKE ENGINES DIFFER FROM THE OLDER VERSIONS?

The long stroke engine vessels are made to consume less fuel and give more power. Unlike the four stroke engines, the two stroke engines are made to run for longer voyages and as of now they are operated at a super slow speed causing carbon deposit. Even a research conducted by Germans says that the exhaust of LSFO is more damaging than the normal fuel oil.

HOW CAN WE PREVENT CARBON DEPOSIT ON MAIN ENGINE LINER?

In the liner only the upper section is heated. The temperature in the scavenge on reaching below the dew point causes acidic corrosion and cold corrosion leading to the formation of carbon in the liner because the temperature in the scavenge should be ideally 41-43 degrees.

WHAT IS THE CAUSE OF CARBON DEPOSITS AND HOW CAN IT BE DEALT WITH?

The carbon deposits take place due to combustion products. You may get done with it if you operate in high temperatures. Generally, people think that the deposit is because of the lack of lubrication but lubrication further worsens the situation. We have now witnessed many such instances where the lubrication of liner is increased, however, it has to be understood that the lube oil put up initially does not get consumed cause the vessels are now operated at a very slow speed to conserve fuel. The engines are designed to be operated with 80 percent load to give optimum performance where the combustion products are minimal. Even the IMO is conducting a research on the impact of slow streaming that stands contrary to the aim of Sulphur Cap 2020. Moreover, the EU MRV regulation that aims to control CO2 emissions from commercial ships over 500 GRT operating into, out of or between a port of call in EU, measures carbon release by a vessel through the amount of fuel used by a vessel, the sailing period, the number of voyages done and the cargo carried by it. The vessels are required to submit their data every year through an audit.

Courtesy : sea and job