



# MARINE ENGINEERS REVIEW (INDIA)

VOLUME 14 ISSUE 2 JOURNAL OF THE INSTITUTE OF MARINE ENGINEERS (INDIA) January 2020 50/-



9

FUTURE OF GLOBAL SHIPPING,  
IN THE NEXT DECADE

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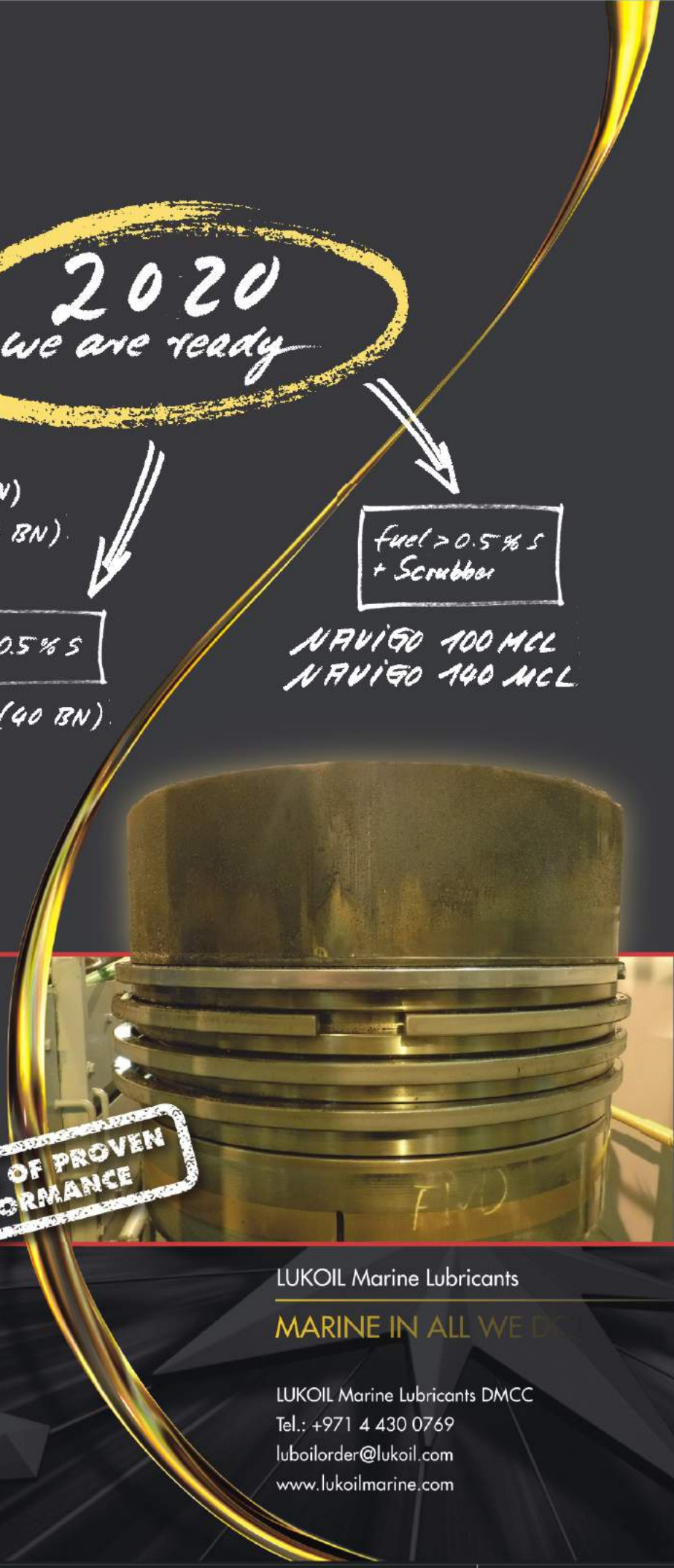
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# Editor's Desk



Its curtains down for 2019 and welcome 2020!

What is the future of shipping? What will be the ideas that will dominate this decade? Andrew McKeran of Lloyds Register gives us a peek in his *Future of Global Shipping in the Next Decade*. Clearly, the direction that the Maritime Cluster will focus on is, sustainable shipping, carbon footprint reduction and the use of extensive digital technology to achieve it.

The article, *LPG VLCC Design and Construction* penned by an Owners Supervisor posted at Korea is an introductory piece. It is often a dilemma for young authors on how much to reveal. Even though image-capturing devices are ubiquitous and information can easily be accessed, most legitimate transfer of knowledge has its restrictions. Does one have the right to publish a GA plan of a delivered ship? Simplifying the drawing to make it a "working student sketch" is often time consuming and becomes a major deterrent in itself.

The piece on *Corrosion Mitigation on Aging Ships* by Dr. Nilkil Agarwala is very relevant. Today, with a volatile charter rate many Indian ship owners have taken to purchasing second-hand ships. This topic therefore remains evergreen.

Lastly, India has just enacted a major law to bring ship recycling up to global standards. This will help India improve its recycling capacity that had dipped earlier. The article *India Passes Major Ship Recycling Law* throws light on this new Bill.

At the start of the new decade, our readers will also have the pleasure of a new Editorial Board. Dr. Rajoo Balaji takes over as the new Editor from the next issue. Our Institute is a learning organization and the MER mirrors the erudition of our fraternity. As a Director at the Indian Maritime University, he and his team are uniquely placed to steer the MER into the new decade of knowledge. I wish him good luck!

To my current editorial team for the countless articles they have scouted and contributed as well as the various authors who have taken time to pen down their knowledge, thank you! Special thanks to V. Sheshashayee and Dr. Piyush Raj who have both been generous with their time, ideas and analysis in their many articles.

I thank the Presidents and Council Members, and finally our readers who have been extremely generous with their encouragement from our first to the last issue.

Finally a small anecdote and a nod of gratitude. When ace photographer, Prabal Mohanty gave his copyright photo for the cover of this issue, I wanted an article to go with the cover. One thing led to another and the LRS Country Head Chitta Dash had a special article written by their London office for this New Year 2020 first issue! I hope we are the first journal to publish a maritime forecast in 2020!

Wishing our readers a Happy New Year!

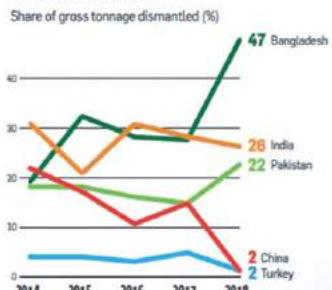
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## India's Share of Global Ship-Recycling Market on the Decline



Source: United Nations Conference on Trade and Development (UNCTAD)

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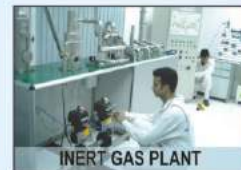
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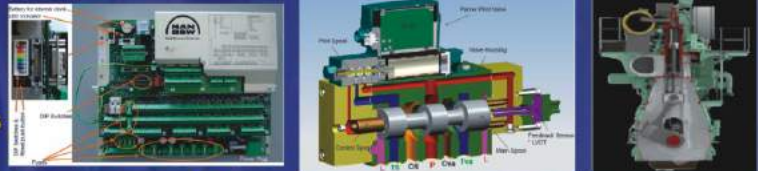
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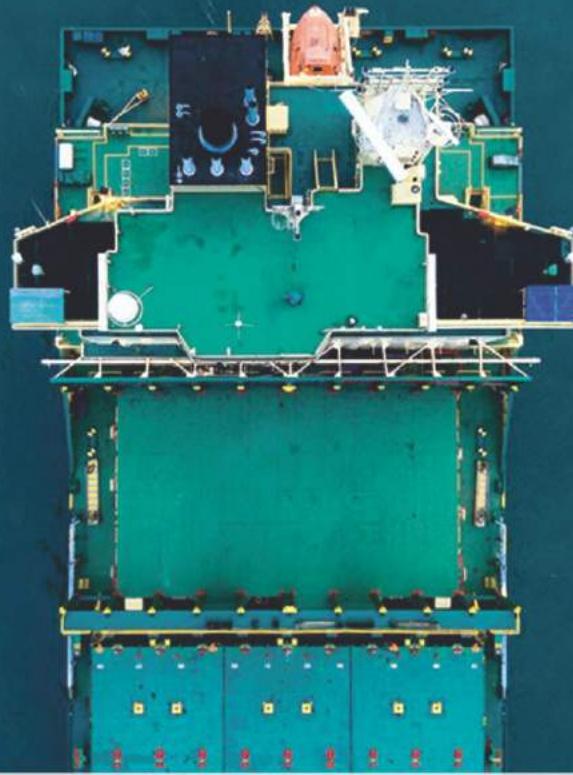


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## FUTURE OF GLOBAL SHIPPING, IN THE NEXT DECADE.

- Andrew McKeran, Commercial Director – Marine & Offshore Lloyd's Register

### STANDFIRST:

Shipping's sustainability hinges on solving the decarbonisation challenge cost effectively and harnessing the efficiencies derived from digitalisation.

January 1, 2020 is a red-letter day in the maritime calendar. Shipping attentions have been locked on the start of this decade ever since the International Maritime Organisation (IMO) ruled in October 2016 that a global 0.5% sulphur cap on marine fuels would come into force on January 1st 2020 – an industry transition that has already involved huge investments in people and assets and a rethink around processes and operational strategies.

The task has been immense and has consumed maritime energies as shipping stakeholders undertook the necessary preparations to comply with this seismic regulatory change. The industry has grasped the nettle and, while it is inevitable that the first few months of 2020 will bear witness to some teething issues relating to this environmental milestone, the decks have now been cleared for shipping to focus on the other drivers that will govern the decade ahead.

Like most other sectors, shipping takes its lead from the geopolitical situation and societal expectations. It is subject to trade wars where global powers jockey for dominance as well as demographic shifts where populations seek substantive change and the role of state, community and long supported processes are called into question.

Increasingly, consumer demand and technology take-up are baring the hallmarks of this evolution with sustainability expectations now dominating the global conversation. Society is under pressure to move away from mass consumption to a circular economy.

One only needs to point to the influence of the headline grabbing, trailblazing Swedish teenager Greta Thunberg and her compelling call on the climate emergency. Recently named Time magazine's person of the year, she has been spearheading a global movement demanding that world leaders take action over climate change.



“Shipping's sustainability hinges on solving the decarbonisation challenge cost effectively and harnessing the efficiencies derived from digitalisation”

- Andrew McKeran



## DIGITAL TAKE UP

The decarbonisation targets are clearly closely linked with the requirement for fleet operational improvements in addition to the fuel mix changes required; thus, we can expect to see an increase in the digitalisation of shipping, an evolution enabling the maritime industry to take advantage of the cost operational efficiencies derived from the implementation of appropriate digital technologies in operational performance and asset health management.

Digital Twin technology to manage the health or the ability to perform of assets is well established in aviation and has now started to cascade into shipping. This technology, when fully implemented at its highest level, will enable ship operations to become much more cost efficient than today, with ship performance being predicted at high fidelity.

It will enable an assurance regime

that is driven by data and this will allow us to move away from the time-based system – currently the calendar dictates when we must undertake annual surveys and special surveys. In the next decade, data will give us confidence about the condition of the vessel and its equipment, the way it is operated and the capability of those managing it so less costly intervention will be required, including really making remote surveys and inspections functional to the satisfaction of the flagstate.

The cost advantages derived from digitalisation are already evident. Digital technology to run operations, such as navigation, cargo and ballasting, or propulsion and energy efficiency on board ships, is already delivering cost advantages to shipping. In the container sector, carriers and cargo owners are already reaping cost benefit from

port call optimisation platforms that improve turnaround time for container ships by providing real-time port productivity analytics to vessels and fleet management departments.

Cloud-based fleet management systems are also reducing shipowner capex freeing companies from buying hardware and managing servers and allowing them to harness the power of a centralised pool of information that make it easier to evaluate data and calculate key performance indicators.

Increased connectivity and autonomy onboard mean that the human interface with the ship will also transition. Digital technologies will replace human decision making for selected activities and this will deliver cost and safety benefits. People will, of course still be needed on board vessels to operate them, but greater levels of maintenance and support will be done remotely.



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And when help is needed by those on board, we will be better informed to provide that expertise remotely. The need for people to travel to and from vessels will be reduced, vessels will hopefully spend less time alongside and this will deliver bottom line savings and overall industry efficiency improvements.

Artificial Intelligence (AI) and Machine Learning (ML) technologies applied to augment a high-fidelity digital twin for health management will have the ability to optimise asset performance in ways where humans might not have imagined before. Further cost efficiencies will be accomplished when the cost advantages of digitalisation are implemented to complete fleets and the learning is fed back to the machine learning algorithm that governs the automated decisions taken by digital twins for operations and health management. The ability

to ingest huge amounts of data and provide insights never dreamed of is now a reality, and the next decade will see the industry able to harness this and turn it into operational and efficiency improvements.

These two digital technologies will increase the utilisation and useful life of assets, generating cost efficiencies to offset potential required additional investments on decarbonising technologies. Furthermore, successful business outcomes will be defined not by operating ships in isolation but through optimisation of the entire fleet and their seamless integration with the emergent connected logistics; and this will be achieved by the application of proven digital technologies.

There is no questioning that next-generation shipping will be lower carbon, while also being digital, highly autonomous and closely

integrated through an intelligent transportation ecosystem. Vessels will feature key technologies such as connectivity, artificial intelligence, edge computing, low carbon propulsion including hybridisation to deliver the lowest operational costs while generating the maximum utilisation and useful life extension. The strategic implementation of these technologies will enable compliance with low-carbon initiatives without sacrificing profitability.

In every industry there are leaders and followers – maritime is no exception – and the next 10 years will call for significant decisions around decarbonisation and digitalisation. Navigating the options and investing wisely and in a timely manner will almost certainly be the defining features of the stakeholders that come to dominate the decade ahead.





## THE ROAD TO 2050

In its series of Carbon Pathways 2050 reports, Lloyd's Register and its industry partners - Shipping in Changing Climates (SCC) and UMAS, specifically address the decarbonisation challenge facing the shipping industry today.

We have already seen from these studies - which includes Low Carbon Pathways 2050 and Zero Emission Vessels 2030 - that we need to advance thinking beyond marginal gains in energy efficiency and alternative fossil fuels if we are to identify the sector's least-cost decarbonisation pathways.

The need for shipping to start its decarbonisation imminently is underlined - as stringency increases over time, increasingly high-cost mitigation steps are then required. The later we leave decarbonisation the more rapid and potentially

disruptive it will be for shipping.

To achieve at least a 50% reduction in CO<sub>2</sub> by 2050 and to be on course for a CO<sub>2</sub> pathway consistent with the Paris Agreement, zero-emission vessels (ZEVs) need to be entering the fleet around 2030. What's more, a significant portion of new-builds will have to be zero emission to compensate for the non-zero emissions of the existing fleet.

So, what does this mean for ship owners and operators? From a practical perspective, if zero-emission vessels (ZEV) need to enter service by 2030 anyone planning to finance, design or build a ship in the 2020s will need to consider how it can switch to non-fossil fuel later in its operational life.

Our experience in innovative zero emission technologies, such as wind, hydrogen fuel cells and batteries,

shows that the possibilities are there. But the next step is to demonstrate that these are viable alternatives to hydrocarbon propelled shipping, at least by 2030.

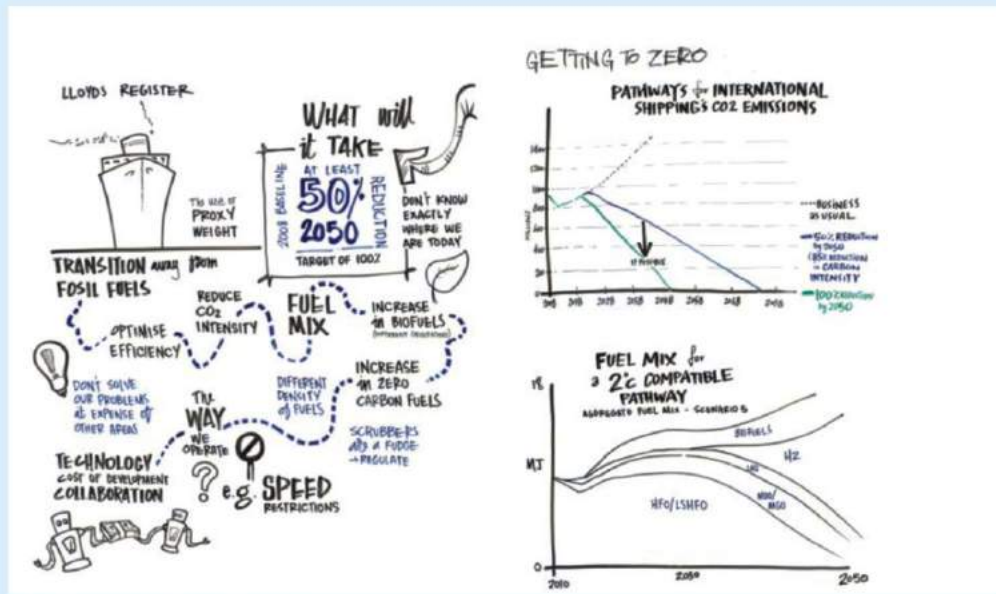
The next piece of the current puzzle is to help the industry answer the next set of questions in this complex challenge: what needs to happen for ship deployment? And what needs to happen to develop the supply infrastructure?

LR and its partners have developed the Transition Pathways study and Climate Alignment Tools to address these questions by looking at the milestones, barriers and enablers over the specified timeframe, and considering cost implications, operating profile and how policy measures such as carbon pricing could influence this.

The study and advisory services aim

to provide what is needed to enable the transition, both at the ship and supply infrastructure level, to support the development of an action plan to deliver zero-emission vessels to achieve the 2050 ambition and to demonstrate to all stakeholders that action can be taken now. The Transitions Pathways study considers all key energy sources including: renewable electricity, bio-energy and fossil-fuels with Carbon Capture and Storage (CCS), and compares the different conditions to enable understanding of the actions we need to take now.

Read more [lr.org](http://lr.org)



Credit: Global Maritime Forum





# LPG -VERY LARGE GAS CARRIER DESIGN AND CONSTRUCTION.

- Vladmir Janovic

## EDITORS NOTE :

The design and construction of LPG ships especially the VLGC ships are still very much a part of the shipyards in house knowledge. Nobody shares much in the public domain. Latest drawings are often therefore blurry and only indicative drawings are available. Building methods are a part of work instructions protected through non-disclosure agreements. However in keeping with our tradition to cover knowledge, here is an account of a yard engineer.

## 1. Introduction

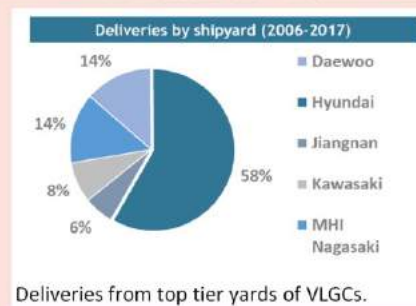
The LPG vessel is an abbreviation of liquefied petroleum gas, which is a type produced as a by-product in the crude oil refining process and a type acquired from natural gas in the gas field. This is a generic term for hydrocarbon gas with 3 or 4 carbons, and there are many kinds such as propane, butane, propylene, butadiene

On the other hand, although it is not included in the classification of LPG, the LPG ship carries ammonia. LPG ships can be transported in a liquefied state in order to transport large quantities of gas to the vessel,

thereby reducing the volume. In general, large LPG ships are cooled under atmospheric pressure and stored in a cargo tank in a liquefied state (about -48C).

Recently, large LPG ships, along with large container ships and LNG carriers, have emerged as new high value-added ships. Currently, there are about 100 large LPG ships in operation, but orders have been actively made, accounting for a significant portion of the fleet. Demand will grow further.

In recent years, we will introduce the increasing background of LPG ships, LPG demand, supply status, new



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shipbuilding and newly applied new construction methods.

## 2. LPG Characteristics and Properties

LPG means Butane, Propane, or a mixture of both, and about 4% LPG is produced during the refinery process.

Natural gas produced in natural gas fields contains 82-85% methane, butane and propane, but these must be removed during liquefaction with LPG. In the past, when small amounts of natural gas production were burned, the demand for LPG increased rapidly.

Also, due to pollution prevention,

even this small amount of LPG is prohibited from burning in the air. LPG exports are expected to increase significantly.

### 3. LPG Supply and Demand Status

#### 1) LPG Supply Side

Global LPG offshore shipments are expected to increase gradually. The reason is that production in the Middle East and West Africa is increasing rapidly.

The main LPG exporters are the Middle East and Africa, Qatar, Abu Dhabi, Saudi Arabia, Iran, Nigeria, Angola, Algeria and Equatorial Guinea.

#### 2) LPG Demand Side

Until now, Japan and Korea have been the main LPG consumers as well as LNG. However, LPG's acceptance in the US, China and India has been increasing recently. In addition to the above-mentioned major demand countries, LPG consumption in the world is increasing, so it is expected to absorb the increase in supply.

As the maritime trade is expected to increase in the future, the construction of LPG vessels will continue to increase.

### 4. Supply and demand status of LPG ship

Increasing sea transportation volume of LPG and diversifying US and Chinese imports are expected to continue to increase LPG demand.

It is expected to be a considerable amount of orders

It is expected that there will be more than three dismantling vessels a year on average, and the economic effects of demand and size of large LPG vessels to replace them are expected.

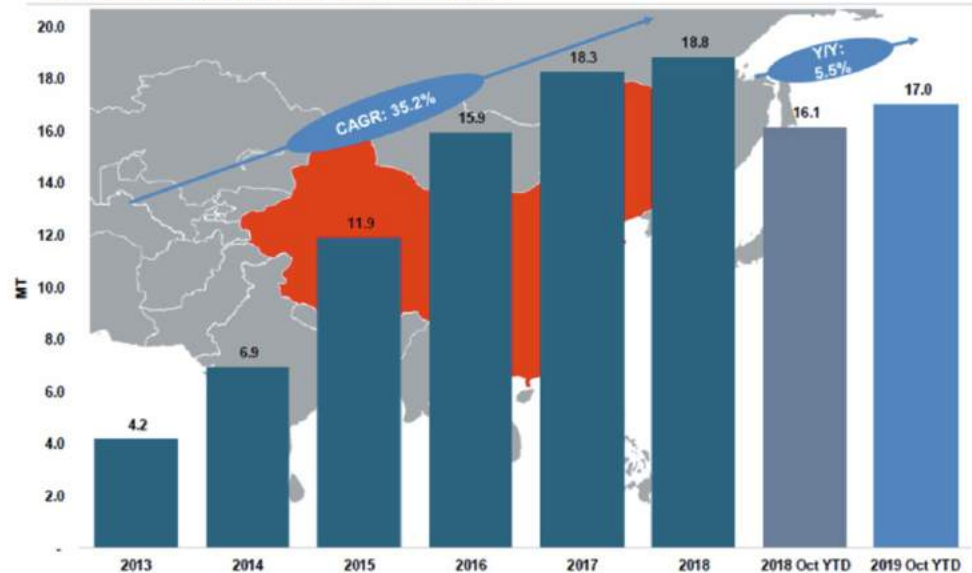
The demand for large-sized vessels is expected to increase demand for large LPG vessels.

In the case of small LPG carriers (30K), large new orders are unlikely

Table 1: The growth Markets for LPG in the East :  
Courtesy Dorian LPG Annual Investors Report Oct 2019.

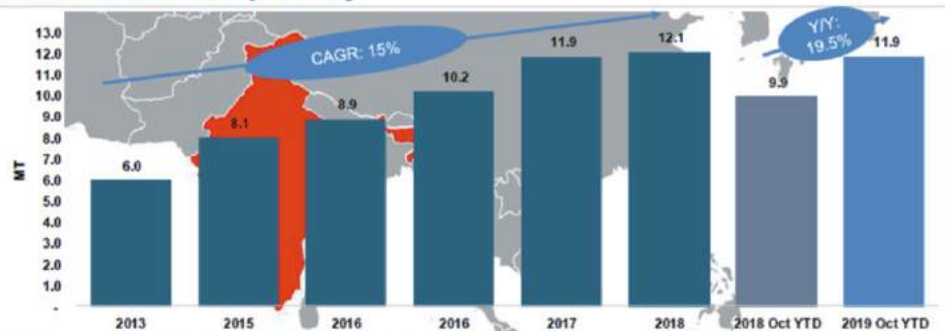
### Growing LPG Markets: China

Tariffs Have Marginally Impacted Chinese LPG Imports



### The LPG Nation: India

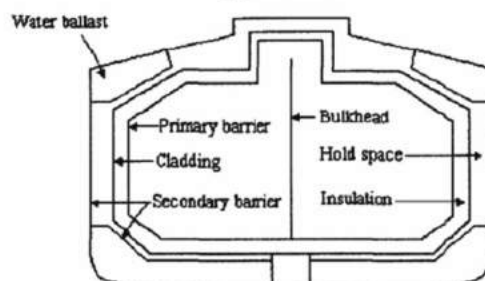
Indian LPG Demand is Steadily Increasing



Government Policies and Infrastructure Development to continue Boosting Consumer Adoption

- India achieved its goal of providing free LPG connections to 80 million poor households six months ahead of its March 2020 deadline
- LPG demand is forecasted to grow by 11%-12% over the next five years, having experienced a 15% CAGR over the past five years
- The major importers: IOC, BPCL, HPCL, and Adani have all announced new terminal or storage projects for 2019-2020
- Gas Authority of India (GAIL) plans to revamp an LPG plant at Usar (western India) in 2023-2024 that is planned to produce 0.5 MTPA of polypropylene
- Product shortages in the Middle East have led Indian producers to buy U.S. cargoes for the first time in 2019

### Type A Tank





to be expected, but new orders are expected to be driven by real buyers.

And the peculiar thing is that the order of medium size LPG ship (60K) is increasing.

As an order to be decommissioned, it has been ordered or is being built at a Korean shipyard.

For the above reasons, the LPG ship market is expected to develop overall, and orders for additional vessels are increasing due to the increase of LPG consumption as a clean raw material. Major LPG ships include Bergesen, Naftomar, Yuyo, Exmar and NYK.

## 5. LPG ship design and construction

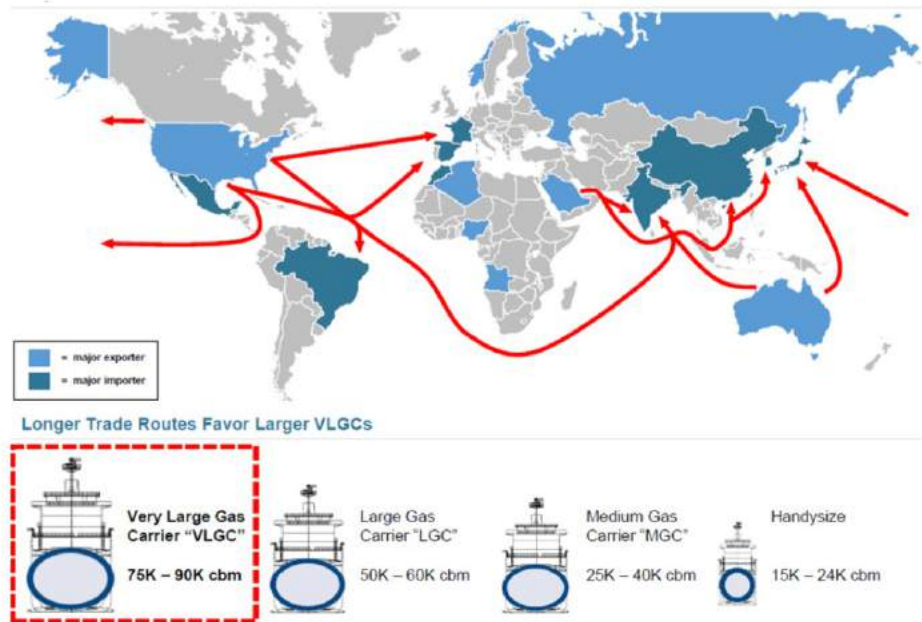
### 1) Characteristics of LPG Ship

In order to transport large quantities of GAS to a vessel, the volume must be transported in liquefied state to reduce the volume.

In general, large LPG vessels use a room that is cooled under

Table2:

VLGC Trade Routes and Classification: Courtesy: Dorian LPG Dec 2019 Investors Report



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Radar Observers Simulator course (ROSC)	3 <sup>RD</sup> week of Jan, Mar, May, Jul, Sep, Nov	Rs. 8000
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RADAR, ARPA, Navigation Simulator course	4 <sup>TH</sup> week of Feb, Apr, Jun, Aug, Oct, Dec	Rs. 10000
Ship manoeuvring simulator & Bridge teamwork	Every Monday	Rs. 16000
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Ship Security Course	3 <sup>RD</sup> week of every month	Rs. 5000
Train the Simulator Trainer & Assessor (TSTA)	2 <sup>ND</sup> & 4 <sup>TH</sup> week of every month	Rs. 24000
Assessment, Examination, Certification of Seafarers Course (AECS)	1 <sup>ST</sup> Two weeks of every month	Rs. 30000

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Practical Marine Risk Assessment Workshop	Rs. 20000
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Company Security Officer Course	Rs. 25000
Vetting Inspection	Rs. 20000
Marine-Systematic Cause Analysis Technique (M-SCAT)	Rs. 10000
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atmospheric pressure and stored and transported in a cargo tank in a liquefied state (about 48C)

GAS ships cause serious accidents in the environment due to the spread of evaporation gas as well as the destruction of the hull, especially when leakage occurs.

Unlike regular cargo ships, special provisions of rescue facilities are required for the containment and emergency of cargoes.

**It has the following characteristics**

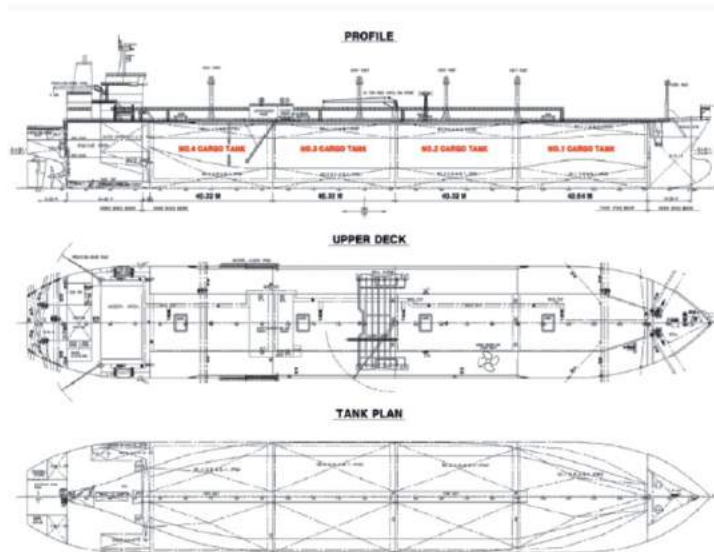
- Necessity of a container for low temperature and low temperature material
- Cargo handling system for loading and unloading low temperature
- Safety preparedness to reduce the possibility of explosion
- Re-liquefaction apparatus to prevent BOG(Boil off gas) loss
- Fully automated cargo control while sailing, and various devices for gas leakage reduction and safety
- Gas trial related to cargo system after sea trial

For reference, if the Vapour Pressure is higher than 2.8KP / cm2 at 37.8C, the Gas Code will be applied. In general, the tank of a ship carrying LPG is "A" type.

**2) LPG ship design and construction**

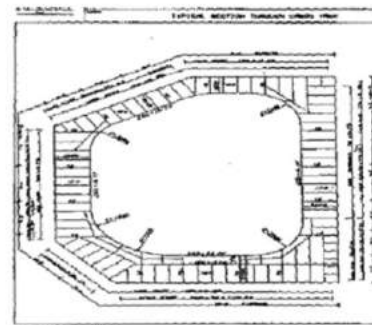
LPG ship refers to a ship that transports propane, butane, ammonia and ethylene with a specific gravity of 0.57 - 0.68 in the liquefied state using the prevention of pressurization or refrigeration.

Depending on the cargo containment of the vessel, it can be divided into fully pressurized, semi-pressurized-fully frozen, and completely frozen. The 20K class and above are completely frozen, and the transport temperature is the same as the boiling point of LPG ship (-48C), and the transport pressure is

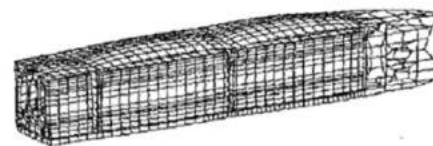


- 82K M³ LPGC General Arrangement

Description	35K	82K
Class	LR	DNV
LOA	174.2m	225m
LBP	165m	215m
Bmld	28m	36.6m
Dmld	17.8m	22m



Basic Scantlings



Global 3-D FEM analysis

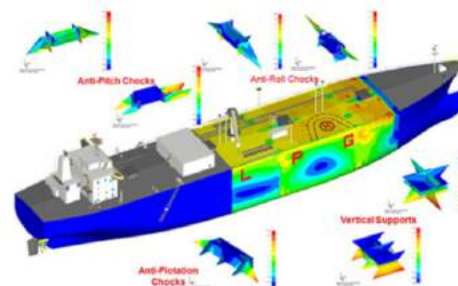


Table 3: FEM Analysis

slightly higher than atmospheric pressure (0.25 ~ 0.28bar).

Cargo containment system is Prismatic type and uses low temperature steel that can be adapted at -48C.

In other words, the use of low temperature steel is required for Cargo tank, Cargo tank Support & Chocks, Secondary Barrier and adjacent hull structure to have the necessary strength at low temperature.

And liquefied gas carriers should be applied not only to the rules of the ship itself but also to the requirements of the IGC.

Therefore, it is necessary to fully review the differences between the classification rules and IGC requirements in determining the material for low temperature steel.

Insulation is also required and a Re-liquefaction plant must be installed.

As representative standard lines, 22.5K, 35K, 60K, 75K, 82K, etc. have been developed.

In this article, I will introduce the design of 35K and 82K LPG ships that are being built a lot.

**LPG ship's hull design procedure is as follows:**

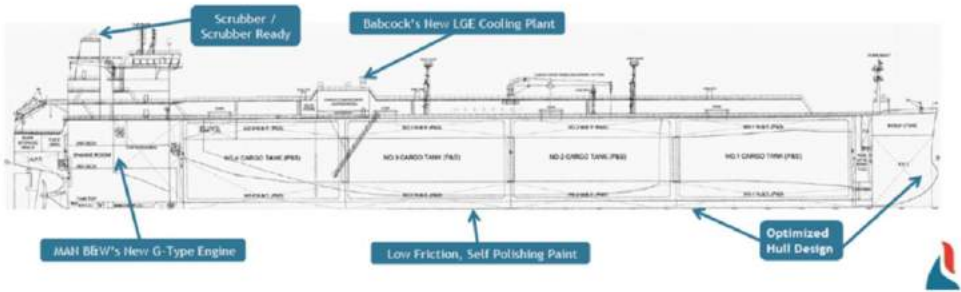
- Basic scantling of tank and hull structure
- Global 3-D FEM analysis
- Fine mesh model investigation in critical areas
- Fatigue analysis based on 30 years life
- Sloshing investigation
- Hull temperature calculation

**LPG ship's design features include deep well type cargo pumps on each tank.**

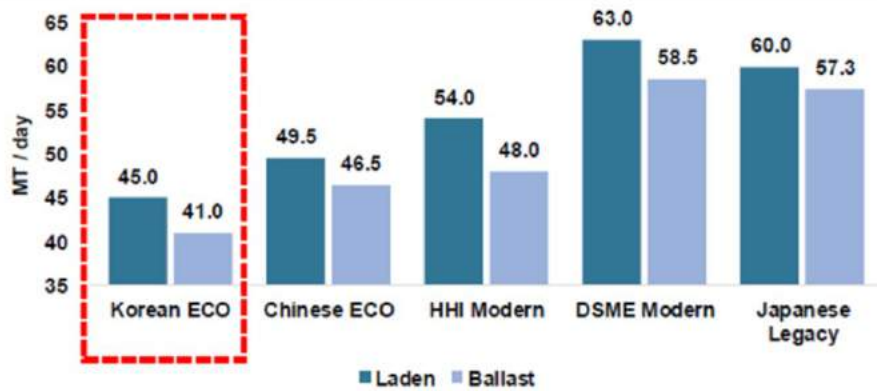
It is necessary to arrange compressor room and motor room on upper deck because several sets of LPG cooling compressor should be installed.

Table 3:

In the 82K VLGC sector Korean Yards have the best designs: Courtesy Dorian LPG Investors Report dated Dec 2019



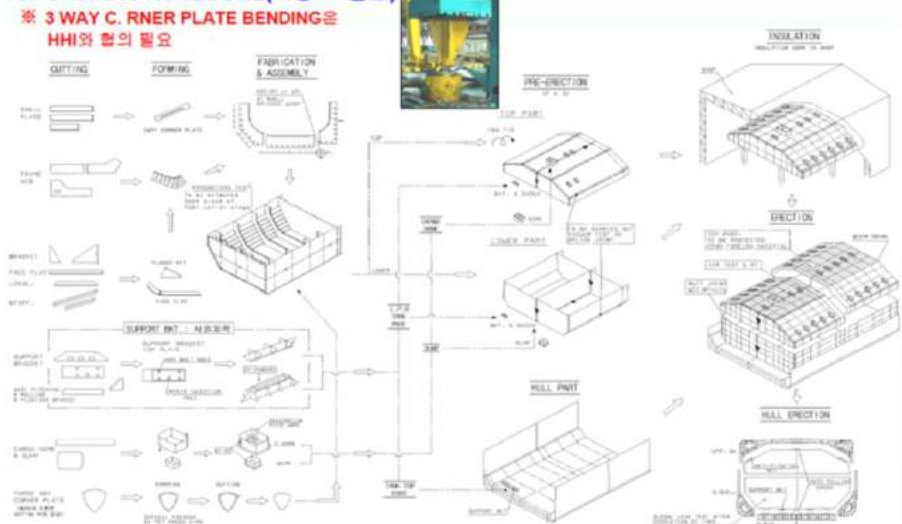
**Average Fuel Consumption by Vessel Profile<sup>1</sup>**



**Estimated Annual Fuel Cost by Vessel Profile<sup>1,2</sup>**



**LPG TANK PROCEDURE (가공 → 건조)**





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You also need to install an inert gas generator for clean inert gas production.

Due to the rapid increase in orders for LPG ships started since 2005, the supply and demand of low-temperature steels was once lacking.

Some steel companies that do not anticipate the rapidly increasing demand for low-temperature steel are in a hurry to develop late.

LPG cargo tanks are usually outsourced rather than manufactured in shipyards, a yard is needed to bring the completed tank, and much effort should be put into the quality control of the tank support check.

A skilled welder is needed because 100% radiographic testing of the cargo tank's welding area is required according to IGC code.

In addition, since cargo piping is stainless steel, SUS welding is required.

A skilled welder is needed because 100% radiographic testing of the cargo tank's welding area is required according to IGC code.

In addition, since cargo piping is stainless steel, SUS welder is required.

As of date Korean Yards have the best know-how which is fiercely protected.

When the Construction of LPG ship is completed, you have to do gas trial after commissioning.

Go to the gas terminal where LPG can supply, receive LPG and move to the high sea to perform gas trial

It usually takes 5-7 days and the LPG remaining in the tank after the gas trial is delivered along with the ship without any discharge.

Existing Foam In-Situ method requires material cladding, support, and scaffold for foam injection, but recently developed spray method is



similar to the existing painting method, so no additional support and scaffold installation is required, and only a protected workshop is required to be provided.

It is possible to save a lot of cost because it is twice as much as the existing work efficiency.

#### 6. Conclusion

LPG vessels, which have been considered as a niche market until now, will have increased demand due to the surge in natural gas production.

In response to the ban on LPG incineration in natural gas producing areas and the growing demand for LPG in the US and China, it has emerged as a new market.

Like LNG carriers, it is the mainstream of high value-added ships. Based on the current standard line, the challenge is to develop a better performance linear and a new construction method to improve productivity.





## CORROSION MITIGATION IN AGING SHIPS

- Capt (Dr) Nitin Agarwala

### INTRODUCTION

*Ships have been under constant attack, especially from the elements of nature. Steel became the marine construction material of choice in the late 1800's due to its stiffness, strength and damage tolerance. In the last 100 years ship design and construction procedures have been standardized with this construction material, employing well established and time-honored practices. Nonetheless they have shortfalls. Major of these being the need to weld thousands of steel plates which create numerous heat affected zones, resulting in areas of stress concentrations and areas highly susceptible to corrosion. This requires use of coatings to shield the structure from the elements. Cost attributed to corrosion damages of all kinds have been estimated to be of the order of 3 - 5% of the gross national product of industrialized countries. Damage encountered due to corrosion leads to loss of material and mechanical properties which ultimately leads to reduction in thickness, fatigue cracks, brittle fracture and unstable failure, and at times ultimate failure leading to risk to human life and environment. Consequences of such damages are a problem of worldwide significance. It is but natural that today most industrial designs are made after taking into consideration the effect of corrosion on the life span of the equipment.*

*Problem of corrosion is accentuated when dealing with salt water or a marine environment. Studies have shown that the general corrosion rate for steel in sea water is about 0.1 mm/ year. Control of this nature of corrosion rate so as not to cause structural failures or necessitate major renewals requires diligence during design, construction and maintenance.*

*The best solution to have a corrosion free structure is to either disallow the metal to come in contact with the electrolyte or to change the steel itself such that it is more resistant to corrosion. Of these two, the former is something which is unthinkable for ships, as ships are made of metal and have to move in sea which acts as the electrolyte. The best and only option is thus the later. It is with this thought in mind that Navy has been investigating stainless steel and composites as a material of choice for the next generation ships. Stainless steel has all the benefits of carbon steel and the added benefit of being non-magnetic and less susceptible to corrosion. Unfortunately, stainless steel is appreciably more expensive (per unit weight) than carbon steel and hence is difficult to compete economically. Composites on the other are cheaper, non-magnetic, less susceptible to corrosion, have low RCS, low thermal signatures, low harmonic resonance, have benefits of stealth, high durability and increased fatigue life. However they have their own problems of strength and flexibility which limit their use for longer lengths. Till the researchers are able to develop a suitable material, there exists a need to devise novel methods to mitigate corrosion onboard steel ships.*

*One of the major reasons for ships to encounter severe corrosion is general lack of reporting and poor maintenance attributed to either a greater deterioration than expected or due to the asset operating continuously for longer than expected thus providing no time for maintenance. Studies indicate that 60% of the world's ships are past their theoretical design age of 20 years. With economic pressure, these ships are being kept in operation for a prolonged period of time well beyond their design life. This requires managing material deterioration and to provide techniques for corrosion mitigation. Presently corrosion mitigation is limited to assessment of corrosion potential and selection of an appropriate corrosion protection system. This methodology may be successful for new ships, but as the ship ages, the corrosion mitigation techniques are not that simple to implement. The present paper dwells on possible ways for aging ships to be kept in service without their loss to ultimate failure as a result of corrosion.*

## CORROSION MITIGATION

Investigations have revealed that close to 40% of marine casualties have occurred due to structural failures largely due to corrosion deterioration. This primarily happens because ships are bought and sold often enough such that most original owners know that they will not be keeping the ship long enough for corrosion to become a problem for them. Hence most ships may not be built with the best materials and coatings and thus require more maintenance later in the ship's life. Since the direct and indirect cost associated with non-availability of the platform for mitigating corrosion is very high, there is a need for greater emphasis towards preservation and maintenance. This has led to major changes in the approach towards mitigation of corrosion. Corrosion mitigation has two approaches namely the technical approach also called as corrosion management and the non-technical approach which encompasses educating owners and ship managers on how corrosion is detrimental for structures and can be managed. In this paper we limit our discussion to the technical approach of mitigating corrosion for aging ships.

For ships, corrosion can be atmospheric or immersed. One school of thought feels that if both the structure and systems onboard ships were designed by factoring in corrosion resistance, one would encounter lesser planned and unplanned maintenance. Another school of thought however advocates that corrosion should be viewed as an acquisition risk and should be managed by considering a number of prevention or reducing measures to mitigate effects of corrosion. This necessitates a firm understanding of the operating environment. It is important to note that an environment isn't a single condition, but rather is a combination of factors which work in concert, such as operating temperature and humidity, salinity, and mechanical loading. Other contributing influences include chemicals, fuels, pollutants, solar radiation and biological organisms and even the galvanic signature of the vessel's berth during fitting out and subsequent berthing conditions through life. By understanding these operating environments, corrosion can be mitigated by either modifying or excluding the affecting environment. The range of potential benefits that result include improved reliability, reduced maintenance, increased

availability, improved performance and efficiency, improved safety, increased service life, and reduced life-cycle cost. Efforts towards corrosive management include use of inhibitors, anodic or cathodic protection, materials selection and environmental change to modify the corrosive environment and use of coatings to exclude the corrosive environment.

## AGING SHIPS

Since economic pressures across the globe are forcing ships to be kept in service beyond their designed life of 20 years. Ship users and owners need to put in efforts to manage material deterioration and provide techniques for corrosion mitigation. Classification rules typically incorporate an allowance for corrosion that is based on a certain amount of degree of corrosion. Should corrosion proceed at an accelerated rate greater than that allowed for in the design and be allowed to continue unchecked, it may result in structural failure, explosion or loss of the ship. This corrosion deterioration in ship structures is visible only as the ship ages. It is thus essential that possible ways to keep aging ships in service without loss to ultimate failure as a result of corrosion are examined. For this one needs to establish existence of corrosion, determine the contributory causes and monitor corrosion activity in real time along with process conditions that cause damage. The corrosion status should be continuously reviewed to refine periods between inspections so as to increase operation and reduce maintenance costs. This will further allow devising a strategy for effective control of corrosion and develop a feedback mechanism to assess effectiveness of corrosion control mechanism and correlate the detrimental effect of corrosion.

The most cost effective method used in shipbuilding for providing corrosion protection to steel is by means of painting. Cost of applying a proper coating is expensive, however the cost associated with the replacement of corroded steel is close to 4 to 14 times more than applying and maintaining a coating. This high cost is attributable to requirement of a thoroughly cleaned surface by ensuring removal of all salt, dirt and chemicals from the surface along with creating of a textured or anchor-pattern surface so that the coating can mechanically adhere to the surface. Hence one can say that corrosion of a surface is greatly affected by the quality of surface

preparation and surface defects prior to coating application. Though new and expensive coatings are being developed regularly which can last a lifetime of a ship and reduce the need for repairs to the steel as the ship gets older, improper surface preparation and / or defects created during the exploitation of the vessel which could damage the coating are areas of concern and require attention. Some of these areas onboard ships include weld seams, edges, notches, dents, repair work, areas of high stress and vibrations, complicated shapes with poor access, areas with insufficient drainage, steel surfaces hidden under thermal insulation, ballast spaces, lap joints, rivets and threaded connections. We discuss herein these corrosion causing areas and possible methods of corrosion mitigation.

## A. SEAMS, EDGE, NOTCHES

Welding seams are susceptible to improper sizing and sequence. They cause distortion, stress concentration and have poor coating quality to become corrosion initiation spots. Longer the seam, greater is the risk of corrosion. Typically crevices occur between intermittent welds, at weld undercuts and at lap joints that are not welded all around.

What to do. Aim at having all welds to be continuous. Intermittent or spot welding should be avoided. All weld spatter must be removed, and sharp edges should be ground to a smooth radius of at least 3 mm (1/8 in) with a preferred radius of 6 mm (1/4 in). Minimize crevices which form corrosion cells, collect dirt and are difficult to protect with coatings.

## B. NICKS, GOUGES, SCRATCHES, DENTS AND CRACKS

Deformation due to dents is assessed against set criteria where deformations up to 50 mm are not considered detrimental to the structural safety. A dent causes local stress and strain concentration that depends on the length and width. Profile of the dent is not a critical parameter, so long as the dent is smooth. Presently there are no formalized acceptance criteria regarding dents. Acceptance is a result of balancing between safety needs and commercial demands. Both scratches and dents result in crack formation and corrosion.

## REMEDIES:

Scratches should be repaired by polishing smooth using a high-speed grinder. Small dents can be repaired





### RESULTING IN CORROSION UNDER INSULATION (CUI)

Corrosion under Insulation (CUI) is a localized corrosion occurring at the interface of a metal surface and the insulation on that surface. This can be a particularly severe because of difficulty in detection of corrosion. Inspections for corrosion under insulation are generally not undertaken regularly due to cost associated with removal and replacement of insulation. On an average, 60 % of insulation which has been in service for more than 10 years will contain corrosion-inducing moisture. Though the corrosion process for CUI is understood well, however CUI goes undetected until the damage is significant.

Remedies: Avoid build up of moisture on insulation. Avoid damage to the covering coating of the insulation. Ensure correct selection of insulation material based on surface and purpose of insulation. Surface hidden under insulation should be inspected periodically using NDT techniques. Use advanced techniques such as nano technology to help inspection personnel to inspect for corrosion more regularly without removal of insulation. If the signs of CUI are recognized early enough it would not get a foothold.

### H. BALLAST SPACES

Corrosion rates in ballast spaces are potentially much greater and can become the controlling factor in determining a ship's life. If a compartment is not protected by coatings or sacrificial anodes, the time in ballast represents the most corrosive condition.

What to do. Ensure full access to interiors of tanks for surface preparation and coating. When dissimilar metals are used, both should be coated to avoid galvanic corrosion. Strategies for inspection, maintenance and repair for parts that can corrode, should be planned and implemented. Means of access, such as ladders, should be carefully maintained. Where existing means of access are not sufficient, appropriate staging must be erected or rafting or other means should be employed to conduct complete inspections. Proper tank inspection and regular maintenance is a must.

### J. LAP JOINTS

Lap joints are subject to failure due to fracture since they do not allow direct transfer of loads and flow of stresses through the joint. Their efficiency is

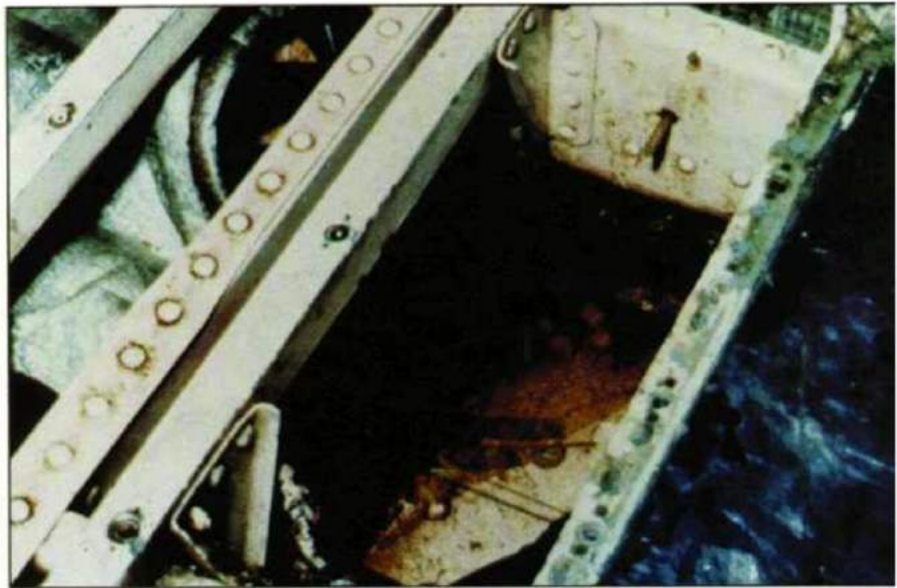


Fig.5 Insufficient Drainage

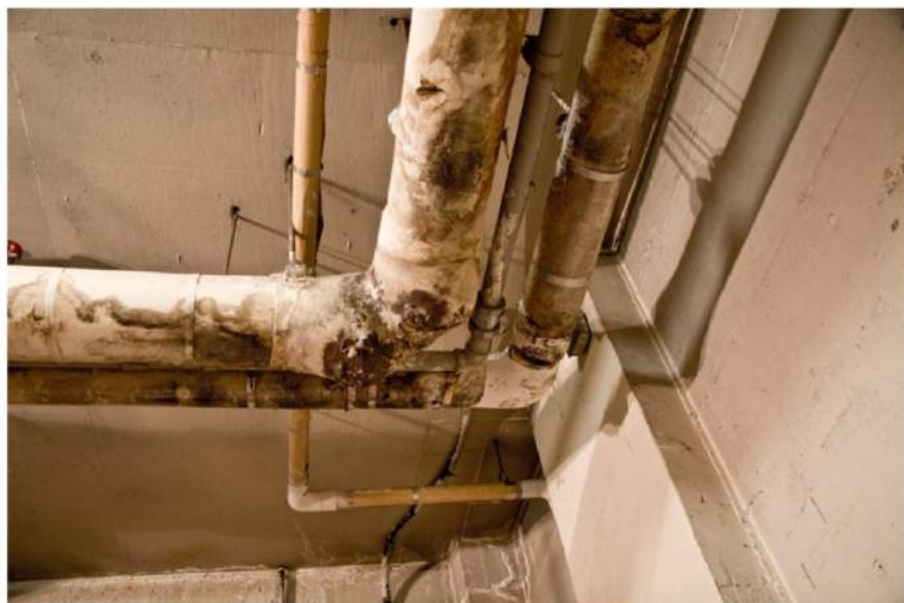


Fig.6. Moisture entrapment in lagging causing Corrosion under Insulation.



Fig.7 Corrosion in Ballast Tank

lower than a butt joint. Butt joints are 1.6 times stronger and lesser stressed than fillet joints used for lap joints. Lap joints show higher rate of corrosion and hence need to be inspected frequently.

What to do. Butt welded joints to be used whenever possible. Existing lap joints need to be replaced with butt joints. Lap joints where used should be inspected frequently.

#### K. RIVETS AND THREADED CONNECTIONS

Rivets and internal bolted connections should be avoided as they entrap moisture and provide a suitable environment for initiation of corrosion. Possibility of their inspection is limited and corrosion is noticed only at an advanced stage.

Remedies: Avoid using threaded connections and rivets. If they have to be used, they should be made using corrosion resistant materials.

#### L. INCORRECT PAINTING PROCEDURES

Deviation from procedures for painting as laid out by the manufacturer leads to reduced paint life and early damage to the preservative coating. This in return causes exposure of the underlying structure to environment thus leading to corrosion. Some factors that contribute to painting mistakes include bad surface preparation, incompatible paints, painting shortcut errors, painting over moisture, painting in sun or wind to name a few.

**Remedies:** Degree of surface profile achieved by blasting, control of humidity and temperature of air and steel during application together with proper curing as recommended by the coating manufacturer should be followed without compromise. Wet coating thickness should be checked during application and care should be taken to avoid increasing the thickness of coatings which can lead to solvent and thinner retention, film cracks, gas pockets, etc. Mandatory stripe coating of frame welds should be undertaken. Where heating and cooling occurs, coating surface should not be compromised with cracking, peeling or holidays.

#### M. DAMAGE TO COATING

Can be caused due to wear caused by crew members and equipment moving through the tank, water sloshing in partially filled ballast tanks, mud silt and other debris that accumulate in the tanks, high-temperature cargos or sloshing ballast water mixed with sand.

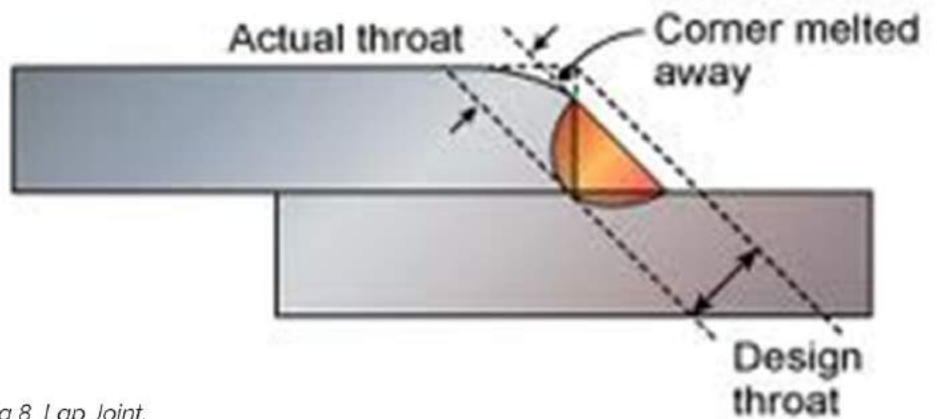


Fig 8 Lap Joint.



Fig 9 Caulking Rivet Joint Lap Joint.



Blistering



Efflorescence



Flaking



Peeling

What to do. Care should be taken to adhere to prescribed surface preparation and recommended procedures by the paint manufacturer while applying fresh coating. In case coating damage is observed, the defective area should be locally addressed by removing the existing coating, preparing the surface to the required standard followed by the application of the coating.

**N. MECHANICAL DAMAGE**

Ship structures may be damaged by falling cargo, impact with the quay, repeated roll-over by wheels of vehicles (RoRo vessels), impact of ice and floating objects, etc.

Remedies: When mechanical damage occurs, need exists to repair the damaged surface at the earliest given opportunity. While doing so adequate surface preparation followed by the recommended coating should be provided.

**P. WEAR AND TEAR**

Wear and tear can be in the form of sliding wear and friction, low and high-stress abrasion, dry particle erosion, slurry erosion, etc. This causes thickness loss which is recorded in survey reports.

What to do. Material hardness, shape and size of abrasive grit or roughness, attack angle, normal applied load, sliding speed and fracture toughness of material are some parameters that need to be considered when considering paint to be used for such surfaces. Additionally, precautions should be taken to prevent attack of coated surfaces from such abrasive materials.

**Q. CORROSION WASTAGE MODELS**

Analytical models for predicting trend in general corrosion are available. Though their systematic interpretation remains limited they can provide an initial idea for structures to be addressed closely.

What to do. Use these models to predict possible areas of corrosion and closely monitor and maintain these areas.

**R. RUST RUNNERS**

Rust runners such as Electrical Boxes & Standoffs, stuffing tubes, doors & door Hardware, pipe hangers & brackets, Electrical Components including Butterfly Clips & Cable Conduits, Lighting System Mounts & Standoffs, Ventilation Gratings & Louvers, Loudspeaker Mounts, Anti-Syphon



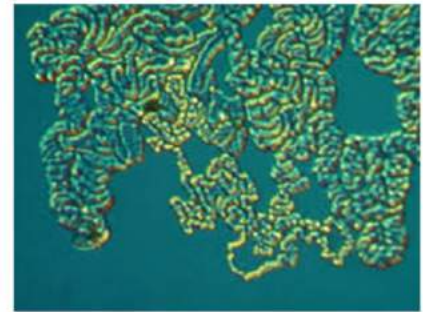
*Due to corrosion*



*In cargo tank*



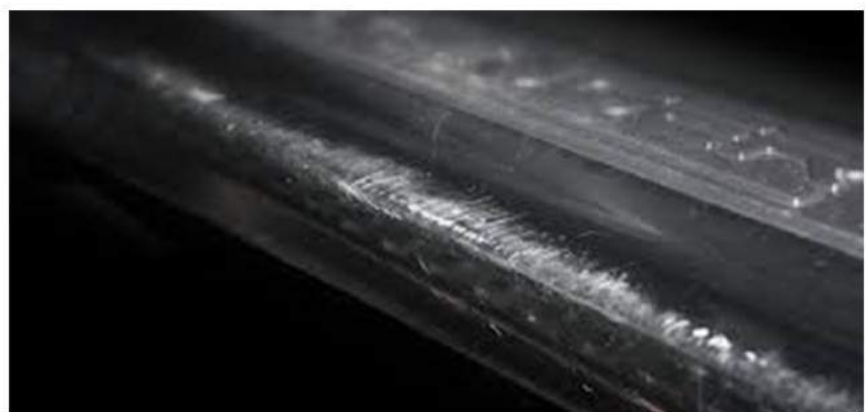
*Due to Improper Curing*



*Due to underlying moisture*



*Fig. 12 Coating damage due to Fork Lift*



*Fig. 13 Damage of coating due to wear*

Shields, Fire/Rescue Equipment Mounts, Rails & Safety Lines, Drain pans, Fasteners, Ammo Lockers, antenna mounts etc. are known to create a start point for the corrosion. To maintain these rust runners is a cumbersome task.

What to do. Change these rust runners to composite materials (i.e. wireways, electrical boxes, etc.).

## CONCLUSION

Aging ship structures suffer from wide-scale corrosion damage including corrosion wall thinning, pitting and multiple fatigue cracks due to inadequate maintenance and timely reporting of structural damage. With growing economic pressures, ship inspection and maintenance, timely and adequate repairs, crew training, imposing limits to cargo loading / unloading procedures need to be given more emphasis to minimize unfavorable impacts on structures.

Investigation and analysis of structural damage during marine incidents with focus on consequences of aging along with development of maintenance schemes to address damage by corrosion are a need of the day. Since there is little understanding of residual strength of damaged components, it is important to develop cost-effective repair and mitigation techniques. Similarly structural reliability should be used in the safety assessment of aged structures for determining survivability, recoverability, operability and maintainability.

The present paper focuses on developing better maintenance practices for life extension. Few steps for improving onboard maintenance have been recommended. Those recommended herein are some basic actions expected from the ship's crew and are in no way exhaustive. Some of these include:

New and expensive coatings developed which last for the entire lifetime of the ship and reduce the need for repairs to the steel as the ship gets older may be used as per the paint manufacturer's recommendations.

Design and corrosion resistance of ships be improved by studying differences between ships of the same class.

Since cost of applying a proper coating is close to 4 to 14 times lesser than replacing corroded steel, emphasis should be given in maintaining structure adequately with coatings

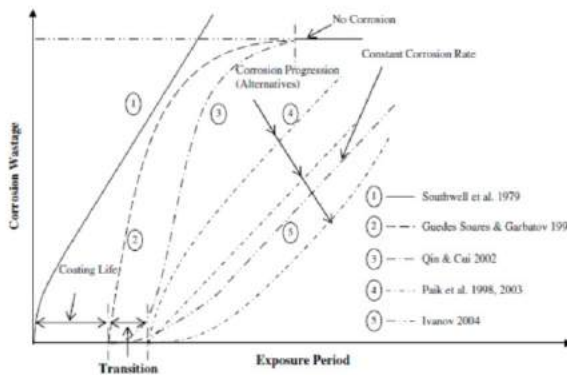


Fig. 14 Corrosion wastage models

rather than by replacement.

Since corrosion performance of coatings is greatly affected by the surface preparation (removing salt, dirt, and chemicals on the surface and then creating a textured or anchor-pattern surface to allow adherence of the coating), adequate importance to proper surface preparation prior to coating application must be emphasized.

Change corrosion resistant fasteners, components, deck gear, rust runners to reduce initiation of corrosion.

Applied insulation should be inspected regularly from outside for moisture retention. The insulation should be removed every 10 years for inspecting area behind and for renewal of the insulation.

Analytical corrosion models should be utilized to understand the corrosion mechanism and to take preventive action in time.

Areas of wear and tear and mechanical damage should be repaired suitably at the earliest given opportunity.

Provide easy access for cleaning, drainage and drying of wet spaces.

Accumulation of silt should be prevented to avoid wear of coating.

Places with unsatisfactory drainage, suction points (especially under bell-mouths) etc. should be inspected closely.

When dissimilar metals are used, both should be coated to avoid galvanic corrosion.

Means of access, such as ladders, should be carefully maintained.

Proper tank inspection and regular maintenance is a must.

Simple shapes for easier access, inspection and ease in applying coatings should be used.

For difficult access areas appropriate



Fig. 15 Rust runner on door

staging be used to ensure complete structural inspections.

Vibration in structure to be reduced by stiffening.

High vibration areas should be frequently inspected for coating and structural failure.

Areas prone to high stresses should be inspected frequently for corrosion.

Scratches should be repaired by polishing smooth using a high-speed grinder.

Small dents should be repaired with a filler material, sanding it smooth followed by paint touch up. Deeper and larger dents should be renewed.

All welds should be continuous and intermittent or spot welding should be avoided. Weld spatter must be removed, and sharp edges should be ground to a smooth radius.

Crevices which form corrosion cells, collect dirt and are difficult to protect with coatings should be minimized.

## About the Author:



Captain (Dr.) Nitin Agarwala is a Research Fellow, at the National Maritime Foundation, New Delhi - 110 010, India. This present paper was presented at the International Workshops Conferences and Expo for Military and Marine Applications held is 2015 at Pune.

**Editors Note:** References are left out due to lack of space.

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Advanced Training for Liquefied Gas Tanker Cargo Operations (GASCO) Starts : 6 <sup>th</sup> Jan, 3 <sup>rd</sup> Feb, 6 <sup>th</sup> Apr	5
Advanced Fire Fighting (AFF) Starts : 6 <sup>th</sup> Jan, 20 <sup>th</sup> Jan, 3 <sup>rd</sup> Feb, 2 <sup>nd</sup> Mar	4
Proficiency in Survival Craft & Rescue Boats other than Fast Rescue Boats (PSCRB) Starts : 10 <sup>th</sup> Jan, 24 <sup>th</sup> Jan, 7 <sup>th</sup> Feb, 6 <sup>th</sup> Mar	4
Medical First Aid (MFA) Starts : 16 <sup>th</sup> Jan, 29 <sup>th</sup> Jan, 12 <sup>th</sup> Feb, 11 <sup>th</sup> Mar	4
Tanker Fire Fighting (TFF) Starts : 18 <sup>th</sup> Jan, 15 <sup>th</sup> Feb, 21 <sup>st</sup> Mar	1
Electronic Chart Display and Information Systems (ECDIS) Starts : 28 <sup>th</sup> Jan, 11 <sup>th</sup> Feb, 25 <sup>th</sup> Feb, 10 <sup>th</sup> Mar	5
Human Element Leadership and Management (HELM) (Operational / Management) Starts : 20 <sup>th</sup> Jan, 17 <sup>th</sup> Feb, 16 <sup>th</sup> Mar	3/5

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# Fearnleys Weekly Report

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## Rates

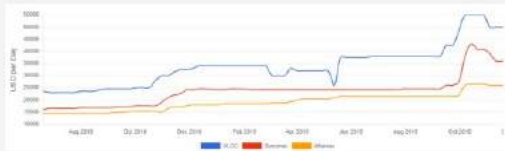
DIRTY (Spot WS)	Size	This week	Change
MEG/WEST	(280 000)	WS 63.0	3.0
MEG/Japan	(280 000)	WS 125.0	12.0
MEG/Singapore	(280 000)	WS 125.0	13.0
WAF/FEAST	(260 000)	WS 112.5	5.5
WAF/USAC	(130 000)	WS 142.5	5.0
Sidi Kerir/W Med	(135 000)	WS 137.5	2.5
N. Afr/Euromed	(80 000)	WS 205.0	25.0
UK/Cont	(80 000)	WS 235.0	10.0
Caribs/USG	(70 000) WS	250.0	55.0

1 Year T/C (USD/Day)		
VLCC (Modern)	\$50000.0	\$0
Suezmax (Modern)	\$35500.0	\$0
Aframax (Modern)	\$27000.0	\$1,000

VLCCs fixed in all areas last week	68	0
VLCCs available in MEG next 30days	120	-5



## TANKERS

### VLCC

What a rollercoaster ride! As last week drew to a close VLCC rates were on a downward trajectory with MEG/East testing the ws100 mark. However, things turned on a sixpence this week as January cargoes came into play. MEG/East went from ws100 to ws110 in one jump, and panic set in. Rates have since continued to climb, with owners now eyeing rates above ws120. MEG rates have also been supported by an influx of USG export cargoes, currently trading close to USD 12 million for China/Korea discharge. N.Sea/East has been correspondingly active, and ships discharging in the area have all but been absorbed. Wafra/East runs, however, has been surprisingly few and far between, although we're seeing signs of a pickup in last decade of January. With a heaving Suezmax market there are few "get out of jail cards" at present, so the run up to Christmas is looking bright for the owning community.

### Suezmax

In the beginning of the week, the Suezmax market world-wide looked fairly balanced, and it looked like we would have a situation where owners would be keen to fix their ships before the holidays without putting too much pressure on the charterers. After a very busy Tuesday, tables have turned, and charterers are now the ones that need to fix their cargoes in time for Xmas. The rest of the week, we could see rates moving further with tight position lists in the Atlantic as well as MEG. Still quite a lot of cargoes left uncovered, so the rest of the year is looking really interesting.

### Aframax

Freight rates in the Baltic and North Sea market seem to have found their feet around ws235 levels in the Nsea and ws190 levels ex Baltic, depending on what discharge options one needs. Stems loading very end year are currently being fixed with quite a lot of cargo activity taking place off the market. Although certain owners have expressed their willingness to put their clean ships into dirty trade, the tonnage list remains tight, and thus we still expect a firm market going into the new year. Cargo activity has been healthy in the Mediterranean and Black Sea this week and owners are pleased to see the market bounce back. Benchmark routes both ex Bsea and cross-Med have picked up about 25 ws-points, and at the time of writing TD19 is trading just above ws200. As transits through straits keep delaying and charterers are looking to cover their stems ex Bsea for second decade January, we expect the market to remain firm in the week to come.

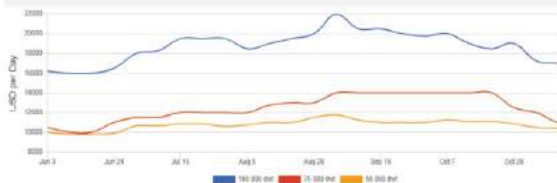
# Fearnleys Weekly Report

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## Rates

Cape size (USD/Day, USD/Tonne)	This week	Change
TCT Cont/Far East (180 DWT)	\$31,915	-\$3,405
Australia – China	\$7.5	-\$1.9
Pacific RV	\$14,350	-\$9,200
<b>Panamax (USD/Day, USD/Tonne)</b>		
Transatlantic RV	\$11,570 -	\$1,485
TCT Cont/Far East	\$18,277	-\$312
TCT Far East/Cont	\$3,986	-\$302
TCT Far East RV	\$9,088	-\$1,217
<b>Supramax (USD/Day)</b>		
Atlantic RV	\$11,738	-\$416
Pacific RV	\$7,557	-\$672
TCT Cont/Far East	\$16,064	-\$443
<b>1 Year T/C (USD/Day)</b>		
Capesize (180 000 dwt)	\$16,500	-\$1,000
Panamax (75 000 dwt)	\$10,500	-\$500
Supramax (58 000 dwt)	\$9,700	-\$300
Baltic Dry Index (BDI)	\$1,281	

1 Year T/C Dry Bulk



## DRY BULK

### Capesize

There has been a rapid drop in rates over the last week. West Australia round is presently in the low 7s and c3 still not seeing any significant change in demand, with levels presently below USD 20 pmt. Period activity remains poor but expected to pick up once we get into the new year.

### Panamax

Downwards trend this week in both basins. A TA round voyage pays owners around the mid USD 12,00 per day. A fronthaul from the Continent yields around the mid USD 18,000's. In the Pacific basin, a round voyage pays owners around USD 10,000 per day. The BPI 4TC-index is currently at 1421 points, 22 down since last week

### Supramax

Negative pressure across the board as the year come in for closing. In the Atlantic, scrap cargoes Cont/Emed paying around USD 11,000, while FH ex Bsea is paying in around USD 17,500. From USG, fh yields in the very low USD 20k's while ECSA trip out is trading around USD 13,000+300k gbb. Stronger downwards pressure in the East, especially in the northern parts. Indo/China coal rv's paying owners around USD 7,750 bss Spore delivery while Aussie rv's paying in the high USD 8k's. Indo coal to WCI is paying around USD 9,000 while in the Indian Ocean, Safr rv to China is trading around USD 12,000+200k gbb.

### Gas

The spread in owners' earnings East vs West narrowed significantly with fixtures reported in the mid 110's for Houston-Chiba. Together with a firming eastern shipping market we were getting close to a market equilibrium between the two sides of Suez. Then Aramco acceptances for January were finally announced last night with big delays. Some of the lifters were even asked to cancel or defer their liftings mainly due to upstream oil cuts. With more shipping length building from traders in 1H Jan these delays from Middle Eastern suppliers means that freight rates may come under pressure again. Same time it seems like the list of available re-lets in the West is decreasing in size, and as such we don't expect the western shipping market to continue tumbling downward from here but rather flat out.

## LPG Rates

Spot Market (USD/Month)	This week	Change
VLGC (84 000 cbm)	\$1,900,000	\$100,000
LGC (60 000 cbm)	\$1,000,000	\$0
MGC (38 000 cbm)	\$950,000	\$0
HDY SR (20-22 000 cbm)	\$650,000	\$0
HDY ETH (17-22 000 cbm)	\$720,000	\$10,000
ETH (8-12 000 cbm)	\$440,000	\$0
SR (6 500 cbm)	\$370,000	\$0
COASTER Asia	\$250,000	\$0
COASTER Europe	\$255,000	-\$10,000
<b>LGP/FOB Prices (USD/Tonne)</b>		
FOB North Sea/ANSI	\$399.50	\$0.00
Saudi Arabia/CP	\$440.00	\$0.00
MT Belvieu (US Gulf)	\$267.00	-\$1.00
Sonatrach/Bethioua	\$405.00	\$0.00
<b>Spot Market (USD/Day)</b>		
East of Suez 155-165 000 cbm	\$87,000	\$0
West of Suez 155-165 000 cbm	\$95,000	\$0
1 Year T/C 155-160 000 cbm	\$76,000	-\$1,000

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## Newbuilding

### Activity Levels



## Prices

Prices (Million USD)	Size	This week	Change
VLCC	300 000	\$91	\$0 ➡
Suezmax	150 000	\$61	\$0 ➡
Aframax	110 000	\$50	\$0 ➡
Product	50 000	\$37	\$0 ➡
Capesize	180 000	\$50	\$0 ➡
Kamsarmax	82 000	\$28	\$0 ➡
Ultramax	64 000	\$26	\$0 ➡
LNGC (MEGI) (cbm)	170 000	\$189	\$0 ➡

## Commodity Prices

### Brent Spot

\$ 64.86 ↑ \$2.72

## Bunker Prices

Singapore			Rotterdam		
380 CST	180 CST	MGO	380 CST	180 CST	MGO
\$437	\$477	\$638	\$428	\$471	\$610
↑ \$9	↑ \$12	↑ \$12	↑ \$9	↑ \$3	↑ \$9



## Sale & Purchase

### Prices

	2014	2009
<b>Dry</b>		
Capesize	\$37.0	\$23.0
Kamsarmax	\$23.5	\$16.0
Ultramax	\$22.0	\$13.3
<b>Wet</b>		
VLCC	\$71.5	\$46.5
Suezmax	\$51.5	\$36.5
Aframax / LR2	\$37.5	\$25.0
MR	\$28.0	\$18.0



## Market Brief

### Exchange Rates

#### USD/IPY

105.92 ↓ -0.40

#### USD/KRW

1211.25 ↑ 3.25

#### USD/NOK

9.02 ↑ -0.01

#### EUR/USD

1.11 ↑ 0.00

All rates published in this report do not necessarily reflect actual transactions occurring in the market. Certain estimates may be based on prevailing market conditions. In some circumstances, rates for certain vessel types are based on theoretical assumptions of premium or discount for particular vessel versus other vessel types.





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## INDIA PASSES RECYCLING OF SHIPS ACT 2019

- Keshav Hrishikesh

Parliament has enacted a major change to India's ship recycling law to bring it in line with global standards. The Recycling of Ships Bill, 2019 was introduced in Lok Sabha by Minister for State for Shipping, Mansukh Lal Mandaviya on 25 November, 2019. Mr Mandaviya assured the house that the bill would help streamline the ship breaking industry and help India obtain eco-friendly steel. After significant debate Lok Sabha approved the bill's passage on 3 December, 2019.

On December 13, 2019, the bill received Presidential approval from President Kovind following which it became an Act and is in force from December 13, 2019. Background and reasons for the Act

The Act ratifies the Hong Kong convention (The convention was adopted by IMO in 2009 but it is currently not in force) and eases the restrictions on Indian yards that are currently imposed by the EU SRR. The EU SRR requires that vessels will be recycled only in a yard that appears on a list of approved yards published by the European Commission.

The aim is to force European owners to recycle ships in Europe and not export waste to other countries. Despite this loopholes exist so a non-EU flagged ship departing on a voyage to a recycling yard from a non-EU port will not be subject to EU SRR. Another probable scenario is where a decision to send a ship to a recycling yard is taken when the vessel is in international waters.

An opinion piece published in The Statesman on 16 December, 2019 credited to the Minister states that the Act is intended to improve India's position in the recycling market. By making Indian laws more compliant with international standards India hopes to retain and gain vessels from European and Asian owners. There is also the hope that India might obtain eco-friendly steel as an outcome of the recycling as steel recovered from ship recycling yards makes up about 10 % of total steel consumption in India. The new Act is part of India's efforts to boost its ship recycling capacity by 40% by 2024 as part of India's push to become a US\$5 Trillion economy.

Minister Mansukh Lal Mandaviya said India is looking to raise its global share in ship recycling business to 60 percent and double its contribution to the country's GDP to about ₹15,600 crore (US\$2.2 billion) after the enactment of the new Act.

Mr Mandaviya speaking to the Press Trust of India said that direct jobs from recycling sector were likely to double to about 90,000. He said: "There are 53,000 merchant ships globally.

Every year 1,000 are recycled and 300 are recycled in India, which is 30 percent of global recycling. Now after nod to Recycling Bill, we expect it to touch 60 percent as the bill provides for acceding to the Hong Kong International Convention for Safe and Environmentally Sound Recycling of Ships, 2009. We expect ships for recycling from many nations."

India, Pakistan, China and Bangladesh account for 90 percent of the ships recycled globally. In 2017, India scrapped 6323 tonnes of the ships scrapped globally. However, ships in India are frequently broken directly on the beach (beaching) instead of industrial sites, a practice that is unsafe and hazardous. This year, The Economist reported that of the 744 ships broken in 2018, 518 were dismantled on beaches.

India has seen controversy over polluted ships entering Indian waters. Eg. In 2005, the French aircraft carrier Clemenceau was prohibited from entering the port of Alang. The existing Shipbreaking Code (revised), 2013 and the provisions of the Hong Kong Convention, 2009 are part of the Act bringing India's laws more in line with global standards.

Features of the Recycling of Ships Act 2019 The Act restricts the use of hazardous material on ships and regulates the recycling of ships.

Owner of new ships will have to make an application to the National Authority to obtain a certificate on the inventory of hazardous materials on board the vessel. Existing ship owners must apply for the certificate within five years of the commencement of the Act. The certificate must be renewed every five years and should be maintained and updated through the life of the ship to reflect changes in the ship's structure and equipment.

The use of hazardous materials in a ship is subject to financial penalties but may also be treated as a criminal offence with prison time. Financial penalties are set at rates between ₹5 lakhs and ₹10 lakhs.

Ship Recycling Plans (SRP) will need to be prepared for incoming vessels. Ships must carry a mandatory Inventory of Hazardous Materials (IHM) on board. The ships will need to obtain a "Ready for Recycling Certificate" in accordance with the Hong Kong convention prior to recycling at these authorised yards. Failure to do so will mean ships can be detained by the National Authority. The National Authority also has powers to suspend or cancel ship recycling by a firm without notice. A bold move since the Ministry's aim is to improve the ease of doing business.

#### **Comment**

While the Act and the Hong Kong Convention both have admirable goals, neither bans beaching and sets no requirements, beyond compliance with national standards, for the management of hazardous waste once they leave the gate of the recycling facility. The majority of large shipping firms still use beaches. According to the NGO Shipbreaking Platform over 6000 ships have been beached since 2009.

The Economic Times asked Minister Mandaviya if India ought to have her yards to comply with EU regulations which are more stringent. He noted that EU regulations prohibit beaching and said the Act would bring India 'very close' to EU standards which is a dubious claim.

The HK Convention relies on flag state jurisdiction which is easy to circumvent by flag hopping. Ships can circumvent this by sailing under grey and blacklisted flags that are popular for last voyages to the South Asian beaches. These are flags known for their poor implementation of international maritime law.

India is also a signatory to the Basel Convention which defines end-of-life ships as hazardous waste because of their toxic components, such as asbestos, lead and mercury. The Basel Convention also adopted the "Technical Guidelines for the Environmentally Sound Management (ESM) of the Full and Partial Dismantling of Ships", a document for countries that already have or are establishing ship dismantling facilities. The Guidelines provide recommendations on procedures, processes and practices that must be implemented to ensure safe and environmentally sound practices. The Guidelines also

provide advice on monitoring and verification of environmental performance.

While no serious attempt to enforce the Basel Convention on the basis of a ship's beneficial ownership country has yet been made India might have adopted the far reaching measures in that particular Convention.

There is also the question of worker's safety. A 2015 report by Litehauz, a Danish marine environmental consultancy, found that in the process of scrapping a 10,000-tonne ship at least 120 tonnes of steel becomes molten and is lost in the sea.

Levels of toxic chemicals as well as oil, in Alang's water are far higher than at other beaches. Workers handle asbestos and dangerous chemicals. The appalling conditions under which ship breaking is carried out have been well documented. Workers are often unskilled and ill equipped meaning accidents are common. Last year 14 workers died at Alang. That is an official figure which makes it reasonable to speculate if the real number is higher.

To this issue, Mr Mandaviya said the issues of environmental and workers' safety had been adequately addressed. The Act does go into this (Sec. 15) but this commentator feels it is simply too brief and not comprehensive enough. Though MER could not obtain full reports of the Parliamentary debate, the excerpts in the press indicate that MP did mention the Basel convention and debated on worker's rights, reducing the length of time within which a ship owners ought to obtain a certificate of the IHM, increasing penalties for non-compliance and the possibility of dismantling ships in dry docks rather than beaches. It is hoped that measures will come to pass sooner rather than later.

NOTE: Flags that are not popular in operation but excessively popular during final voyages. Includes flags of Albania, Togo, Tanzania, Cambodia on the blacklist and United States, India, Iran, Egypt and Switzerland on the grey list. The full list can be found on [www.parismou.org](http://www.parismou.org)

Author: Keshav Hrishikesh is a lawyer by profession.





## 83<sup>RD</sup> GC MEETING – AN OVERVIEW



**Standing(L-R):** Rajiv Ramanujam, Abhijit Banerjee, B Chandakkar, D.S. Anand, Anil Kumar, Y Nath, Bhupesh Tater, Anil Rao, Thomas Kurian, Mohan Singh Pal,

**Sitting (L-R):** Gautam Sen, K Shankar, CV Subba Rao, Tarun Kumar, Uday Kr. Purohit, Kushal Roy, BS Mathur, Vijendra Jain, Satya Prakash Arora

The 83rd GC Meeting of the Institute was held on 21 Dec 2019 at IMEI House, Nerul, Navi Mumbai.

The President, Mr. Uday Purohit, who chaired the meeting, welcomed the newly elected GC members and commenced the proceedings.

The Chairpersons of the various Subcommittees and Branches presented/ informed, for discussion, their activity report/s ATR (Action Taken Reports) and their financials (actual operational figures vis-à-vis that budgeted and proposed budget). A status update of issues closed and those pending were discussed.

The Agenda for the GC Meeting, which usually addresses matters of governance, also included discussions/ information / proposal and resolutions such as adoption of 82nd GCM / information of 36th AGM Minutes, Changes in the Trustees in BES, Nominations for various external bodies, change of signatory at HO, formation of sub committees, update on Benevolence fund, various

proposals such as distribution of soft copy of MER to the Corporate members with option open for asking hard copy, resolutions through e-voting, stop printing of sending hard copy of the AGM notice except option open for asking Hard copy, appointment of CEO, changes in the role and responsibilities of the office Bearers , changes in the AOA/ ORP, changes in the life membership fees structure, proposed to withdraw hostel facilities, submission of white papers in the National and International Seminar, award from the Branch level, E net Banking, proposal for further investment in various Mutual funds, Group insurance for employees, update of equivalence of COC, Courses useful for shore jobs, discussing in detail and checking out the systems - e.g. HELMS, Continual Faculty Development, etc.

The meeting ended with a vote of thanks to the Chair.



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# IME(I) CHANDIGARH CHAPTER



A seventy five minutes Seminar on 'Corrosion Mitigation on Aging Ships' was conducted by the Institute of Marine Engineers (India), Chandigarh Chapter, under the chairmanship of Mr. Iqbal Singh, on December 3, 2019.

Forty engineers and deck officers that included Eighteen members of the IME (I) Chandigarh chapter were in attendance.

Capt. (Dr.) Nitin Agrawal, a serving officer of the Indian Navy, obliged by being the main speaker. He was facilitated by the immediate past chairman Mr. Ashok Gulati and introduced by Mr. Ajay Gautam.

Capt. Nitin explained how corrosion could be controlled. He stressed on the role of the ship staff in maintaining the vessel in a corrosion free state by proper observation, reporting, maintenance and repairs.

At the end, a discussion on low sulphur fuel, being implemented by the IMO from Jan 1, 2020, took place. Program ended with a vote of thanks by Mr. Arun Aggarwal.



*Capt. (Dr.) Nitin Agrawal, being welcomed by Mr. Ashok Gulati, Immediate Past Chairman*



# IME(I) MUMBAI



The Mumbai Branch of IME(I) launched much needed 'Value Added Courses' in a grand Ceremony on the 7th December preceded by an impressive Technical Seminar at 'The Hilton', Mumbai.

#### The Technical Seminar covered the following topics:

1. Step Forward from Digitalisation – Leveraging AI and Machine Learning for enhancing vessel availability' – by Mr. Alok Bhagwat, M/s Larsen & Toubro Ltd.
- '2.Achieving Cyber Vigilance – Insights in Maritime Industry' – by Mr. P. P. Singh, Tata Consultancy Services 'Impact of Digitalisation on Shipping' – by Mr. T. S. Girish, DNVGL

The launch of the Value added courses was preceded by an interesting talk on Wealth Management by Mr. Feroze Azeez, Deputy CEO, M/s Anand Rathi Wealth Management Services.

The first Value Added Training programme on Electricals & Electronics for Marine Engineers & ETO's followed its 7th December launch and was held during 9th and 13th December.

#### The IME(I) plans to start classes on the following topics over the next few months:

1. Electronics and Electricals Course for Marine Engineers
2. Hydraulics Course for Marine Engineers
3. Distance Learning courses on Management and Commercial aspects of shipping

The first course was conducted by an experienced faculty Member - Mr. Ajit Kumar K. T. at the NMIS premises in Nariman Point who spoke about Microcontrollers, PLC's, VFD, AC drives, inverters, position sensing encoders and about Marine Instrumentation, Control engineering and Boiler instrumentation amongst other topics during the 5 days. The discussions were extremely interactive and the faculty rose to the expectations of the participants. The full class and the positive feedback from the candidates serves as encouragement for the Branch to continue this programme further. The next class is being scheduled from 20th January on Hydraulics.





**Mr. Alok Bhagwat, L&T, speaking on the event**



**Mr. PP Singh, TCS, sharing his thoughts**

A brochure was released on this occasion by the Chief Guest Rear Admiral (Retd.) S Nedunchezian, NM in the presence of IME(I) President Mr. Uday Purohit.

The first Batch of Classes have commenced on 09 December 2019 at NMIS, Mumbai who have graciously provided space in their Nariman Point premises.

## IME(I) CHENNAI

The Institute of Marine Engineers India (Chennai Branch) conducted a technical paper presentation at the Seafarers Club in Chennai on 17th December 2019. This event was sponsored by the HIMT group as part of its "Continual Development Programme". Shri. Ajithkumar Sukumaran, Principal Officer, MMD Chennai who presided over as Chief Guest for the grand event.

Mr. Anil Kumar, Chairman of IMEI Chennai Branch welcomed the gathering. Mr. S.Kannan and Mr. K.Chidambaram felicitated the Principal Officer and the Guest Speaker Dr.L.R.Chary a renowned academican and maritime consultant, respectively. Mr. Ramesh Subramanian introduced the Principal Officer and Mr Suresh Shenoy introduced the Guest Speaker. Shri. Ajithkumar Sukumaran delivered the keynote address. A technical paper on "AUTONOMOUS SHIPPING" was presented by Dr. L. R. Chary which was appreciated.

Mr. Kushal Roy, Vice President IMEI presented the memento to the Principal Officer and Mr. I. M. Rao presented memento to the guest speaker as token of appreciation. Vote of thanks was proposed by Mr. B. Jayakumar, Vice Chairman IMEI Chennai branch. Mr. Sanjeev S Vakil Hon. Secretary IMEI Chennai & CEO, HIMT group was the master of ceremony. The meeting concluded with national anthem.



**Dr L.R Chary presenting his paper.**





## The Institute of Marine Engineers (India)

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# Cutting Costs By Optimizing Engine Performance And Fuel Compatibility Tester

14<sup>th</sup> Dec 2019



Fuel compatibility and Diesel engine performance were the measurement used to reduce maintenance cost. It was also was the focus of attention for over a hundred members of the shipping industry. The UAE branch held a technical meeting of the Institute of Marine Engineering, Science and Technology (IMarEST) on 12 December. The topic 'Cutting costs & reducing harmful ship emissions' and 'On-board Fuel Oil Compatibility Tester' was presented by Mr. Matthias Winkler, Managing Director CMT.



*Matthias Winkler, Managing Director CMT*



*(L to R) Fahad Hayee, Matthias Winkler, Nikeel Idnani, Surendra Naidu, Ravi Bhandurge, Hazel Prado and Rohith Raj*

With the growing use of low Sulphur fuels, testing the stability of the fuel oil and its compatibility for commingling is becoming increasingly important. Whilst every fuel oil is produced to be stable - in that, it does not have the tendency to produce Asphaltenic sludge - bunkers being stemmed are not necessarily compatible with existing on-board fuel stocks. CMT's on-board fuel oil Compatibility Tester is extremely simple and takes just 4 hours, providing engineers with crucial information that can prevent sludge build up, damage to fuel oil systems and ensures smooth engine operation by ruling out any problems with fuel combustion, in advance. During his presentation, Matthias emphasized that optimizing diesel engines performances are key to reducing ships' operational costs. Towards this end, Indicator Diagrams are indicative of the power generated within engines and are a useful tool for marine engineers to get an insight on their engines' performance. Sensors like acoustic emission sensors can provide useful additional information about injection, ignition and combustion. Modern Main Engines are sometimes monitored 24/7 with online systems provided by the manufacturer. However, these systems only monitor some key points from the combustion process. For a detailed analysis of problems shown by an online system, a handheld system can be useful. Also, the Auxiliary Engines are often neglected when the main engine is monitored online and hence consume more fuel than needed. However, recent trials undertaken for market research showed large differences between the different sensor technologies, different hand-held devices available on the market, as well as the different software solutions provided with the devices.

Main deviations have been found in accuracy and the capability to undertake diesel engine performance analysis. Diesel engines, typically with six or more cylinders, are frequently prone to cylinder-to-cylinder variability requiring periodic re-balancing and frequent adjustments. In some marine diesel engines, cumbersome monthly balancing is required to maintain nominal engine operation and emission characteristics.

Nikeel Idnani, Honorary Secretary of the IMarEST UAE branch who presided over the meeting remarked, "the presentation introduced innovative ways of monitoring the complete combustion process to reduce fuel consumption and emissions commensurate with the IMO 2050 target. Enhancing the performance of engines is a straightforward method of reducing GHG emissions and operational costs of a vessel". Mr Idnani spoke about the risk of incompatibility when mixing two types of fuels. He suggested using approved instantaneous on-board Compatibility Test Kits as a mitigating measure against clogging of fuel filters and separators and including sticky fuel injection pump, all of which can lead to loss of power or even shut down of the propulsion plant.

The seminar, organized by CMT's exclusive distributor in the Middle East - Planet Blue Marine.

There was an almost never-ending stream of questions from the floor as discussions continued during and even after the networking dinner.



## EXCELLENCE



**M**r. N. Nanda has been bestowed with National Level VIBHUSHAN AWARD (Treasure of Shipping) for exemplary contribution to the Maritime Industry in the field of 'Maritime Technical Literature' at Kashti Awards 2019 held at New Delhi on 1st October 2019.

The Chief Guest was, Honourable Union Minister of Shipping, Shri. Mansukh Mandaviya. Mr. Nanda along with Mr. Vikram Gokhale has authored 'NG Series' books on Marine Engineering, which are widely used by students of the Marine Fraternity. He is also a columnist with leading publications, both Maritime and Mainstream.



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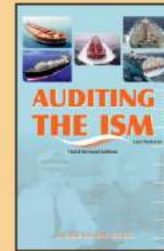
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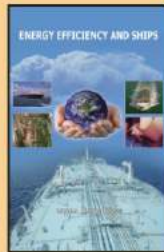
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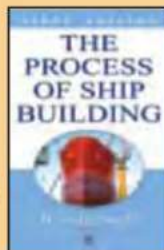
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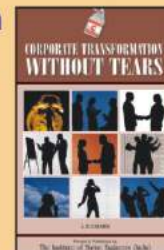
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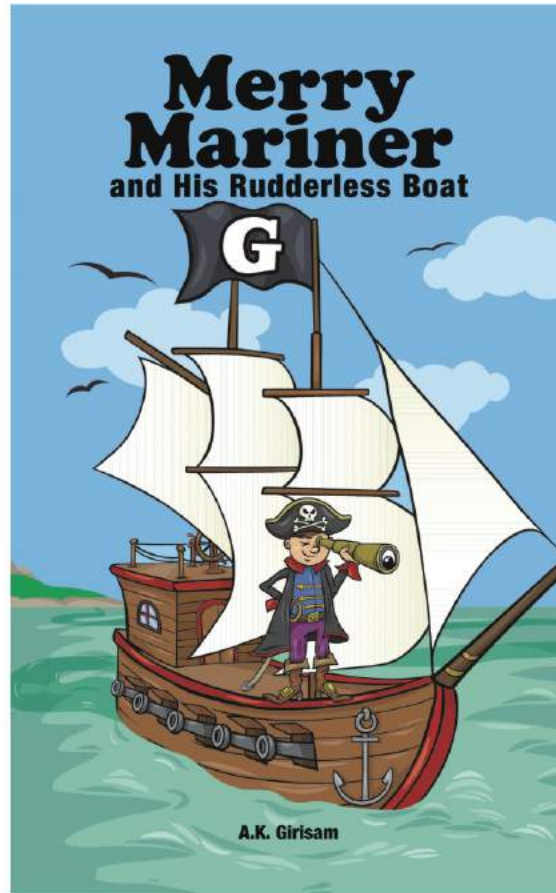
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**About the Author :**

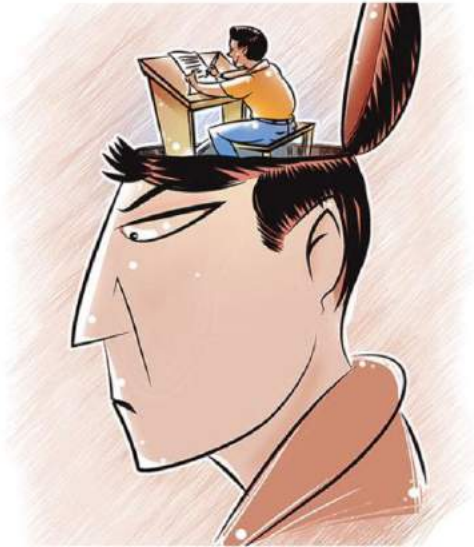
*A.K.Girisam is the pen name of Chief Engineer O.S.Rao whose sense of humor and wit must have made him a great companion to sail with. His short stories and anecdotes are ideal for this holiday season.*

## CLEARING MOT II CLASS ON THE FIRST ATTEMPT

**T**hough I can claim that I cleared MOT II class exam on the first attempt due to my brilliance and sheer hard work, I will not do so, for I wish to be candid and forthright in these stories. A feather might fall in your cap while you are walking under a tree, still there would be a feather in your cap for all to see.

In the late seventies, passing on the first attempt was almost unheard of. Even the most brilliant, gold-medal-calibre students had to go through the grind of making a number of attempts. I was staying in Fairhost Lodge in Chembur. Like in the college days, I was carefree, used to study when in the mood and party for any, every, and no reason (which was often, as many friends or

acquaintances would fail in the oral exams and we shared their grief and buried pain in their beer and whisky or occasionally someone would pass and partying would be harder). There were three MMD surveyors conducting the oral exams for II class candidates. They were called Good, Bad, and Ugly. Good had a heart of gold and would pass any candidate whose written exams were fairly good. So he was Good. Bad was tough and would pass someone only if his written papers were very good and he fared very well in the oral exams. So he was Bad. Ugly was a sheer terror; he had a strict 'no pass' policy. He would rarely pass a candidate on first oral exam with him, which meant that if the candidate had come to him for the first time after several attempts before other surveyors, he had no



chance. So, he was Ugly.

Those days, there used to be about fifteen sets for each subject. If you had prepared for about 70 percent of the questions in each paper, you were adequately prepared. Even with meagre effort, I could do very well in the written exams, thanks largely to the grind and tricks learned in college (ours was a five-year course, six subjects per semester and two semesters per year with countless exams and tests). After the exams, it was time to visit temples and pray to God to arrange the orals with Good, or at the very least, not with Ugly. After several days of suspense, my prayers were partially answered; my oral exams were to be conducted by Bad. When D-day came, I arrived at MMD, properly and immaculately attired with tie and all. The candidates' feelings before entering the surveyor's room can be only understood by persons of the Roman era who had to enter the circus in the coliseum where hungry lions would be waiting.

Even the waiting area in MMD sported a dejected, gloomy look of gladiators' waiting room. The tense, gulping, sweating candidates hardly talk to each other and would be busy referring to last-minute notes. When my name was called, I knocked, entered, and froze. I expected to see only Bad, but there was another smug, smirking gentleman with him. Those days, each surveyor's pet

questionnaire sets were available and I had prepared well for Bad's set. Bad waved at me to take a seat and told me that the apprentice surveyor (he didn't say 'apprentice') would be conducting the orals. This fellow was rubbing his hands in glee and could not wait to pounce on me. He must have been dreaming of this day, since his own II class exam days. He started bombarding me with questions and I started answering reasonably well. Then he started asking questions that were beyond my scope and his sneering, ridiculing way of conducting the orals was pushing my mind into numbness.

I wished this grilling would end and was mentally already preparing for my next attempt. Then Ugly walked in to discuss something with Bad and, before leaving, casually asked, 'How is this fellow doing?' Before Bad could answer, Junior replied, 'Not too good.' Bad gave a sharp, murderous look at Junior. Junior finally told me, 'I am sorry, you have—' 'Passed,' Bad cut in firmly. Junior's jaw dropped. 'But...' he was stammering. Ignoring him, Bad told me, 'Your written papers are very good. You have scored high marks. I think you know all the answers to the questions asked by the surveyor but you are too tense and worked up. I am passing you. You can go.' I thanked him, ran out, gave the attendant baksheesh, and did not hang around for a second longer. I hopped into a cab and rushed to Chembur to celebrate. Tailpiece: There was an unwritten cardinal rule, 'If the surveyor tells you, "Passed," don't hang around by thanking him and engaging in small talk and give him a chance to change his mind. Just blurt out "Thank you, sir" and vanish.' The background story is that once at office closing time, a surveyor passed a candidate. As they were leaving, it started to rain heavily. The candidate offered to drop him at his house. He dropped the surveyor at his home in his magnificent brand new car. During the ride, the surveyor had continued the orals, and when leaving the car, he thanked the candidate and told him that he had failed him and wished him better luck next time.

## TAKING DELIVERY OF A NEW SHIP

The irony or beauty of life is that a fall from the crest or a rise from the trough can be sudden, unexpected, and spectacular. One shipping company felt that I was a danger to shipping and warned all foreign shipping companies by blacklisting me in FOSMA. Within a short duration, one of the most prestigious companies in the world wanted, or rather insisted, that I take over delivery of a new ship from the yard.

My company was a management company and their role was limited to supplying qualified personnel to the owners of the ship. They must have lined up a few of their best chief engineers for this prestigious assignment but had to give in to the request of owners. Capt. Dev and I first went to Hong Kong for briefing, then to Tokyo to meet the top brass. That was one of the few occasions when I was attired in a suit. We were received with traditional and customary Japanese courtesy; they briefed us about various aspects. Though ISM Code concept was not even thought of, their vision and thinking was progressive and ahead of the times.

After briefing, we flew to Ulsan, South Korea. Since I was a vegetarian, I had a tough time. I managed to teach the cook to prepare vegetable fried rice and had the same diet for the next three weeks. We would go to the yard daily and observe the progress and report to HO. One super, Mr. Fuji was in charge of supervising shipbuilding. He must have been at least seventy-five years old but was extremely fit and agile. One day the lift had a breakdown in the yard. We climbed all the stairs to reach main deck and went down all the stairs to engine room and then into crankcase to inspect main bearings. While I was panting, he was not even out of breath. Ulsan shipyard was amazing. Those days they used to deliver fifty-two ships of all types in a year, which translates to delivery of one ship every week. Like kids building with blocks or grown-ups with a pack of cards, Koreans used to build ships with similar ease and lack of fuss. One day we would observe the superstructure of a ship in initial stages of fabrication. After a few days it would be already fitted on a ship. It was like magic. Only one welder would be working without helpers, operating a cherry picker on which he would be riding with a remote. Even our ship was being completed seemingly effortlessly.

Attending sea trials was a rich experience. In all ships, the sea trial records are the guiding factor or reference point for checks. I used to wonder if I would ever get a chance to be a part of the team during sea trials. It is physically demanding. Without respite, everyone wants you to witness their equipment's performance. Main engine's indicator cards would be taken, vibration levels would be

measured by another technician, noise level would be recorded by another, steering tests would be conducted. Class surveyors, Captain, and I were on our toes for more than twenty-four hours. Finally, Captain and I took a break and slept for a few hours. But, Japanese Technical Manager and his assistants stoically sat through the entire trials, never batting an eyelid, smoking and drinking black coffee. After we returned from sea trials, 2/E and C/O arrived. The 2/E was young, energetic and was to take over from me. He was tall, gangly, and unattractive (I am reluctant to use the word 'ugly', but small kids would have been frightened and cried if they saw him at close quarters). After he arrived, my workload reduced, as I found him taking interest and initiative. C/O was tall and handsome and a Casanova. Both have joined the office now. Finally the day of taking over arrived. Management companies are notorious for their cost-cutting techniques. The crew arrived two days before delivery. For the first few days, anyone will be confused in a new environment. It would take some time to reach mess, cabin, engine room, or bridge without getting lost. All stores, provisions, etc. arrived immediately after the crew came on board. One can imagine our plight in receiving and storing all items with a new crew. The problem was compounded by language barrier. The Bangladeshi crew understood very little English or Hindi. C/O was a Bengali and 3/E was Bangladeshi. So we somehow managed to confine confusion from escalating to panic or chaos.

Vice president of our company came with his entourage for the ceremony. Like in India, a pandal was erected on the jetty. Captain and I were resplendent in full uniform, black coats with epaulette stripes and caps. That was the first and last time I donned the coat. It was too bulky to carry to ship and you could not wear it for social occasions. We were seated on the dais. After the customary speeches, the champagne bottle was broken. Vice President went on a tour of the ship. I still have photographs of discussing some aspects with him in ECR. Electrical Officer brought coconuts from India, which we broke in the bridge wings and ECR entrance. After Vice President gave long blasts on ship's air horn, the ceremony was complete. There was a gala lunch afterwards. Superintendent kept murmuring in our ears that pilot was booked in two hours time, so not to have too many drinks, even though everyone kept offering toasts. We were told that the programme was aired live in Korea and Japan, as this was the first ship of that series, class, and design.

After lunch and farewells, the vessel sailed out. Service engineers and technicians shook hands and disembarked with pilot after breakwater. Now, we were on our own.



Though the ship was of UMS (unmanned machinery spaces) class, I decided to stick to watchkeeping for at least one round voyage. Taking delivery of a new ship is a very cumbersome, laborious, and challenging experience. How main engine and other equipment would perform later would largely depend on care taken during the initial running in period. The rpm should be increased very gradually; cylinder lubrication should be gradually reduced from maximum position to normal over the next few months, after observing liner condition at each port. I told 2/E to come the next day at 0400 hours and kept watch and monitored all equipment. My other assistants were a brand-new engine cadet, and 3/E. The first day was uneventful and smooth. The 2/E came at 0400 hours, but he did not come alone; he brought a disaster with him. He told me that he was feeling feverish and also had boils on his chest and torso. One look and I knew it was chickenpox. Immediately, I told him my diagnosis and told him to go to his cabin and not to talk to anyone or linger around in the mess or the bridge. I called Captain, told him about 2/E's condition. There was no option but to keep him in complete isolation, since chickenpox is highly contagious. I put accommodation A/C on fresh air. Until

ship reached Australia after two weeks, he was locked up. He had to wash his plates and clothes. Food would be kept outside his cabin and he would take it after steward left. He was bored to death and tears and was pleading to give him at the least some paperwork.

My life had become tough. I could not rely on the cadet, and though 3/E fortunately turned out to be reliable, I had no means of knowing that initially. For two weeks, I used to sleep in ECR and would leave engine room only for a shower, food, and sending messages. Since this was the first ship in its series, both shipyard and office wanted me to check many aspects and to report to them. Every day, twice I had to calculate BHP by taking indicator cards and fill up the format of engine performance. In addition, warranty claims had to be made for all deficiencies observed. Fortunately, all the equipment worked smoothly. I had a good sleep on a proper bed in my cabin, after 2/E was given a clean chit by the doctor in Australia. Again my efforts were highly appreciated. By the time I signed off, the number of warranty claims crossed 100. While the shipyard was unhappy, the owners and managers were jubilant, since they had leverage in the negotiations.



## Annual Meet 2019-2020 NOTICE

Dear Member,

The Mumbai Branch of the Institute of Marine Engineers (India), along with the Navi Mumbai and Gujarat Chapters, will be hosting its **Annual Meet on Saturday 11th January 2020, at the Mumbai Cricket Association premises, RG - 2, G - Block, BandraKurla Complex, Bandra (E), Mumbai - 400051 from 1900 hrs. onwards.**

Dress: Lounge Suit / National

For Further Details / Tickets / Advertisement/ Support, Kindly contact  
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**Mr. V K Jain**  
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**Mr. C R Dash**  
Chairman  
IME(I)-Navi Mumbai Chapter

## OBITUARY



### ARRACKAL THOMAS JOSEPH (F 65)

IME(I) deeply condoles the passing away of Mr. A. T. Joseph on the 21st of December 2019. Mr A.T. Joseph was born on 26th August 1923 in Trichur, Kerala. He joined the TS Dufferin around 1941 and graduated in 1945, just months before the end of World War II.

He was a junior Engineer with Scindia's from around 1945 (5th Engineer) to about 1956 when he became Chief Engineer. He subsequently went ashore as a Superintendent initially based in Calcutta before transferring to the UK-London office in 1958 as one of Scindia's UK superintendents. He returned to India around 1963 as Superintendent in Scindia's Bombay office. He then joined SISCO's at inception, whilst in Bombay before shifting to their new HQ in Chennai around 1964. He was Operations Manager and then GM till he retired in 1987. To this day many of his SISCO staff remember him fondly as a visionary leader and mentor whose values, brilliance and commitment have had a very positive impact on them as people and in their career success.

Mr. Joseph was the second President of IME(I) and was actively involved with the setting up of IME(I) branch right from its inception - a very commendable achievement overcoming many challenges faced at that time. As a founding member he had great pride in watching it grow and increase in influence over the years. He was part of the Govt. of India shipping delegation to IMCO (Inter Governmental Consultative Organization) now known as IMO-International Maritime Organization. He was also a member of INSA (Indian National Ship-owners Association) and played lead roles at various times over the years. He was a passionate mariner at heart and undoubtedly a senior figure in the Indian Shipping Industry.

Mr. Joseph is survived by his wife Mrs. Manorama, daughters Ann, Lucie, Marie and son Thomas Joseph.



# The Institute of Marine Engineers (India)

Promoting Knowledge - Building Relationships

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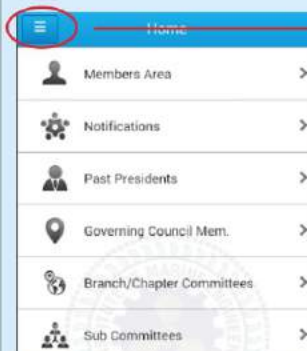
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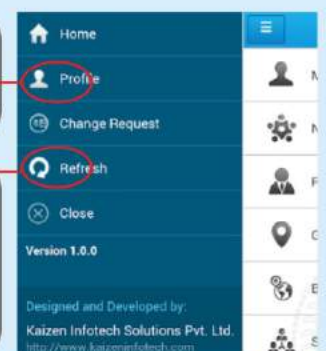
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*Cover Picture shows the Vishakhapatnam Container terminal, shot on location by Award Winning photo journalist Prabal Mohanty. Prabal's photographs are usually of industrial sites and has adorned many industrial houses and government offices. He has also sailed as a Chief Engineer on board ships.*