



ISSN 2250 - 1967

# MARINE ENGINEERS REVIEW (INDIA)

VOLUME 13 ISSUE 5 JOURNAL OF THE INSTITUTE OF MARINE ENGINEERS (INDIA) April 2019

₹50/-

## holi at sea - paint scheme



INSIDE

- 09 A Case for Convergence: Shipbuilding in India
- 11 Marine Emissions, Pollution & the Indian Maritime Landscape
- 24 Maritime Forecast to 2050/Designing a Carbon Robust Ship



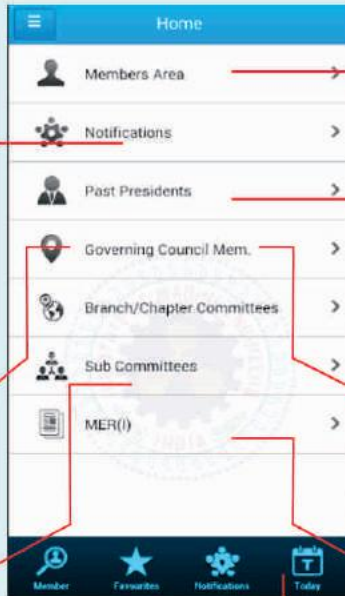
# The Institute of Marine Engineers (India)

Promoting Knowledge - Building Relationships

## IME iConnect

Mobile App for Effective Communication Within the IME(I)

Broadcasting events and/or announcements to the members (e.g. AGM or Technical seminar Notice etc.) with provision for RSVP response.



Easy search for IME(I) Members by Name, Branch / Chapter, Grade or Membership Number

Read the names of all the past presidents of the institute

Know the current office bearers of your branch or chapter

Read the monthly technical journal Marine Engineers Review (India)

Connect with current members of the governing council

Know the current members of the sub committees

Search for birthdays of members in your branch

### Downloading The IME iConnect App

#### iPhone users :

Go to iTunes and search for the IME iConnect App. Continue to download and install following the instructions. You may also feed in the following url into your phone browser:

<http://tinyurl.com/iphoneime>

#### Android users :

Go to playstore and search for IME iConnect App. Continue to download and install following the instructions. You may also feed in the following url into your phone browser:

<http://tinyurl.com/andime>

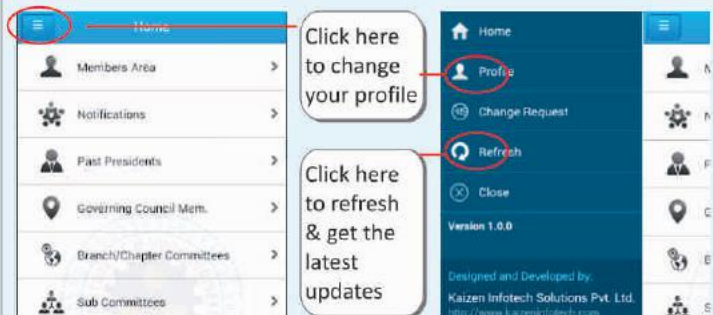
### How secure is the data in IME iConnect ?

IME : iConnect respects the privacy of every member and take utmost care to protect it. The data is highly secure and the app can only be enabled on a phone through a registered member user. Whilst downloading you will be sent a one time password on your registered mobile number, which would then enable you to download the members data on your phone. This ensures access to only respective member using their valid mobile number.

Additional advanced privacy features are available like the option to disable / enable the display of email address and mobile contact if so desired by the member.

### Making changes in your profile

It is probable that you may wish to update your data in the app once you download it. This can be done by a "Change Request" - a feature that is available within the app itself. You may also enable / disable personal details e.g. your phone no. & email id. This can also be done in the same manner.



Click here to change your profile

Click here to refresh & get the latest updates

**Help Line :** Drop an email to 'imeconnect@imare.in' with your problem. Alternatively ring up 41516999 (PIC Mr. Sagar Markal) or IMEI Nerul on : 27706749 / 27701664 (Membership Team / Mr. Shetkar) for quick solution.

### THE INSTITUTE OF MARINE ENGINEERS (INDIA)

"IME(I) House", Plot No. 94, Sector 19, Nerul, Navi Mumbai - 400 706, Tel. : +91 22 2770 1664 / Fax : +91 22 2771 1663  
 Email : [administration@imare.in](mailto:administration@imare.in) / [accounts@imare.in](mailto:accounts@imare.in), [membership@imare.in](mailto:membership@imare.in) / [training@imare.in](mailto:training@imare.in)

# ANGLO-EASTERN MARITIME TRAINING CENTRE

**AEMTC MUMBAI:** 50, Karmayog Bldg., Parsi Panchayat Road,  
Near Sona Udyog, Andheri (E), Mumbai - 400069  
T. +91 22 6720 5600 | F. +91 22 2683 7008  
aetr.bom@angloeastern.com  
Capt. K. N. Deboo, Mr. Francis Akkara, Mr. Ivor Wilson

**AEMTC DELHI:** A- 101, Dayanand Colony  
Lajpat Nagar - 4, New Delhi - 110 024  
T. +91 11 2642 6801 / 802 / 2647 2831 / 2647 1129  
aemtcdelhi@angloeastern.com  
Capt. Prashant Gour, Ms. Sukhjeet Kaur

[www.maritimetraining.in](http://www.maritimetraining.in)

MAN | PrimeServ



Courses at Mumbai

## ME-C Control System Standard Operation



April 2019 : 01 - 05, 22 - 26    May 2019 : 06 - 10, 13 - 17    June 2019 : 03 - 07  
July 2019 : 08 - 12, 15 - 19    August 2019 : 05 - 09, 19 - 23, 26 - 30

### ME-C Electrician Standard Maintenance

June 2019 : 11 - 14  
October 2019 : 15 - 18

### ME-B Control System Standard Operation

September 2019 : 03 - 06

### Four-Stroke Holeby Classic Engine Standard Operation

June 2019 : 17 - 21  
September 2019 : 30 - 04 Oct

For bookings: [PrimeServ.academy-cph@man-es.com](mailto:PrimeServ.academy-cph@man-es.com)



## Approved Courses

### High Voltage [DELHI] Operational & Management Level

22 - 26 April 2019

### Advanced Training for Oil Tanker Cargo Operations (TASCO) [DELHI]

12 - 16 April 2019

### Advanced Training for Gas Tanker Cargo Operations (GASCO) [DELHI]

15 - 20 April 2019

### Advanced Training for Chemical Tanker Cargo Operations (CHEMCO) [DELHI]

29 April - 04 May 2019



PROCESS INSTRUMENTATION



ENGINE ROOM MGMT



MARFLEX PUMP SYSTEM  
(ON REQUEST)

## D. G. Approved Competency Course



### MARINE ENGINEER OFFICER CLASS-II (FG)

AEMTC - Mumbai  
1st April, 1st June 2019

AEMTC - Delhi  
1st May, 1st July 2019

1st in India and 2nd in the world to receive distinction by DNV SeaSkill Benchmarking



## ENGINEERING TRAINING FACULTY REQUIRED AT IMTC

### A CAREER OPPORTUNITY IN THE FIELD OF MARITIME TRAINING

If you are a holder of a **Class 1 (MOTOR) COC** and have a strong drive towards academic development, then IMTC invites you to apply for the position of **Training Superintendent**. Good communication skills, a pleasant classroom demeanour, a firm belief in the value of training, and above all, a positive attitude to learning, are the basic pre-requisites for this position. Work hours are well-regulated, and the work environment is among the best in the maritime training sector.

#### Preferences:

- Experience on **Tankers** and/or **Gas Carriers** as **Chief Engineer** or **Second Engineer**.
- Experience on the **camshaft-less ME type Main Engines**.
- A commitment of **at least four to five years** is desired.
- Age, not more than **55 years**.

#### Additional Preferences:

- Completion of Course in 'Training for Trainers & Assessors'

Please apply to "Head of the Training Centre", IMTC with your bio-data  
OR

Send by e-mail at [imtc.mumbai@wilhelmsen.com](mailto:imtc.mumbai@wilhelmsen.com)

Last date of application: 30<sup>th</sup> April, 2019



**International Maritime Training Centre**

*A division of Wilhelmsen Ship Management (India) Pvt. Ltd.  
201, SIGMA, Hiranandani Gardens, Powai, Mumbai - 400 076.*

Tel: +91 22 2570 5570 Fax: +91 22 2570 5547 Email: [imtc.mumbai@wilhelmsen.com](mailto:imtc.mumbai@wilhelmsen.com) Website: [www.imtcmumbai.org](http://www.imtcmumbai.org)

## NAUTICAL TRAINING FACULTY REQUIRED AT IMTC

### A CAREER OPPORTUNITY IN THE FIELD OF MARITIME TRAINING

If you are a holder of a **Master Mariner COC** and have a strong drive towards academic development, then IMTC invites you to apply for the position of **Training Superintendent**. Good communication skills, a pleasant classroom demeanour, a firm belief in the value of training, and above all, a positive attitude to learning, are the basic pre-requisites for this position. Work hours are well-regulated, and the work environment is among the best in the maritime training sector.

#### Preferences:

- Experience on **Tankers** and/or **Gas Carriers** as **Master** or **Chief Officer**.
- A commitment of **at least four to five years** is desired.
- Age, not more than **55 years**.

#### Additional Preferences:

- Completion of Course in 'Training for Trainers & Assessors'

Please apply to "Head of the Training Centre", IMTC with your bio-data  
OR

Send by e-mail at [imtc.mumbai@wilhelmsen.com](mailto:imtc.mumbai@wilhelmsen.com)



**International Maritime Training Centre**

*A division of Wilhelmsen Ship Management (India) Pvt. Ltd.  
201, SIGMA, Hiranandani Gardens, Powai, Mumbai - 400 076.*

Tel: +91 22 2570 5570 Fax: +91 22 2570 5547 Email: [imtc.mumbai@wilhelmsen.com](mailto:imtc.mumbai@wilhelmsen.com) Website: [www.imtcmumbai.org](http://www.imtcmumbai.org)



## Editor's Desk

*This issue of the MER could be a point of inflexion in so far as the contents are concerned. We usually discuss technology or merely voice opinions. We rarely issue strategic outlooks nor publish policy statements with reasonable certainty that it will be implemented.*

*However two major classification societies, LRS and DNV-GL have made available their reports which give a very detailed road map in the way future ships will be built and operated. We were also given a policy paper written by Vikrant Rai on behalf of the DG Shipping. When think-tanks of our industry give such clear road maps we have to stand up and take notice.*

*The Report on 'Energy Transition Outlook and the Maritime Forecast 2050' by DNV-GL is truly a landmark report. It shows the shift in technology and gives a very clear indication on how the maritime cluster can invest. It's a fine report to be downloaded and studied in detail by our readers. I have published a mind map for our readers to quickly scan its contents. Some excerpts from the report are also published. The paper titled 'Marine Emissions, Pollution and the Indian Maritime Landscape' reveals the angst of the policy making bodies. As India marches towards becoming the 5th largest Economy in the world we have a merchant fleet whose size is worrisome. There is also serious concern expressed that in 3 years time 80% of Indian owned vessels will be more than 20 years old.*

*Our series on the Indian Maritime landscape written by 'Shesh' continues and this time the focus is on Shipbuilding. Manu Singh's article on the advantages of electrical propulsion for inland and coastal shipping is an idea for serious thought.*

*Finally I would urge our readers to read the interview with Mr Brede Olsen. Project Engineer for the Kongsberg make K- Sim® Full Mission Engine Room Simulator installed at IMEI House, Nerul, Navi Mumbai. It will give maritime training a boost.*

*The cover water colour cartoon is drawn by sailing chief engineer Bipin Pradhan. While certainly 'inspired' by an old Jan Sander's original I hope readers like it for its sheer creativity.*

*With China slowing down, US having low growth and predictions that both Germany and Italy has a looming recession, it is expected that 2020 may find India in a position to grow rapidly. Hope this edition helps us to prepare for growth!*

Happy Reading!

**Hrishikesh Narasimhan**

Honorary Editor

[mereditorial2018@gmail.com](mailto:mereditorial2018@gmail.com) / [editormer@imare.in](mailto:editormer@imare.in)

+91 99625 62263



## The iCOlube® Pioneering Technology

LUKOIL iCOlube		SPC 11-43-05
Quantity	400 L	MANUAL
BN Specific Feed Rate	28	
Required Feed Rate at Lubric.	0.85 g/kWh	
Base number A	70 mgKOH/g	
Base number B	6 mgKOH/g	
Concentration Oil A	54.0%wt	
Fuel sulfur content	0.8 %	

TREND FLOW VIEW DATA COUNTER LOG SERVICE

Tailors the base number to the prevailing engine load and fuel sulfur content.

LUKOIL Marine Lubricants

**MARINE IN ALL WE DO!**

Oceanic Lubes  
India Representative for  
LUKOIL Marine Lubricants  
Tel.: +91 22 2781 0406  
Tel.: +91 22 6673 5319  
email: [oceanic@lukoil.com](mailto:oceanic@lukoil.com)



## MARINE ENGINEERS REVIEW (INDIA)

JOURNAL OF THE INSTITUTE OF MARINE ENGINEERS (INDIA)

### Administration Office

IMEI House  
Plot No. 94, Sector - 19, Nerul,  
Navi Mumbai 400 706.  
Tel. : +91 22 2770 16 64  
Fax : +91 22 2771 16 63  
E-mail : editormer@imare.in  
Website : www.imare.in

### Editor

Mr Hrishikesh Narasimhan

### Editorial Board

Mr V. Sheshashayee  
Mr Girish Sreeraman  
Dr. Piyush Raj  
Mr M. Satiyamoorthy  
Ms. Rashmi Tiwari (Sub-editor)

### Disclaimer:

Papers and articles have been included in this Journal largely as submitted, with basic editing and formatting only, and without technical peer review. The Institute of Marine Engineers (India) does not take any responsibility whatsoever for any statements and claims made in these papers and articles for the quality, accuracy and validity of data presented or for any other contents. Inclusion of papers, articles, and advertisements does not constitute any form of endorsement whatsoever by The Institute of Marine Engineers (India).

Printed, Published and Edited by  
Mr Hrishikesh Narasimhan on behalf of  
The Institute of Marine Engineers (India).  
Published from 1012 Maker Chambers V,  
221 Nariman Point, Mumbai - 400 021, and  
printed from Corporate Prints, Shop No.1,  
Three Star Co-op. Hsg. Society, V.P. Road,  
Pendse Nagar, Dombivli (E) - 421 201.  
District - Thane

Designed by : Mr Gaurav Kulkarni

# MER-(I) CONTENTS

## Articles

- 
- 09 **A Case for Convergence : Shipbuilding in India**  
- Venkatraman Sheshashayee
- 11 **Marine Emissions, Pollution & the Indian Maritime Landscape**  
- Vikrant Rai
- 20 **Maritime Forecast to 2050/ Energy Transition Outlook 2018**  
- **Executive Summary**  
- Courtesy DNV-GL
- 24 **Maritime Forecast to 2050/Designing a Carbon Robust Ship**  
- Courtesy DNV-GL
- 29 **Transition to a Renewal based future**  
- Manu Singh

## Education, Safety, Environment & Business

- 
- 32 **Fearnleys Market Report**  
- (Published with permission)

## Events

- 
- 37 **IME(I) Branch News**
- 40 **Press Release**
- [a] Honouring the Author
  - [b] Full Mission Engine Room Simulator installed at IME(I)'s Training Centre
  - [c] Press Release ISF Institute of Research and Education

## The Learning Engineer

- 
- 45 **Learning to Learn - Experiential Learning**  
- Debabrata Pattrea

## Interview

- 
- 48 **Interview with Brede Olsen Simulator Expert**

- 
- 50 **Obituary**  
Shri Kalyan Bhattacharya



## HINDUSTAN INSTITUTE OF MARITIME TRAINING

11, Millers Road, Kilpauk, Chennai - 600010

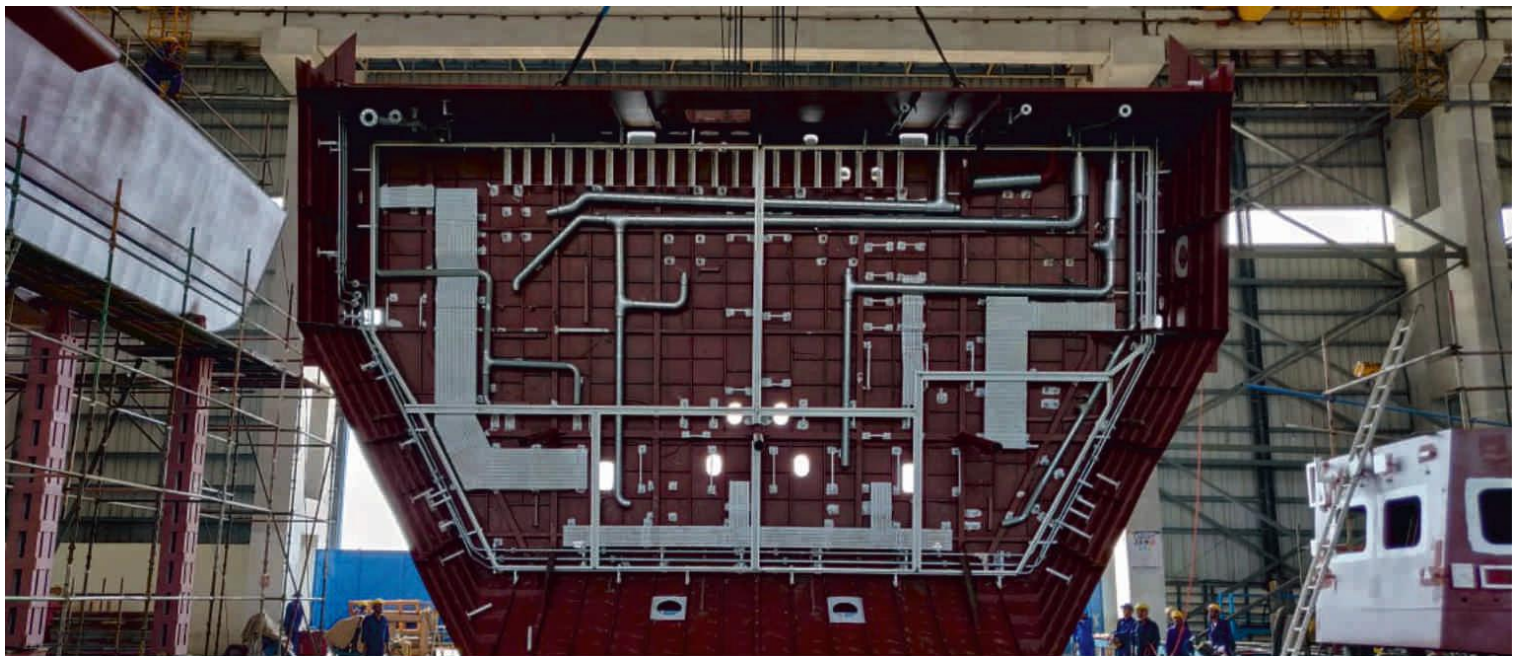
Visit [www.himtmarine.com](http://www.himtmarine.com) for online booking



### Following D.G.Shipping Approved courses in the Heart of Chennai

Courses	Days	Fee
<b>Simulator Courses</b>		
High Voltage Course (Management Level)	5 Days	14900
High Voltage Course (Operational Level)	1 Day	3900
Liquid Cargo Handling Simulator - Management Level Course [LCHS]	5 Days	11900
Diesel Engine Combustion Gas Simulator - MEO Class-I (DECGS)	3 Days	8900
Engine Room Simulators - Operational Level-MEO Class IV (ERS)	3 Days	4900
Engine Room Simulators - Management Level-MEO Class IV (ERSM)	5 Days	9900
Global Maritime Distress Safety System (GMDSS)	12 Days	19900
Electronic Chart Display and Information System (ECDIS)	5 Days	12900
<b>Revalidation &amp; Upgradation Courses</b>		
Marine Engineer Officer (REO) Revalidation of Certificate of Competency	3 Days	6900
Bridging Course for Existing Electrical Officers to ETO (BETO)	16 Days	41900
Refresher course for AFF & Refresher Course for PSCRB	2 Days	11800
Refresher course for Medical First Aid (RMFA)	1 Day	2900
Refresher course for Medical Care (RMC)	1 Day	3900
Refresher Course for FPF (RFPF) & Refresher Course for PST (RPST)	2 Days	3800
<b>Advanced Courses</b>		
Medical First Aid (MFA)	4 Days	4900
Advanced Fire Fighting (AFF)	6 Days	8900
Proficiency in Survival Craft & Rescue Boats (PSCRB)	5 Days	9900
Ship Security Officer (SSO)	3 Days	4900
Advanced Training for Tanker Operations (TASCO / CHEMCO / GASCO)	10 Days	11900
Advanced Passenger Ships Safety Course (APS)	5 Days	12900
<b>Basic Courses</b>		
Basic Safety Training (STCW Courses- PST, EFA, PSSR and FPF)	11 Days	11600
Security Training for Seafarers with Designated Security Duties (STSDSD)	2 Days	2900
Tanker Course Combined(Oil & Chemical) (TFC-C)	6 Days	4900
Passenger Ship Familiarization (PSF)	3 Days	3900
<b>Competency Courses</b>		
2 <sup>nd</sup> Mate Function - 31900; Chief Mate PH1 - 39900; PH2 - 44900; ASM - 31900		
MEO Class I (EM) - 31900; MEO Class-II (PCT) - 39900		
<b>HIMT offers Loyalty Discount up to ₹3000/- to all their Ex-Students</b>		





A hull block being turned at an Indian Yard.

# A CASE FOR CONVERGENCE : SHIPBUILDING IN INDIA

5th in the series of articles on the Indian Maritime Sector

- Venkatraman Sheshashayee



*In this series, we first discussed the need for an integrated vision for or approach to shipping, shipbuilding, maritime and multi-modal logistics for India. We also discussed the need for an economic and business case for each of the sectors of shipping / maritime, with the objective of driving home the point that India needs a singular, holistic policy for this sector, with the objective of achieving national security, economic independence and globally benchmarked efficiency and productivity levels.*

*This article will seek to evaluate the business case for shipbuilding in India.*

Let us start with extracts from a speech made by Mr. Nitin Gadkari, Union Minister of Shipping, in late 2018 : "...India has a long way to go in terms of its share in global ship making sector..."

"...India has a meagre contribution as far as the global share in ship making sector is concerned. "South Korea, China and Japan together have 92 per cent share in the shipbuilding sector. India has 27 commercial shipbuilding yards and 30 plus dry docks. But our share in global shipbuilding sector is less than 1 per cent. Shipbuilding in

India has a turnover of around Rs 3,200 crore..."

"...Andaman and Nicobar have to take their ships to China for repairs. Our shipbuilding and repairing sectors are in a critical condition..."

Now, let us step briefly into the past. Indian shipbuilding has existed since the times of Harappa and Mohenjo-Daro. The Rig-Veda documents the various parts of a vessel. Shipbuilding has also been documented in the Arthashastra. It is recognised that the shipbuilding industry in India contributed to the nation's maritime trade for thousands of years, allowing Indians to journey across the oceans to the Middle East, to Africa and to South East Asia, dominating both trade and trade routes.

## What happened between then and now?

The easiest (and most emotive) answer is to blame invasion and colonisation and nationalisation. There is truth in this, but only upto a point.

A more rational analysis, however, reveals the real reasons - sub-optimal

policies, inadequate infrastructure, negligence, complacency.

## A few examples -

**Duties :** till very recently, ships could be imported into India at almost negligible rates of basic customs duty (BCD) and nil rates of countervailing duty (CVD). However, the inputs used in ship manufacturing and repair attracted normal rates of BCD and CVD - leading to a huge costs disadvantage for Indian shipbuilders, ranging between 8-23%.

**Finance costs :** Indian shipyards have to pay interest rates of 11-14% on capital borrowed and on working capital loans. China and South Korea pay less than 5%. On large projects with long gestation periods, this differential interest cost can add up to more than 15% additional burden on Indian shipbuilders.

**Logistics costs :** transportation in India can add upto 16-18% of total cost, against 4-6% in Korea, Japan and China. These costs, in a process which requires thousands of tons of steel, piping and equipment add a further inescapable burden, which has to be passed on to the unwilling customer.

Cash-flow management : in the past two years, three of India's private yards – ABG Shipyard Ltd, Bharati Shipyard Ltd and Pipavav Defence and Offshore Engineering Co. Ltd – went into corporate debt restructuring as poor cash flows and the lack of new orders constrained their ability to repay loans.

No wonder then, that all Indian fleet owners choose to place orders for new ships at global yards, leading to Indian yards lying idle, losing money, people and knowledge.

Having said this, in the last few months, the Indian Government has unveiled a more rational policy for shipbuilding and repair. The main features of the policy includes granting financial assistance to shipbuilders—both state-owned and private—on each ship they build. The government has set aside ₹ 4,000 crore to implement the scheme over 10 years. The policy also gives a so-called right of first refusal to Indian shipyards for government purchases. It means that even if they are not the lowest bidder, an Indian yard can match the lowest foreign bid and secure the contract. The cabinet has further granted infrastructure status to the shipbuilding and ship repair industry, with attendant tax benefits. The inputs used in ship manufacturing and repair have been exempted from customs and central excise duties. In a related move, the government is modifying a cargo support policy so as to give first preference to ships that are manufactured and registered in India to move cargo on local routes (earlier, such preference was given to Indian-registered ships but not necessarily built in India).

These changes are welcome and are expected to have a positive impact, and will indeed counter some of the cost disadvantages compared with Japan, South Korea and China. However, the target that Ministry of Shipping has set for itself, to achieve a 5% share of the global shipbuilding market by 2020, seems unrealistic and is unlikely to be achieved.

While the timeline may be unrealistic, the ambition makes sense. The growth of domestic shipbuilding can provide a major trigger for large scale indigenization of heavy engineering products and ancillaries. It can trigger investments of upto INR 2,200 billion in related sectors. It can generate employment of anything between 400,000 – 2.4 million additional jobs. It can attract and retain foreign investment, talent and IP to the betterment of our country's value chains.

#### **What does the Indian shipbuilding sector need?**

Some of the measures that countries like China and South Korea have employed to support and reinforce their shipbuilding industry include:

- Direct subsidies against contract prices.
- Provision of refund guarantees.
- State-funded innovation to develop ship design, shipbuilding technology or shipyard production expertise.
- Working capital finance on subsidised interest rates or interest-free loans, underwriting debt to reduce the commercial risk.
- Preferential tax schemes.
- Exchange rate control for shipyards (one of the key risk factors).
- Incentives to ancillaries such as steel manufacturers, engine builders or equipment suppliers.

#### **Other measures that may be used to enhance the productivity and efficiency of the industry are:**

- Pre- and on-the-job training, especially in areas such as design
- Process technology – integrated project management, procurement, cost management
- Enhanced equipment and infrastructure
- Direct imports into shipyards
- Alliances with more experienced and capable shipyards

So, we come back to the need for an

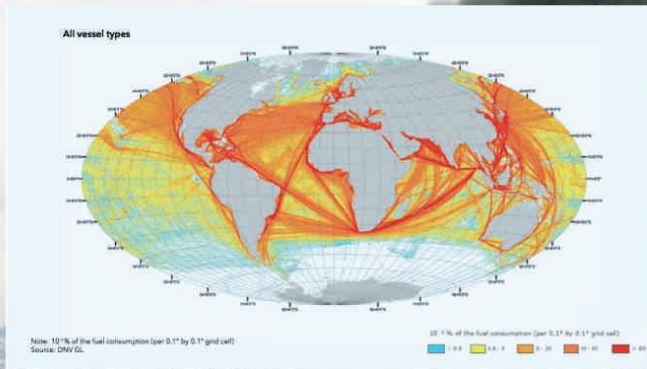
integrated policy. One that enhances operational freedom, uses regulations to deliver competitive advantage, incorporates technology and levels the playing field. Once again, any policy must promote and encourage investment in and growth of the entire maritime sector, thus building a self-sustaining framework that will become a bulwark of the Indian economy.

India's journey down this road has recently taken a positive turn. We need to continue transforming and quickly, to unfold a comprehensive and holistic policy for the entire sector, one that transcends centre and state, public and private, commercial and government, that will throw open the gates to growth and glory.

I will re-state my usual caveat - this article is not exhaustive. It is meant to provoke thought, dialogue and readers' contributions.

**About Author : Venkatraman Sheshashayee ("Shesh") currently manages Radical Advice, an advisory group that focuses on transforming businesses and professionals, and helping them achieve their potential. Shesh has more than 34 years' experience at sea and on shore. He has worked in shipping, manufacturing, services and offshore logistics. He has extensive experience in building greenfield companies and turning around distressed companies. He has served as CEO/MD for over 10 years in three companies. He serves on the Editorial Committee of MER(I) and is a regular contributor.**





# Marine Emissions and Pollution and Indian Maritime Landscape

- Vikrant Rai

**Introduction** :Leading economists have predicted that the oceans contribution to global economy is going to increase in this century and oceans are likely to become one of the world's main economic forces in this frenetically changing, modern world. As per WWF report 2015, oceans generate goods and services worth at least \$2.5 trillion each year, while their overall value is ten times that figure. If oceans were a nation, it will rank amongst the first 10 biggest economies in the world. However, there is nothing more certain than that the world will continue to change but ocean is changing faster than at any other given point of time in years that have been passed due to the ever-increasing exploitation of ocean resources for economic growth. There is a possibility that we may push many ocean systems beyond the point of no return, seriously constraining options for our children and for generations to come.

Shipping and the larger maritime industry which includes ports are vital to this ocean-based economy. The transportation of passenger and goods facilitate many other industries such as oil and gas, fishing, tourism etc. and ports will continue to be the gateways between the land and sea. India is one of the fastest growing large economies in the world with a GDP growth rate of 7.5% in 2015-16 and maritime transport industry play an important role in the overall economic development of the country. Approximately 95 % of India's merchandise trade (by volume) passes through sea. Although waterborne transport is much safer, cheaper and cleaner, compared to other modes of transportation, it accounts for less than 6% of India's modal share. By comparison, coastal and inland water transportation contribute to 47% of China's freight modal mix, while in Japan and US, this share is 34% and 12.4% respectively. Significant savings can be achieved by

shifting movement of industrial commodities like coal, iron ore, cement and steel to coastal and inland waterways. Government of India (GOI) is pushing for a modal shift of cargo from road to water in order to decongest roads and reduce cost of logistics and plan to achieve 10% share of water transport by 2020.

Further cruise tourism is being promoted to boost India's economic growth and generate employment. To promote coastal shipping, the GOI plans to enter into agreement with her neighbours and has already entered into a coastal shipping agreement with Bangladesh wherein sea transportation from Indian ports to Bangladesh ports and vice-versa are being treated as coastal movement, making it eligible for 40% concession on vessel and cargo related charges. Treatment of short sea shipping as coastal movement reduces the operational cost of the vessels due to the lower constructional, equipment,

manning and survey requirement without affecting safety of the vessel.

In order to fulfil GOI vision of enhanced use of ships for transport of goods, promotion of tourism and enhanced contribution from blue economy to Indian GDP, it is essential that the landscape of maritime transport is sustainable in the long term and that its effect on coastal environment is minimal. The purpose of this paper is to enlist the efforts under taken by GOI to provide a sustainable maritime transport by providing a view of maritime landscape of India, the international marine pollution regulatory mechanism and policy initiatives by the Directorate General of shipping to minimize adverse effect on coastal environment and communities due to pollution from ships.

**Marine Pollution and International Regulatory Mechanism:**

**Air Emissions**

Ship generates pollutants while at sea and in port and discharge operational waste at sea, though in a controlled rate yet it has a direct impact on biosphere. The main pollutants are sulphur dioxide, carbon dioxide, nitrogen oxides and various kinds of particulate matter. Distinction is made between greenhouse gas emissions (GHG) and other emissions. GHG results in climate change and affect stratospheric ozone layer, with resultant global impact, whereas non-GHG emissions generally have more local impacts. It is estimated that about 15 % of the anthropogenic NOx emissions and 7 % of the SO2 emissions are due to shipping. Although shipping is regarded as a relatively eco-friendly form of transportation, emissions can be significant in areas with heavy ship traffic.

Emissions to air are regulated by Annex VI in MARPOL (the International Convention for the Prevention of Pollution from Ships), to which India is

a signatory, and rulemaking power conferred to central government by the Merchant Shipping Act, 1958 through the Merchant Shipping Rules to regulate such operational discharges to ensure discharges are in accordance with the stipulated requirements. The Rules and Regulations seek to minimize airborne emissions and their contribution to global air pollution and environmental problems.

**Marine Litter**

Ships generate waste such as oily wastes, sludge, sewage and garbage and cargo residues during loading and unloading operations. The type and quantity of wastes generated depend on various factors such as the type and size of the ship, the duration of the journey, the number of crew on board, the speed of the ship, the type of fuel and the waste management practices on board. Globally, it was estimated in 1982 that 8 million items of marine litter entered the world's oceans and seas every day, of which 5 million items were thought to be thrown overboard or lost from ships (UNEP, 2009). However, year on year the quantity of marine litter is increasing (UNEP, 2011).

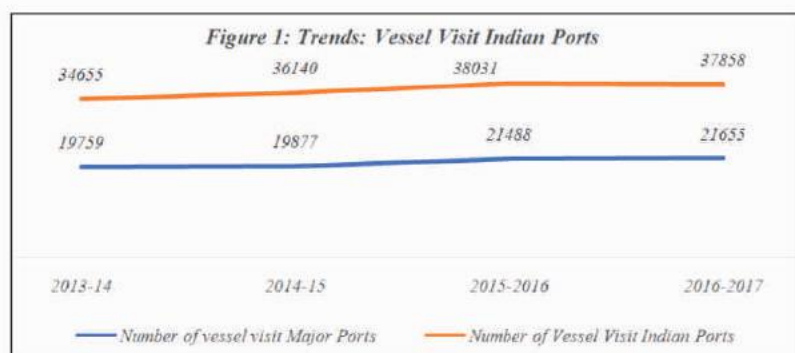
A report (Plastic debris in the coastal and marine ecosystem: a menace that needs concerted efforts) by A. Vennila, H. B. Jayasiri and P. K. Pandey published in the International Journal of Fisheries and Aquatic Studies 2014 has stated that ocean and waterways activities account for 8.5% of all coastal debris. MARPOL prohibits

discharge of many of these wastes and to prevent dumping at sea puts an obligation on contracting parties to provide reception facilities for these wastes in their ports. However, inadequacies in the provision of port reception facilities often result in these wastes ending up at sea/oceans. The impact of these discharges is well known, ranging from chemical pollution, which may affect the acidity of the ocean waters or add chemicals into the food chain, subsequently affecting marine life and human health, to the death of marine life as non-digestible, non-degradable debris and plastic is eaten by marine animals by mistake. Marine litter can also affect both the natural and economic value of the shoreline. Under Merchant Shipping Act, 1958 the ports are obligated to provide port reception facilities.

**Maritime Landscape of India:**

**Emission Statistics Data and Analysis:**

At present there is no collated firm data available as to number of ships touching Indian ports (both major and non-major). Following data is interpolated from "Basic Port Statistics: 2016-2017" published by Ministry of Shipping and information from Indian Port Association to estimate the number of vessels visits in minor ports of India by extrapolating the cargo handled (major and minor ports respectively) data available in "Basic Port Statistics" and number of vessels visit in Major ports of India. The data is analysed to estimate emission



inventory and performance of Indian port state control measures and will also be used to analyse the ways and means for reducing pollution from ships in Indian territorial waters. (Table 2)

Most scenarios for shipping towards 2050 predict significant growth in the demand for seaborne trade and a corresponding growth in the world fleet. As per a report of the National Transport Development Policy Committee, India's cargo traffic handled by ports is expected to reach 1.695 million metric tonnes by 2021-22. Based on these statistics and considering that 37500 vessel-visits handled 1100 Million MT of cargo from/to Indian ports, it can be roughly estimated that there will be about 57000 vessel-visit in Indian ports by 2021-22, thereby increasing the estimated fuel consumption in Indian ports to 2, 50,000 metric-tonnes. Below is a study of vessels registered in India and plying on Indian coast (Table 3)

Foreign vessels coming to India are verified for compliance to MARPOL and other requirements once in six months. In order to ensure that sub-standard ships do not operate in the region, many countries in the Indian Ocean have collaborated via a MOU wherein all ships visiting this region (that is any country in the IOMOU) are inspected once in six months. Statistics of these inspections is used to calculate emission compliances based on the date of build of ships touching Indian ports. Details of port state inspection statistics in IOMOU region for the calendar years 2013 - 2017 is given below (Source: IOMOU) (Table 4)

A look at the tables gives following narrative about NOx emissions in Indian coastal regions:

i) Inferring from port state inspection statistics, it is estimated that about 55-60% of all the foreign registered vessels leaving/coming from/to Indian ports

Number of Vessels which sailed out from Major Ports	Total Cargo handled in Indian Ports	Percentage of total cargo handled by major ports	Percentage of total cargo handled by other ports	Estimated number of vessels which sailed out of non-major port based on cargo handled	Estimated total number of vessels which sailed out of Indian ports
21655	1100 Million MT	57%	43%	16000	37858

Table 1: Estimation of Vessels which sailed out of Indian Ports in 2016-2017; Source: Basic Port Statistics of India, 2016-2017; Transport Research Wing, Ministry of Shipping, GOI; <http://shipmin.gov.in/showfile.php?lid=2687>

Average turn-around time in Indian Ports	Pre-berthing detention time	Average time in port per vessel	Total fuel burned in Indian ports in 2016-2017 taking into consideration that each ship runs a 400KW diesel generator which consumes 2 tonnes of fuel per day (Conservative basis)
3.48 days	1.27 days	2.21 days	37858 x 2 x 2.21 = 1,66,000 Tonnes In port area considering pre-berthing detention time = 2,61,000 Tonnes

Table 2: Estimated fuel oil burned by visiting ships in Indian ports

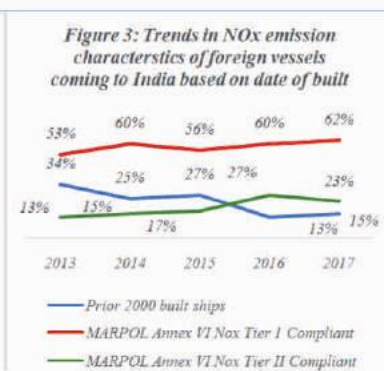
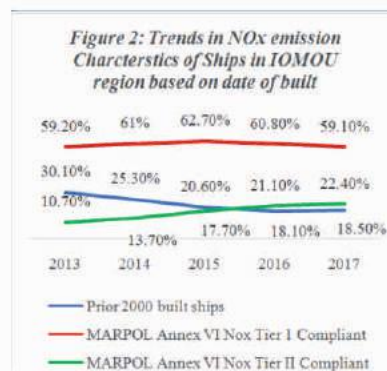
Total number of vessels	Vessels built on/after 1 January 2011 (Before entering of MARPOL NOx Tier II compliance)	Vessels built on/after 1 January 2000 but prior 1 January 2011	Vessels more than 20-year-old (Before entering into force of IMO NOx Tier I compliance)
934	185	277	472

Table 3: Approximate figures of coastal vessels registered in India

Source: As on 31.12.2017; Directorate General of Shipping; [http://dgshipping.gov.in/WriteReadData/UserFiles/file/Monthly\\_tonnage\\_statement\\_310718.pdf](http://dgshipping.gov.in/WriteReadData/UserFiles/file/Monthly_tonnage_statement_310718.pdf)

Year	2013	2014	2015	2016	2017
Number of ships inspected built prior to 1 January 2000	2064	2032	1808	1485	1431
Number of ships inspected built between 1 January 2000 and 1 January 2011	4053	4892	5495	4978	4561
Number of ships inspected built after to 1 January 2011	734	1101	1454	1727	1725

Table 4: Determining year of built of vessels inspected under Port State Control in IOMOU region



are less than 10-year-old. As per IMO, after 2008, the operational efficiencies of ships have increased by 30% and thus lower emissions of GHG and non-GHG pollutants. Further about 80-85% these vessels are built after 2000 and thus either IMO NOx Tier I or II compliant and thus emits lesser amount of nitrogen-oxides. This is a measure of success of port state control measures implemented by India; where-in foreign ships are increasingly inspected for compliance to international and national requirements. The sulphur dioxide emissions from ships can easily be controlled by limiting the amount of sulphur in fuel burned on board a ship. The limit of sulphur in fuel is going to be stipulated at 0.5% from 1 January 2020 and will substantially limit the amount of SOx emitted. With measures such as shore power supply

Year	Percentage of total ships inspected which are less than 10 years of age	Percentage of total ships inspected which are between 10-15 years of age	Percentage of total ships inspected which are more than 15 years of age
2017	58.2%	20.2%	21.6%
2016	55.8%	23.1%	22.1%

to visiting ships being initiated, these emissions are further going to come down many-folds.

ii) Age profile of Indian coastal vessels shows that about 51% of Indian coastal vessels are either MARPOL Annex VI Tier 1 or 2 compliant for NOx emissions and many of these are operating on gas oil with low sulphur content in fuel oil. The remaining 49% vessels are neither NOx Tier 1 and nor Tier 2 compliant, but these are few in numbers. However, as a ship becomes old, its operational efficiency comes down and it not only emits higher GHG emissions but also

other non-GHG emissions.

As per a discussion paper by International Transport Forum (Shipping Emissions in Ports, 2014) Asia and Europe represent 70% of international ships port calls; however, the GHG & non-GHG emissions per port call in European ports is considerably lower than that in Asian ports due to implementation of policies such as shore power supply to visiting ships, use of low sulphur in ports and incentives on fuel switch in ports. As compared to ports in developing countries like India, it is estimated that 70% of emissions in

## EDITOR'S NOTE

### Energy Outlook for India

India is now the world's third-largest electricity producer as per figures given by Indian Brand Equity Foundation (IBEF). IBEF is a Trust established by the Department of Commerce, Ministry of Commerce and Industry, Government of India. India generated around 1,160.1 billion units of electricity in financial year 2017, up 4.72% from the previous year.

The country's installed power generating capacity of 334.4 gigawatt (GW, or 1,000 megawatts) as of January 2018 is the world's fifth-largest.

Back in 2016, India became the world's third-largest power consumer, too. The country's consumption is now set to go up to 1,894.7 TWh by 2022, the IBEF said. However, production levels are not enough to meet the rising demand which has outstripped supply by about 7.5%.

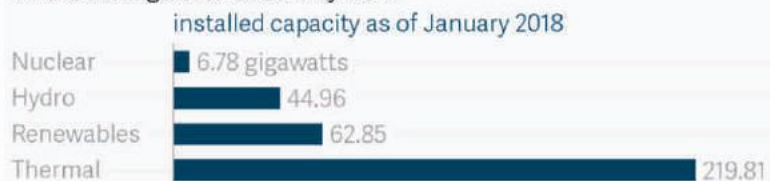
India intends to add around 100 GW of power capacity between 2017 and

### India is the world's third-largest producer of electricity



ATLAS | Data: India Brand Equity Foundation

### Where India gets its electricity from



2022, focusing more on hydro, renewable, and gas-based power, besides looking at the adoption of clean coal technology.

India plans to have around 60 GW of wind capacity and around 100 GW of solar by 2022. The government aims to quadruple its nuclear capacity to 20 GW by 2020. Over the last five years, renewable energy has been the fastest-growing segment, but still contributes only around 14% to the total power capacity in India.

ports in developed countries is due to shipping. In Mumbai port, the report stated that the emissions from shipping accounts for 20% less than that from trucks due to lower regulatory norms imposed on road transport.

According to "Statistical Report on Port of Hong-Kong in figures -2017" published by Marine Department, People Republic of China, there were more than 1,80,000/- vessels arrival in Hong-Kong in 2016(however, more than 84% of these are River Sea Vessels)with an average turn-around time of 1.45 days. This results in burning of more than 0.5 million tonnes of fuel (taking an average fuel burned per day =2 tonnes) in 2016and that too only in one port of China. China, where coastal and inland shipping accounts for over 47% of freight modal mix, has to urgently implement a series of measures in a span of 2-3 years to reduce emission intensity from shipping in its coastal waters. It includes enforcing the use of fuel with a maximum sulphur content of 0.5% on ships berthing at 5 identified ports in 2016 which further increased in 2017 to 11 such ports. Further, from 1 September 2018, engines of all vessels imported in China are required to meet the NOx Tier II emission limits under the IMO's MARPOL Convention. With a shipping traffic growth in Indian ports of more than 5% in 2016-2017 and major ports utilizing only on an average 60% of their available capacity and with the implementation of the Goods and Services Tax (GST), demonetisation, and other structural reforms, the potential real GDP growth of 8-10% is a reality. This will lead to many-fold increase in shipping traffic at Indian ports and its consequential effect on emissions from ships in Indian coastal regions and ports.

The promotion and development of coastal shipping in India by GOI is on the acceptance that maritime transport is an environmentally

Plastic	Oil-sludge	Sewage	Domestic Waste	Operational Waste
0.001-0.008 m <sup>3</sup> per person per day	0.01 to 0.03 m <sup>3</sup> of sludge per tonne of HFO and 0.01 m <sup>3</sup> per tonne of MGO.	0.01 to 0.06 m <sup>3</sup> per person per day. Sewage is sometimes mixed with other waste water. The total amount ranges from 0.04 to 0.45 m <sup>3</sup> per day per person.	0.001 to 0.02 m <sup>3</sup> per person	0.001 to 0.1 m <sup>3</sup> per person per day.

Table 6: Rough estimate of few of the waste categories generated on board a ship [Reference: The Management of Ship-Generated Waste On-board Ships; EMSA/OP/02/2016]

Year	Total number of reported oil pollution incidents	Number of reported Oil pollution incidents involving oil quantity above 50MT	Number of reported Oil pollution incidents involving oil quantity above 700MT
2010	5	2	1
2011	5	3	0
2012	1	0	0
2013	1	0	0
2014	2	0	0
2015	0	0	0
2016	0	0	0
2017	1	1	0
2018	2	0	0

Table 7: Number of reported Oil Pollution Incidents from Ships: Source: MRCC

friendly mode of transport in terms of CO<sub>2</sub> emissions when calculated per deadweight tonne along routes of similar length. However, considering that other non-GHG emissions to air, like sulphur dioxide, nitrogen oxides and particulate matter, are much higher for shipping than other modes of transport – especially when no abatement technologies are applied, the GOI has already initiated a number of measures (detailed in next section) to combat such emissions from shipping anticipating an upward growth in cargo movement from/to Indian ports and when Indian coastal shipping is on the verge of an expected growth trajectory.

#### Garbage and Waste Statistics:

Apart from air emissions, marine litter can be a significant problem in development of a sustainable marine infrastructure on Indian coast, if not addressed adequately and quickly. A rough estimate of few of the waste categories generated on board a ship [Reference: The Management of Ship-Generated Waste On-board Ships; EMSA/OP/02/2016] Table 6.

The importance of provisions of

adequate port reception facilities in India cannot be emphasized more for the reasons that there are 37500 vessels-departure/visits from/to Indian ports and considering that each ship touched an Indian port after an average of 5 days sailing and with an average of 10 crew on board, these ships bring to Indian coast about 1875m<sup>3</sup>-15000m<sup>3</sup> of plastics, 1875m<sup>3</sup> to 1,87,500 m<sup>3</sup> of operational waste and 1875m<sup>3</sup> to 37,500m<sup>3</sup> of food waste. Without adequate infrastructure to enable ships to discharge this litter ashore, much of this may end up in Indian coastal waters.

Failure of ship structure and machinery can result in disastrous catastrophic oil pollution as can be seen from Exxon Valdez incident. This probability of failure increases with age of vessel. Drawing inference from Port State Inspection Statistics (Table 5) IOMOU Port State Control Statistics) about 55-60% of vessels visiting Indian coast are less than 10 year old with low probability of structural and machinery failures. In last 9 years, there are only 17 reported oil pollution incidents on Indian coast indicating an

average of 1.9 incidents per year which is same as the world average of 1.9 between 2010-2018 as indicated by ITOPF on their website. Again this is an indicator of success of Indian port state control in identifying operational and human related problems prior occurrence of a major disaster.

#### **Efforts of Directorate General of Shipping in combating Shipping emissions & pollution**

The Directorate General of Shipping being a custodian of MARPOL under Merchant Shipping Act, 1958 has direct and moral responsibility to combat pollution from ships in Indian coastal zones including seas and ports. In the effort to provide a clean environment to coastal communities following initiatives have been undertaken by the directorate:

#### **Shore Power supply to ships visiting Indian Ports:**

While docked at the port, ships shut off their propulsion engines, but use their auxiliary engines to power refrigeration, lights, pumps and other equipment. If ships connect to a shore-side power supply instead, emissions of SO<sub>2</sub>, NO<sub>x</sub> and PM can be cut by 90 per cent or more considering berthing/departure and connection/ dis-connection time. The Directorate General of Shipping in collaboration with Indian ports has decided to mandatorily supply shore power to visiting ships in Indian ports. Shore power is normally supplied to ships at high voltage rather than low voltage in order to keep the physical size of related electrical equipment such as shore connection cables manageable. However, the high-voltage supply requires development of considerable investment and time for ports to prepare for the same. It is realized that about 60% of Indian coastal vessels are less than 1000 GT with low power demand and further maximum among these are tugs and motor launches and thus can easily be supplied with low voltage supply from

National Grid. Therefore, on a pilot basis and with intent to prepare Indian ports for the shore-power supply to Indian and International ships, it is decided that with immediate effect ships requiring a maximum of 150kW load will be mandatorily required to be supplied with shore power in Indian ports.

#### **Waste reception facility at Indian Ports**

Indian ports have been providing shore reception facilities to visiting ships. No ship or seafarer deliberately wants to throw waste into the sea, however there are many reasons i) the non-availability of port reception facilities for all types of waste; ii) tight schedule with limited time in port to dispose of operational waste at an inconveniently located place in the port; iii) facility not available 24x7 and iv) low probability that illegal dumping activities will be detected for such activity. Further even if the facility is provided, the waste should not end up in sea or cause pollution on shore if the authorized contractor does not dispose it off in accordance with local laws.

The directorate as part of its obligation under MARPOL to provide adequate port reception facilities in Indian ports, assessed port reception facilities provided by various ports across India in the first quarter of 2018. Based on this assessment, and to facilitate further provisions of Port reception facilities in India has developed "Swachh Sagar"- a centralized, automated on-line system where prior entering an Indian port, each and every vessel has to mandatorily fill up the quantity of each and every type of waste on board and a contractor for waste collection is allotted through this system. The contractor then collect waste from ship and upload on the system, the necessary evidences regarding disposal of waste in accordance with local and national laws. This centralized mechanism will

not only help in creation of a data base to be utilised for various purposes including shore power supply to visiting ship in times to come.

#### **Emission Inventory**

The development of any policy in medium and long term will require data to analyse the emission pattern from ships on Indian coast. The centralized waste reception system will also facilitate collection of other data such as date of build from visiting ships which will help to determine the operational efficiencies, compliances with MARPOL NO<sub>x</sub> and GHG control requirements and ultimately the GHG and non-GHG emission pattern in Indian coastal waters. Further with figures such as time in ports and at port anchorages the total emission pattern will be established.

To determine future policy initiative, International Maritime Organization, via amendments to MARPOL has made it mandatory for all ships above a certain size and on international voyage to submit their fuel consumption data through countries where their ships are registered. In order to enable creation of a GHG emission inventory and future policy option such as mandatory switch over to green fuels, the directorate has made it mandatory for all ships irrespective of size and area of operation to declare their fuel consumption data.

#### **Conclusion**

The global character of the shipping industry makes it a challenge to regulate as compared to road transport industry. These global regulatory regimes are to a large extent dependent on achieving consensus among many nations which makes the international regulatory regime related to shipping more sluggish than the equivalent regimes applied to land-based modes. Though, shipping contributes only 2.5% of world GHG emission



## **EDITOR'S NOTE : Lighting Strikes over the Shipping Lanes of the Indian Ocean.**



Lightening Strikes a Cruise Ship at the Port of Genova (picture is of poor quality)



Smoke billows from the funnel area just after the lightening strike. (picture is of poor quality)

On the 19th of September 2017 an article appeared in the *New Scientist*, under the headline "Cargo ships trigger lightning storms"

This article reported by LaxmiSupriya states that, "SHIPS spewing soot into the pristine ocean air are causing extra lightning strikes along busy maritime routes. It is a bizarre example of how human activities can change the weather. When Joel Thornton at the University of

Courtesy: *New Scientist* dated 19th September 2017 and *American Geophysical Union* dated 7th September, 2017.

Washington in Seattle and his colleagues looked at records of lightning strikes between 2005 and 2016 from the World Wide Lightning Location Network, they noticed there were significantly more strikes in certain regions of the east Indian Ocean and the South China Sea, compared with the surrounding areas. Unusually, they occurred along two straight lines in the open ocean, which coincided with two of the busiest shipping lanes in the world. Along these paths there were twice as many lightning strikes as in nearby areas.

"We were quite sure the ships had to be involved," says Thornton. But they still had to eliminate other factors that influence storm intensity, such as wind speeds and temperatures.

Once these had been ruled out, the team concluded that aerosols from the ships' engine exhausts were the culprit. Aerosol particles act as seeds, around which water vapour condenses into cloud droplets. In clean air there aren't many seeds, so the cloud drops quickly grow and fall as rain.

The study shows how the changes we make to the atmosphere affect clouds and even the development of stormy weather. Thornton also suggests that the pollution we have released over the last few hundred years may have affected storms and lightning in many places, creating lightning where there was none."

intensity and is considered one of the most environmentally friendly modes of transport, pro-active measures are being initiated to promote greener technologies so that shipping does not lag behind other sectors of Indian economy including roadways in combating pollution. This includes promotion of new fuels like methanol and liquefied natural gas to run ships. Rules for ships to run on low-flash point fuel are already developed. Kits for running fishing vessel on Liquefied Petroleum Gas has already being type-approved. To promote green Indian shipping, considerable investment is required and therefore,

in the new Merchant Shipping Bill, 2016, the ownership criterion for registering a vessel in India has been changed from "fully-owned by Indians" to substantially-owned". This will allow small owners to tie-up with foreign investors for growth of green Indian shipping.

The initiatives by the Directorate are small steps forward greening the ports and the surrounding areas.

The short sea shipping alternative will not deserve a "green label" unless SO<sub>2</sub>, NO<sub>x</sub> and PM emissions are addressed further. It is a firm belief that all stake holders will certainly rise

to the occasion and put in their sincere efforts to collaborate with each other for the cause of this great nation in providing the future generations a cleaner ocean than what is today for their survival.

**(Vikrant Rai is an Extra First Class Engineer (2007) and Masters in International Business from IIFT, New Delhi. He presently works as Engineer and Ship Surveyor at the DG Shipping, where he is the Dy Director Technical. He was previously with the Lloyds Register of Shipping.)**

## Free IMarEST Student Membership

The Institute of Marine Engineering, Science & Technology (IMarEST) UK, offers free Student Membership to all full-time students (undergraduate and post graduate), full time cadets, apprentice or trainee on any course, for the duration of ones' studies.

For instant signup use this link: [www.imarest.org/students](http://www.imarest.org/students)

### Benefits of Student Membership include free access to:

- The Virtual Library
- Marine Technical Notes
- The Marine Professional Magazine (digital monthly magazine)
- Special Interest Groups (SIGs)
- NEXUS – an online working environment [for members only]
- IMarEST TV
- e-Marine --bimonthly industry newsletter

### Student Membership also makes one eligible for

- Awards, scholarships and intern programmes
- Use of post nominal 'SImarEST' [Post nominals letters or designatory letters are placed after a person's name, as a suffix, to indicate academic or other credentials eg. BSc, PhD,]
- 25% off on selected books

## PANEL OF EXAMINERS OF IME (I)

The Institute of Marine Engineers (India) invites Marine Engineers (holders of MEO CL I COC and sailing experience as Chief Engineer), specially those involved in teaching/ training to join the Institute's Panel of Examiners being formed to assist the Maritime Administration in evaluation of written C. O. C. examinations. The DGS approved external examiners would be required to evaluate the answer scripts for the MEO CL I & MEO CL II (FG) candidates. Examiners will receive the evaluation fee through IME (I) for their participation as examiners. Such external examiners may initially have to work as trainee examiners. Members interested may forward their CV to the IME (I) Head Office addressed to the Director "M. E. & T". The soft copy of the CV can also be forwarded on email i.e. [training@imare.in](mailto:training@imare.in)

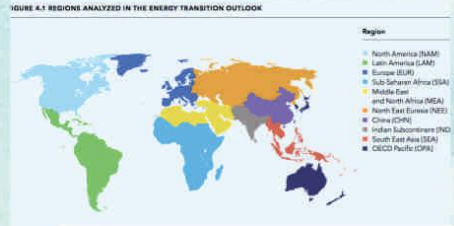
- Address -

### Institute of Marine Engineers (India)

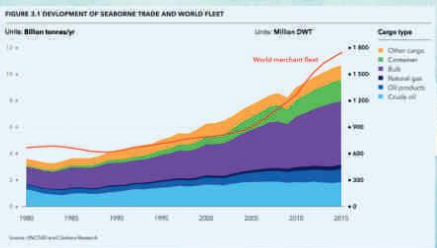
IMEI House, Plot No. 94, Sector- 19, Nerul (East), Navi Mumbai 400706.

MIND MAP TO NAVIGATE

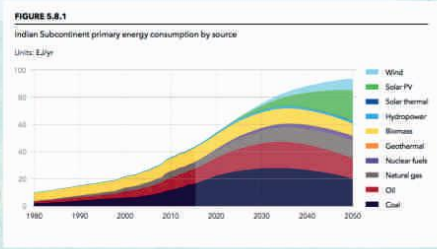
How do regions consume energy?  
Leading indicators for growth



Past & Present Shipping



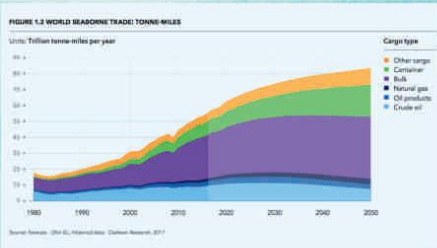
How did the fleet grow?



Major Issues That Will Impact World Fleet

Production to Consumption Transport Distance

Trade Volumes



How will the fleet grow?

Energy Usage  
GDP per Capita  
Population Spread

Carbon Footprint  
Energy Efficiency  
Political Mood  
Environmental Concerns

Carbon-Robust Ships

Carbon-Robust Ships Allow A Framework To Be Applied To Ensure That Ship's Design Is Robust Enough To Function in Changing Markets And Regulatory Regimes

Scenario	BREAK-EVEN DAILY RATE				CO <sub>2</sub> EMISSIONS			
	Scenario A	Scenario B	Scenario C	Scenario D	Scenario A	Scenario B	Scenario C	Scenario D
Scenario A	100%	100%	100%	100%	100%	100%	100%	100%
Scenario B	100%	100%	100%	100%	100%	100%	100%	100%
Scenario C	100%	100%	100%	100%	100%	100%	100%	100%
Scenario D	100%	100%	100%	100%	100%	100%	100%	100%

Relative performance of three designs under two scenarios, showing the percentage of the whole fleet that performs better in 2020, 2025, and 2040 performance in total fuel oil break-even rate and CO<sub>2</sub> emissions.

Handwritten signature and date: 31/3/19



# Maritime Forecast to 2050 Energy Transition Outlook - Executive Summary

- DNV GL

*Editors Note: For the Complete report please download from the DNV-GL website.*

The ongoing digital transformation will — through automation, robotization, and adaptive manufacturing — have a large impact on global value chains. It will also advance the design and operation of ships, and create new business models. For shipping, there is increasing pressure to decarbonize and to reduce emissions to air. This will impact asset value and earning capacity more significantly than in the past. It will shape the future fleet in important ways, particularly in the choice of fuels and technologies.

This publication is one of DNV GL's new suite of Energy Transition Outlook (ETO) reports. It provides an independent forecast of the maritime energy future and examines how the energy transition will affect the industry. Trends and drivers factored into our long-term projections are outlined in the integrated approach to forecasting. Our focus this year is the challenge of decarbonization facing the maritime industry. Our intention is to provide guidance for stakeholders coping with increasing uncertainty, risk, and opportunities.

## SEABORNE TRADE OUTLOOK TOWARDS 2050

Based on the updated model for the DNV GL

Energy Transition Outlook 2018, we forecast a rise of nearly a third (32%) in seaborne trade measured in trillion

tonne-nautical miles per year for 2016– 2030 (see Figure 1). We see increases in tonnage over the forecast period for all trade segments except crude oil and oil products. The largest relative growth in trade is for gas and container cargo, for which we see a tripling and doubling, respectively, by 2050. We predict only 5% growth in trade over the period 2030–2050. For bulk, there is sustained growth in tonne-miles for grain and minor bulk throughout the forecast period. For iron ore, we expect strong growth until 2030, more than offsetting an expected decline in coal transport. The total bulk trade increases by 39% over the period, maintaining bulk as the largest ship segment; however, most of this growth is expected in the first 20 years of the forecast period.

## REGULATORY AND STAKEHOLDER OUTLOOK

To ensure compliance and to make the right business decisions, it is crucial to understand the existing and future regulatory framework, and the expectations placed on shipping from external stakeholders. Over the past decade, shipping has seen a surge of environmental regulations. Impact on shipping in the next five years will include:

- The global sulphur limit for ship fuels, as set by the International Maritime Organization (IMO)

- IMO Tier III requirements for limiting nitrogen oxides (NOX) in Emission Control Areas (ECAs)
- The regulation of ballast-water management in accordance with The International Convention for the Control and Management of Ships' Ballast Water and Sediments.

Greenhouse gas (GHG) emissions will be the main challenge for the next decades. In addition to global carbon dioxide (CO<sub>2</sub>) requirements, we will see local, regional and national requirements to reduce harmful emissions of NO<sub>x</sub> and sulphur oxides particles. We expect safety regulations to be improved incrementally. This relates mainly to ensuring that new environmental technologies and fuels can be applied safely, and to address challenges linked to digitalization, such as cyber risk, autonomy, and control systems.

The key challenge for shipping will be ecarbonize its activities. The IMO has recently adopted a strategy aiming to at least halve total GHG emissions from shipping by 2050 when compared with levels in 2008.

The IMO targets are ambitious and will require application of currently immature technologies and solutions, acceptance of lower speed, and deployment of large volumes of carbon-neutral fuels. Such fuels will also be essential to achieve the IMO

vision to fully decarbonize shipping somewhere between 2050 and 2100.

Although the IMO's ambition is clear, its conversion into practical regulations is still unclear. To meet its targets, the strategy must be followed by mandatory requirements for individual ships, and by other policy measures to support development and implementation of new technologies and fuels.

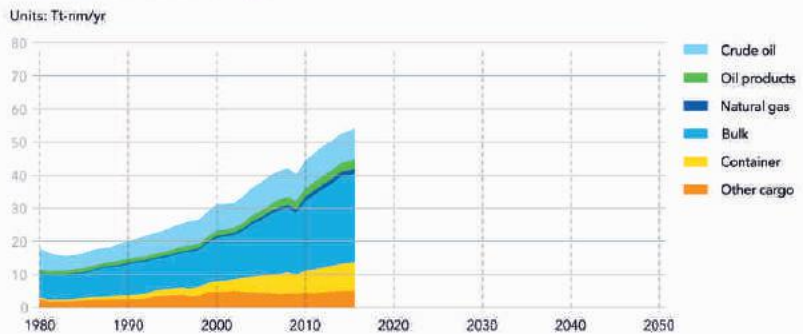
#### FUEL AND TECHNOLOGY OUTLOOK

Fuels that could contribute to meeting the IMO targets include ammonia, biofuels, electrification, electrofuels, hydrogen, and nuclear power. In each case, it is important to take a lifecycle perspective to ensure that energy used to produce the fuel is from renewable sources or from fossil sources using carbon capture and storage. The selection of fuel will be based on a compromise between the benefits and drawbacks of the various fuel options being compared. The cost associated with machinery, as well as the expected fuel prices and availability of bunkering infrastructure, will be key barriers. Safety will be a primary concern. It can be translated into monetary terms once a design has been established and the necessary safety measures identified. The many alternative fuels, and their diverse characteristics, make it difficult to identify 'winners and losers' clearly. This is why we introduce a concept for the 'ranking of alternative marine fuels', as an important new feature in this latest Energy Transition Outlook report. It describes a multi-objective approach focused on the environment, economics, and scalability, to evaluate promising fuels.

Operational and technical energy-efficiency measures complement the fuel options. Reducing vessel speed is an especially effective operational measure, with a large fuel-saving potential. Substantially reducing speed will impact the transport system and require the industry and related stakeholders to collaborate to

**FIGURE 1**

World seaborne trade in tonne-miles



realize this potential. However, our Automatic Identification System (AIS)-based study of the world cargo fleet reveals how it spends much of its time at anchor or in port. Resolving this inefficiency, perhaps through emerging digital technologies, could contribute to reduced sailing speed and thereby lower fuel consumption. Technological developments in batteries, drag reduction, energy efficiency, materials science, and propulsion will provide the basis for specifications of new ship concepts to reduce energy losses and improve overall performance. Only a fraction of the fuel energy going into a ship's main engines ends up generating propulsion thrust; the rest is lost as heat. Exergy (or useful work) analysis reveals insights about the energy losses in a ship's energy cycle and assists the prototyping of novel mature and immature technologies to improve the energy efficiency.

The concept of hybridization is a promising ongoing development, where the benefits of two or more configurations for saving fuel are combined. A hybrid electrical ship could contain alternative diesel engine configurations, marine fuel cells, battery packages, and even retractable wind turbines, solar panels, and sails.

#### FLEET OUTLOOK

Integrating our knowledge of future trade demand, regulatory developments, and technology and fuel advances, we have modelled the uptake of a wide range of alternative

fuels, energy-efficiency measures, and other emission-reduction technologies. Measuring in deadweight tonnes (DWT),

#### we predict:

- The fleet size will increase by more than a third (35%) by 2050
- The crude oil fleet will decline by 30% by midcentury, peaking in 2030 at about 20% larger than today, then shrinking
- Today's product tanker fleet will decrease by 8% by 2050.

One of our key assumptions is that IMO GHG reduction targets will be met. Beyond 2035, we will see the full impact of gradually improving the energy efficiency of new ships and the shift to alternative fuels. Fuel consumption per tonne-mile will decline by, on average, 30% by 2050. We find that total energy use in international shipping will increase from about 11 exajoules (EJ) to 13 EJ during 2016–2035. It will then decrease to 11 EJ in 2050, which equates to nearly 270 million tonnes of oil equivalent (Figure 2).

Our model finds that by 2050, 39% of shipping energy will be from carbon-neutral fuels, which will have overtaken the 34% share of liquid fossil fuels, such as heavy fuel oil (HFO) and marine gas oil (MGO). Liquefied natural gas (LNG) and liquid petroleum gas (LPG) will, together, have a 23% share. Electric batteries will be an energy source on one third of all ships from mid-century, providing about 5% of the total energy



# ELECTION NOTIFICATION



## IME (I) GOVERNING COUNCIL, BRANCH & CHAPTER COMMITTEE ELECTIONS 2019-2021

With elections for The Institute of Marine Engineers (India) approaching, we would wish to notify all Corporate Members of the following.

### 1. SCHEDULE : NOMINATION FORMS

- Nomination Forms for the Governing Council, Branches and Chapter Committee elections have been despatched to the mailing addresses of all Corporate Members and should have been received by now.
- Soft copies of (relevant) Nomination Forms have also been sent as email attachments which also should have been received.
- Nomination Forms may also be downloaded from the landing page of our website [www.imare.in](http://www.imare.in) > "What's New"
- You may download & print off these soft versions of the Nomination Forms ; complete it as required and send us a hard copy addressed to : **Election Officer, The Institute of Marine Engineers ( India), IMEI House, Plot no. 94, Sector 19, Nerul East, Navi Mumbai 400 706**
- Nominations, in the prescribed format, should be received at the IME(I) Head Office no later than **15 April 2019**.
- Last date for withdrawing nomination(s) shall be **30 April 2019**.
- The scrutiny of nomination papers for the Council shall be completed by the Election Committee by **05 April 2019**.

### 2. E-VOTING

*As a Corporate Member, you can now exercise your franchise at the forthcoming elections at IME(I) using the standard Ballot Paper or, alternately, opting for e-Voting.*

- Members, who wish to opt for e-voting, shall be required to indicate this (e-Voting) choice via email\* (Those who have previously exercised the e-voting option need not opt again. It shall be presumed that the email addresses of such members have remained unchanged.
- Remaining members shall receive their paper ballot as usual.
- The two options would be available for both elections i.e. for the Head Office as well at the Branch level.
- Members, who wish to opt for e-voting, and have previously not done so, are required to indicate their option no later than **30 April 2019** via e-mail, at the address below.
- Please, do clearly indicate the email address where you wish to receive the e-voting link (Reply to: [electionofficer@imare.in](mailto:electionofficer@imare.in)).
- Registration for e-voting shall run from **01 January** to **30 April 2019**.
- The e-voting option may not be available beyond the close date for registration.

### 3. USE OF WORKPLACE / OFFICIAL MAIL IDS

- Given that we have, in the past, had mass emails blocked at certain receiving (organization) mail domain(s), treated as spam and, in some cases the blacklisting of the IME(I) domain, we would strongly recommend the use of personal email ids, should you decide to opt for the e-voting option.
- The use of your personal mail id would ensure that you do not miss any important communication relative to the election process.

*Should any member have any questions/suggestions in this regard, they may contact the undersigned.*

**- Election Officer ([electionofficer@imare.in](mailto:electionofficer@imare.in))**

for shipping. We have not evaluated which carbon-neutral fuels will be preferred, as this will depend on future production costs, availability, and infrastructure. Short sea and non-cargo shipping will use 40% of the total energy; and, in these segments, electricity will constitute more than a tenth (11%) of energy use.

### THE CARBON-ROBUST SHIP

Fleet forecasts, as presented in this report, contain inherent uncertainties and depend heavily on assumptions. Regulations on CO<sub>2</sub> are poised to shape the future fleet. Developments in fuels and technologies are rapid, with potential game changing consequences. Add in 'traditional' concerns over market cycles, trade demand, and supply, there are many aspects to consider when investing in new tonnage. How can a shipowner wanting to invest today, handle this uncertainty and associated business risks to make the right decisions?

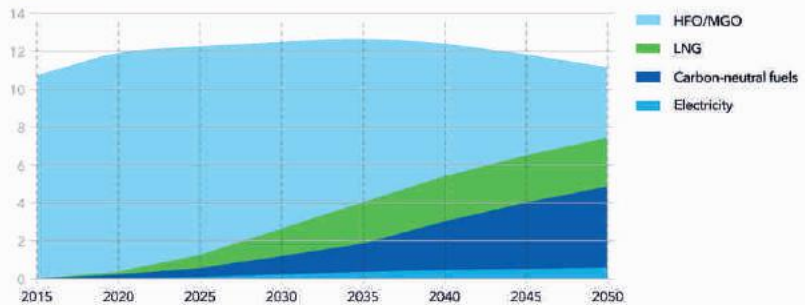
In this study, we present a further and significant development of the carbon-robust ship concept that we introduced in 2017. A new model now evaluates fuel and technology options by comparing the break-even cost of a design to that of the competing fleet of ships (see Figure 3). The cost structures of competing fleets are compiled on the basis of scenarios, including, for example, regulations, fuel prices, and technology developments. We showcase the model here to gain insights into what a carbon-robust bulk carrier would be like under possible future CO<sub>2</sub> regulations. We use the model for exploring key questions for three design alternatives for a ship designed today and built in 2020. The design alternatives are a standard ship, an LNG-powered ship, and a fuel-efficient option.

The study shows significant differences in competitiveness over the life of a vessel, depending on different scenarios. One striking finding is that investing in energy efficiency and reduced carbon

FIGURE 2

### Shipping energy mix

Units: EJ/yr

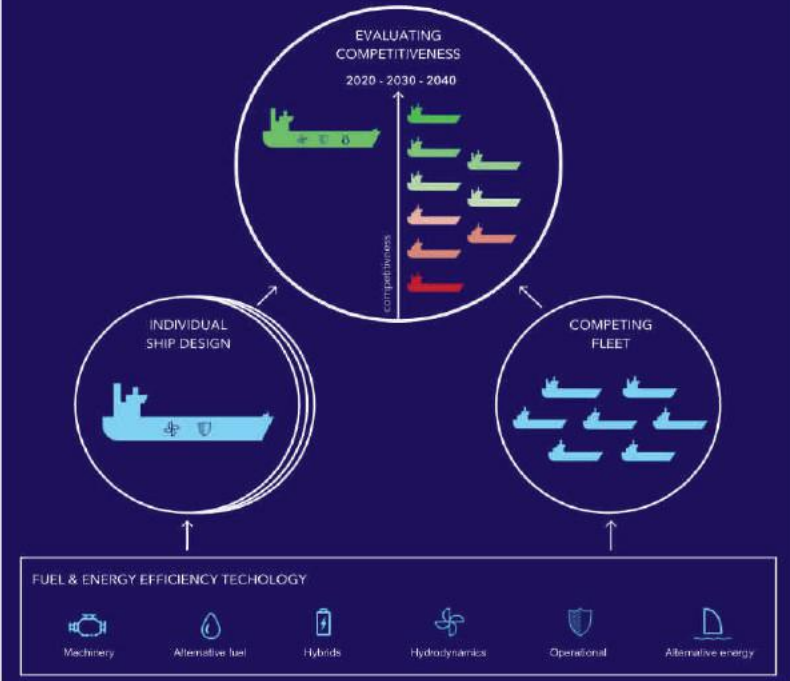


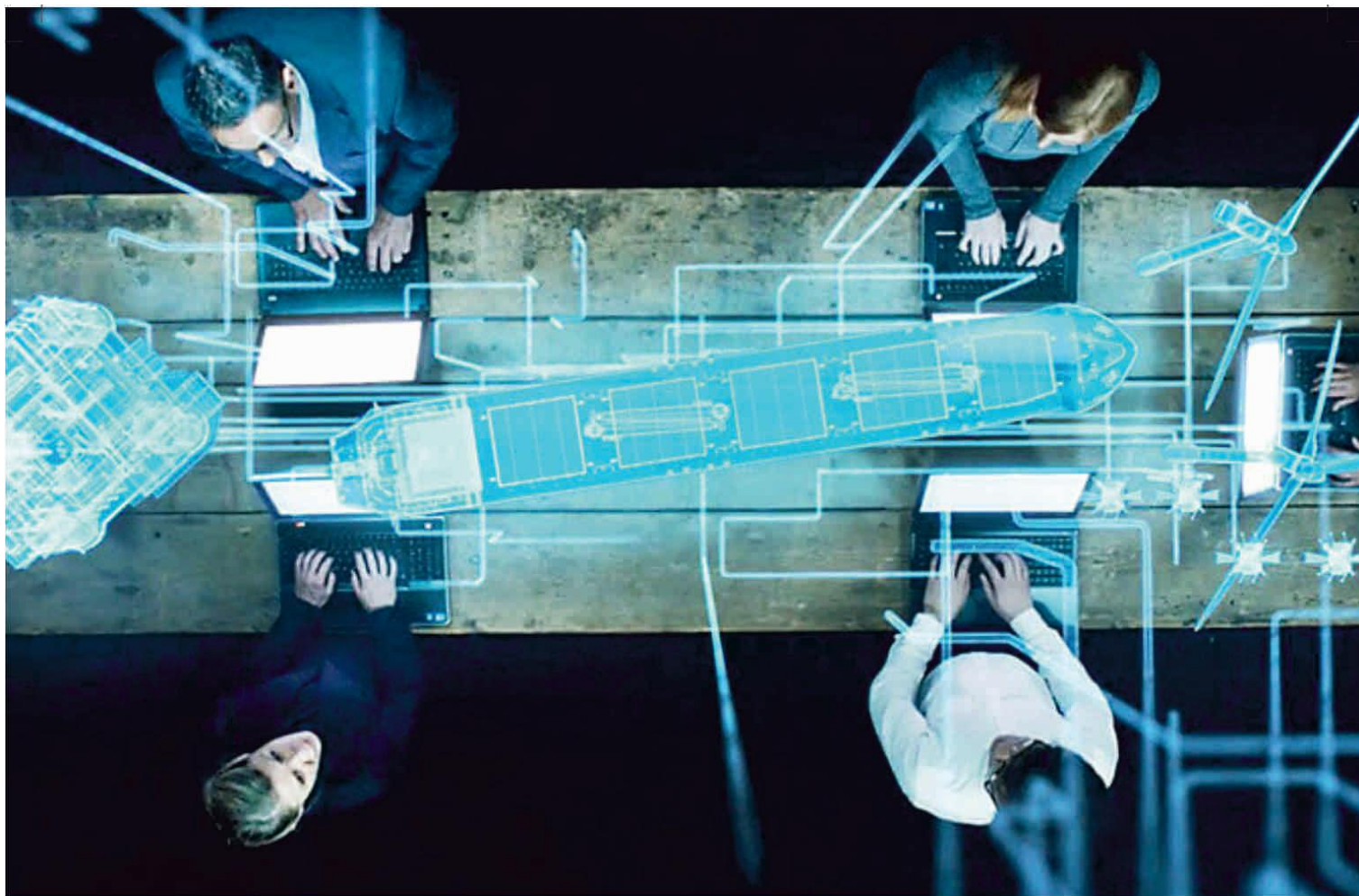
footprint beyond current standards seems to increase competitiveness over the lifetime of the vessel. The study also suggests that owners of high-emitting vessels could be exposed to significant market risks in 2030 and 2040 in scenarios where low-emission vessels attract premium rates or avoid CO<sub>2</sub> taxes or levies. In this report, we have explored the maritime implications of a global transition towards an increased use of renewable energy and a diminishing

use of fossil fuels, which is underway and will progress towards mid-century. As discussed, uncertainty is high. However, we believe that this uncertainty is manageable. By applying a structured, knowledge-based approach, supported by modelling tools, stakeholders can stay ahead of industry developments and remain competitive moving forward.

FIGURE 3: OUTLINE OF THE CARBON ROBUST MODEL

Competitiveness of selected individual ship designs is evaluated against the competing fleet of ships at a given point in time (e.g. 2030 or 2040) using the break-even cost or CO<sub>2</sub> emissions as a measure. The user can draw on a pool of fuel and technology options in creating the individual ship designs. For the competing fleet, fuel and technology uptake are governed by pre-set scenarios.





## Putting yourself ahead of the pack with the carbon-robust ship

Courtesy DNV-GL

*The carbon-robust model can assist ship owners in choosing future-proof vessels, ensuring long-term competitiveness and profitability as the maritime industry decarbonizes.*

"We are in an energy transition," says Øyvind Endresen, Environmental Consultant, at DNV GL's Environment Advisory section. "Global regulations on emissions to air as well as the rapid rise and faster cycling of new fuels and technologies are poised to change the fleet of the future."

These changes are exposing the shipping industry to more risk than it has seen in many years and at a more fundamental level. When a vessel was planned 50 or even 20 years ago, the choices were much simpler. Size and cargo types varied, as did market

drivers, but there was essentially only one choice of fuel and propulsion system. Today, the question of the propulsion technology, the fuel to be used, and even the crewing, is much more complex.

### **Overcome uncertainties of decarbonization**

"There are many uncertainties to consider when investing in new tonnage," says Magnus Eide, Principal Consultant, at DNV GL's Environment Advisory section. "But without a doubt, today's ship owners face more change in the near future than at any time in recent memory. We cannot assume that the regulatory and technology landscape will remain stationary, and we need to examine the questions of what is next, how can

we plan for the future, and what are the factors we need to take into account."

The carbon-robust model was launched in 2017 by DNV GL as part of the Maritime Forecast to 2050 to help manage this uncertainty and navigate towards this new future. The model can be used when developing ships that can withstand regulatory, fuel, technological and market shifts. A carbon-robust ship is one that is competitive and thrives in any decarbonization scenario, manufacturing, services and offshore logistics.

### **Evaluating fuel and technology options**

The core of the carbon-robust model lies in evaluating different fuel and



## CALL FOR DONATIONS FOR IME (I) BUILDING FUND

Work on the addition of a 3rd floor to the IMEI House at Nerul, Navi Mumbai, is now complete and this new space is being fitted out to provide for better equipped classrooms, labs and enhanced infrastructure for our Training and Learning activities.

It is a matter of immense pride that the building, hitherto, was built and equipped entirely from contributions from its members and well-wishers. To fund this expansion and fit-out, we are once again reaching out to our members and corporates to seek generous contributions to the fund.

All contributions will be gratefully acknowledged.

IT deductions can be claimed under section 80G.

**Cheques should favour: "The Institute of Marine Engineers (India)"**

### For online NEFT

<b>Name of the account</b>	- The Institute of Marine Engineers (India)
<b>Name of the Bank</b>	- IDBI Bank
<b>Savings Bank A/c. No</b>	- 244104000013165,
<b>IFSC Code</b>	- IBKL0000244.

## *Dynacom Tankers Management Private Limited*

**Requires For (Tankers) VLCC / PRODUCT / CRUDE OIL TANKER Master /  
Chief Officer 2 / Off (with chiefmate ticket)**

**THIRD ENGINEER (with 2nd Class Ticket) / ETO Ranks with suitable  
experience may apply with immediate effect**

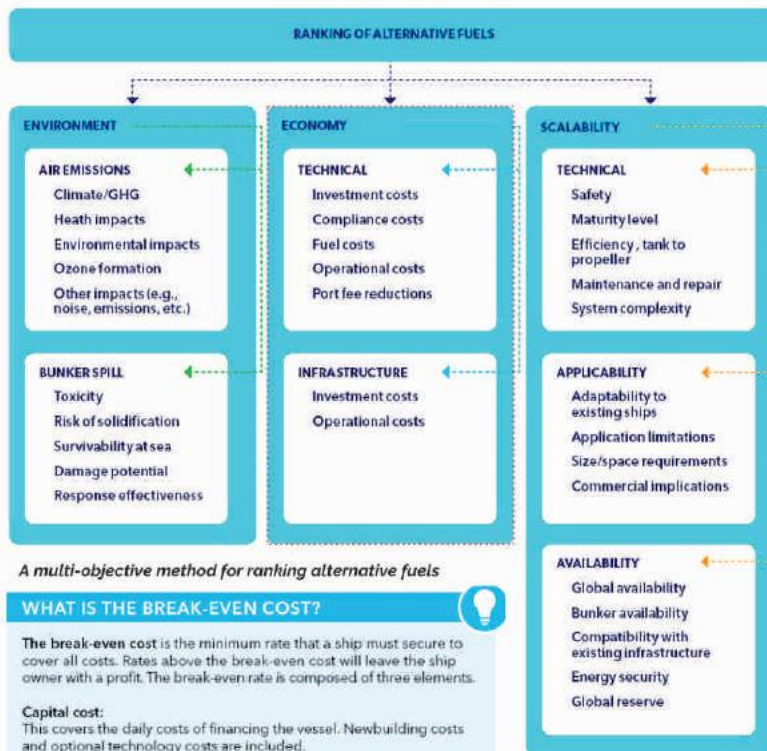
**REQUIRES FOR THEIR PRINCIPALS DYNAGAS LTD. ON LNG VESSELS Master  
/ Chief Officer C/ Eng / 2 / Gas / Eng / ETO**

**WE OFFER :** Excellent Promotion Prospects, Attractive Remuneration, best  
in the industry, Re-joining Bonus for all officers,  
Standby wages for all Ranks, Choice of terms of duty with full benefits.

**CONTACT US : HEAD OFFICE - CAPT. M. V. NAIK / MR. G. SURESH KUMAR**

Solitaire Corporate Park, Business Square, 4th Floor, A-402, Near Holy Family Church, Chakala, Andheri (E), Mumbai 400093. TEL : 022-2834 7349/ 2834 7294,  
FAX : 022-2834 1866, E-MAIL : resume@dynacomindia.com We have offices at Delhi, Chennai and Kolkata RPSL License No. : RPSL- MUM- 236  
Issue Date : 21/11/2017 Valid Until 20/11/2022

**WE DO NOT HAVE ANY AGENTS.**



A multi-objective method for ranking alternative fuels

### WHAT IS THE BREAK-EVEN COST?

The break-even cost is the minimum rate that a ship must secure to cover all costs. Rates above the break-even cost will leave the ship owner with a profit. The break-even rate is composed of three elements.

**Capital cost:**  
This covers the daily costs of financing the vessel. Newbuilding costs and optional technology costs are included.

**Operational cost:**  
This covers the daily cost of crew, maintenance and repairs, stores, etc.

**Voyage cost:**  
The annual cost of fuel, and port and canal dues.

needs to be selected. The model then estimates the CO<sub>2</sub> emission levels and total annual costs. Fuel prices and CO<sub>2</sub> tax levels can be changed from pre-set levels.

The results are indicated for the period between 2020 and 2050. The performance of the vessel is compared with the performance of the rest of the fleet. The break-even distribution for the fleet is utilized in the comparison.

### Who is my competition?

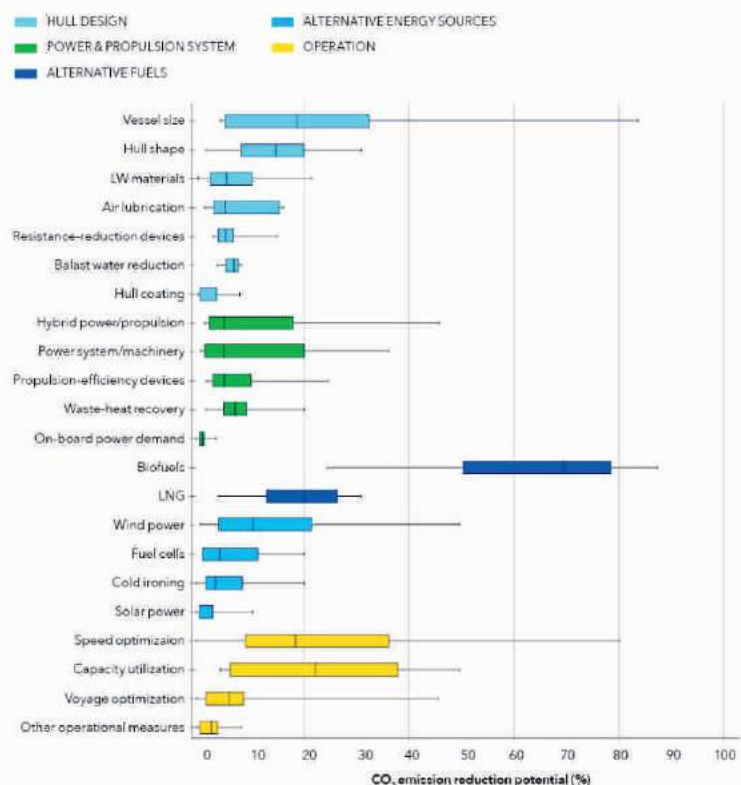
The competing fleet consists of ships currently operating and of ships being added to the fleet in the years to come. As time progresses, the future fleet is constructed by scrapping ships and building new ones. The number of ships to be scrapped and built is governed by the scenario description. Towards 2040 and 2050, the fleet composition is dominated by vessels built after 2020. Each new vessel is allocated an energy efficiency level, an exhaust treatment measure if required (e.g. scrubber), and a fuel and

technology options by comparing the break-even costs (the minimum rate that a ship must secure to cover all costs) of a design to that of the competing fleet of ships under different scenarios. The break-even cost is the minimum rate that a ship must secure to cover all its costs.

"A scenario-based model lets us explore design options and stress-test them for ship or fleet competitiveness under a range of possible regulatory, technology and energy price futures," says Endresen. "This helps to deal with the uncertainty of how regulations and technologies will evolve in the next decades. The model also lets us see where the competitive advantages lie, not just at launch but over a vessel's lifespan."

### How does the carbon-robust model work?

To begin, a set of fuel and technology choices for a vessel to be built in 2020



CO<sub>2</sub> emission-reduction potential of individual measures within five main categories

engine type.

"The model allows for the inclusion of a range of different fuel choices that can be applied to any ship type and the competing fleet, everything from HFO and scrubber to LNG," says Endresen. "You can then add, change or remove different energy efficiency measures to your design – adding PIDs (propulsion improving devices), for example, or improved digital services like weather routing or planning optimization. These elements are reflected in the costs of your vessel and its fuel consumption over time. We can work with customers to build a model for their own plans, including the vessel type, and for their operational profile, and include their own projections on the future of the market. With all of this, we can then examine the most promising options for their individual case."

#### **Case study for different decarbonization scenarios**

To demonstrate the model's application, Eide and the Maritime Forecast team drew up a case study

on the performance of three different VLCC designs, built in 2020. Each uses different energy efficiency technologies, of which one design is fuelled by LNG. Performance is tracked over 20 years, under two different decarbonization scenarios: Dull Blue to indicate business as usual and Bright Green to indicate a more driven approach to carbon reduction, including a carbon levy of USD 50 per tonne of CO<sub>2</sub> from 2030.

The results of the case study suggest that any way you cut the numbers, improving energy efficiency is essential. "There are significant differences in competitiveness, but the results indicate that the energy-efficient ship (design C) is the most robust choice in terms of break-even competitiveness, with the best balance over both the short and long term. However, we also see that vessels which continue to run on conventional fuels with scrubbers are potentially very vulnerable to changes in GHG regulations, which could expose owners to significant market and price risks in 2030 and

2040," says Eide.

#### **Reduction of GHG emissions as an innovation driver**

Eide is quick to note that the case study covers only a very limited set of technologies and fuels, and to come to firmer conclusions would require additional scenarios and designs. The indications of the Maritime Forecast and the carbon-robust model are clear though, says Endresen: "The reduction of GHG emissions will drive innovation in shipping. In addition to energy-efficiency measures, we will most likely see the widespread adoption of low or zero-carbon fuels. We believe the carbon-robust model could be a valuable supplement to ship owners in their newbuilding process and give investors and financiers an indication of the competitiveness over the financing period. By applying a structured, knowledge-based approach, supported by modelling tools, stakeholders put themselves ahead of the pack and remain competitive moving forward."

### **The Institute of Marine Engineers (India), Delhi Branch**

is having its contributory Annual Dinner

on 4th May, 2019 at Hotel Taj, Vivanta Ambassador, Sujjan Singh Park, Subramania Bharti Marg Khan Market, New Delhi -110003 as per program.

All mariners are invited & requested to confirm their attendance ASAP to enable us make proper arrangement.

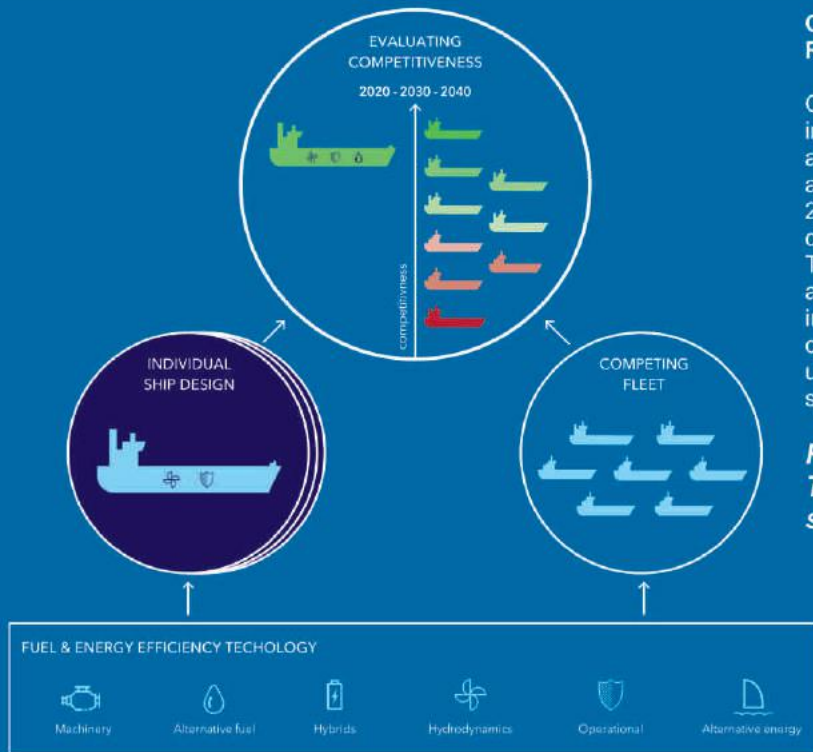
**All those interested may please contact Ms. Asha on her mobile number +91-9650426134,  
Office: +91-11-41009760, Mobile: +91-9999689760.**

#### **For invitation cards please contact:**

1. IMEI Office Bhikaji Cama Place – Ms. Asha - Tel : 011-41009760,+91-9999689760
2. Fosma, Noida - Mr. Vikcy Malhotra –Mobile: + 91-9811046949
3. Mr. Ravi Sachdeva : JK-1, Mobile: +91-9810622214
4. Herald Maritime Services Pvt Ltd - Capt Deepak Lal, Okhla Phase-I,– Landline: 011-49057676 / 77, Mobile: +91 9810091794
5. Capt. Kharbanda, Gulmohar Park – Mobile: 9811118086, Direct: 011-47985314.
6. ARI – Saket, Mr. Arun Gulati – Mobile: +91-9810187693
7. Mr. Daljeet Singh Khuman, Bhikaji Cama Place, 424 Ansal Chambers II, Bhikaji Cama Place New Delhi. Mobile:+91-9810052051
8. IMI- Mr. Rajesh Trivedi, HoD, Noida – 0120-2326311, +91-8527966888

**Dress Code: Smart Casuals.**

DNV-GL studies the ships efficiency and creates a model that will allow the ships performance to be tracked into the future. The robustness of the design to face operational competitiveness and regulatory changes can be predicted.



### OUTLINE OF THE CARBON ROBUST MODEL

Competitiveness of selected individual ship designs is evaluated against the competing fleet of ships at a given point in time (e.g., 2030 or 2040) by comparing the break-even cost or CO2 emissions as a measure. The user can draw on a pool of fuel and technology options in creating the individual ship designs. For the competing fleet, fuel and technology uptake are governed by pre-set scenarios.

**Figure A : A Set of Fuel and Technology choices are selected to create the model.**

### THE BULK CARRIER CASE STUDY: THREE POSSIBLE DESIGNS

To showcase the carbon-robust model, three bulk carrier design alternatives are presented. These are variations over the same 55,000 DWT Handymax vessel, featuring different fuel and energy-efficiency technology options. The competitiveness of the three designs is assessed using the model, capturing changes to the investment and fuel costs associated with the fuel and technology options

**Figure B: Different designs are compared over time for the best choice to withstand evolving market and regulatory scenarios over time.**

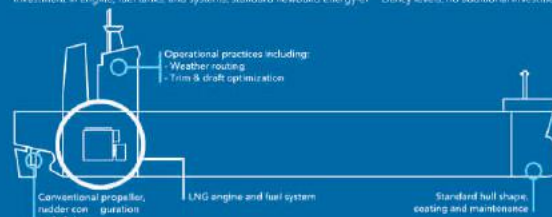
#### Design A The standard ship

Running on MGO/LSHFO  
Standard newbuild energy-efficiency levels, no additional investments



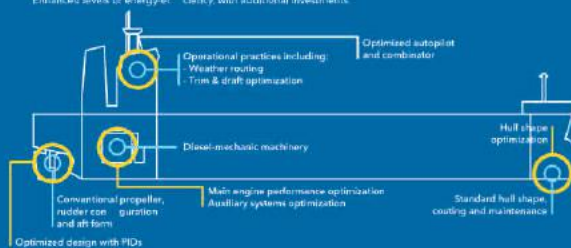
#### Design B The LNG-powered ship

Running on LNG  
Investment in engine, fuel tanks, and systems, standard newbuild energy-efficiency levels, no additional investments



#### Design C The fuel-efficient ship

Running on MGO/LSHFO  
Enhanced levels of energy-efficiency, with additional investments



Reference : DNV-GL Maritime Forecast to 2050; Energy Transition Outlook 2018. Please refer to their website or offices for the complete report.



## TRANSITION TO A RENEWABLE BASED FUTURE

- Manu Singh

### The need to Reduce Carbon Footprint

Conventional Fossil based fuels have powered our shipping Industry now for well over a century. An entire Industry caters to fossil fuel propulsion, transportation over the seas, purification and refining, waste disposal, pollution control with their inherent challenges and limitations. Scientific research spanning decades has shown the ill effects arising from fossil fuel based propulsion, carriage, disposal and the pollution it causes. Yet so far the high costs of replacing fossil fuel based propulsion with renewable or low carbon footprint based solutions found very few takers because of technological limitations along with high costs. However the trends have changed since technological strides have resulted in lower costs for powering vessels with renewable energy and will make more choices of propulsion available to owners in the years to come.

In addition to the technological advances, like lowering of costs of alternate methods of propulsion, the Government of India is committed to

2015 Paris agreement to cut it's emissions by 30-35% of its 2005 levels It s also committed to 40% of it's energy to be produced through non fossil based fuel sources like Solar, Wind, Bio fuel. We see thus the main factors propelling a change in the way we propel our vessels coming in for a change from the traditional largely through:

1. Advances in Technology
2. Improvement in efficiency of energy storage and production
3. Reduction of costs and cost competitiveness.
4. Carbon Reduction imperatives from rationale and commitments.

The commitment and imperatives driving change to such a fossil fuel free future manifests in the Government's commitment to achieve 175 GW through green energy of which 100 GW would be through solar alone. The magnitude of these figures can be gauged by the fact that during the first 50 years of Independence we had installed only 100 GW total power capacity of all kinds. Thus in the next few years we will see change in the transition that

we have not witnessed as yet in decades. The signs of this happening are all too evident and have also been adequately covered in a previous paper.

Since efficiency and cost effectiveness are very key to the transition, it would be prudent to see how much efficiencies we can build up into traditional vessels using fossil fuels. We seem to have reached a plateau as far as specific fuel consumption goes and with some blending it is possible to reduce cost as well as emission. This is an option and methanol or blended fuels have been in the market now for some time now. As regulations have become stricter sulfur caps have risen and offset cost advantages due to lower oil prices. Yet for high powered engines on long voyages diesel options and LNG based solutions are still the most cost effective.

The primary reason is the large power requirement and technological limitations of large energy storage without charging. Yet if the power requirement and voyage length reduces then the cost and

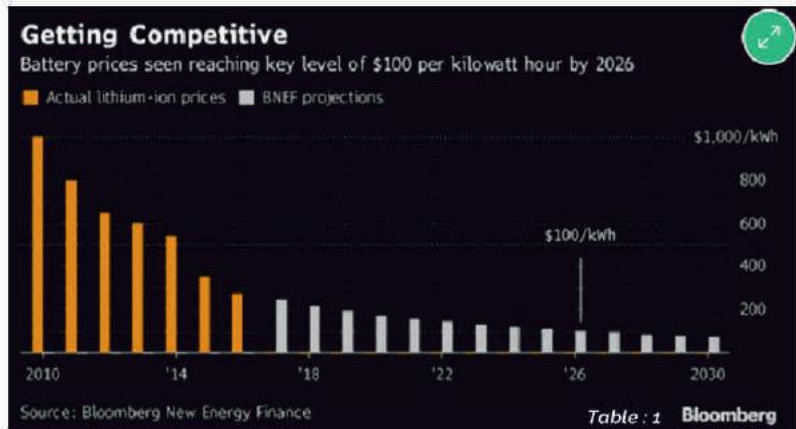
effectiveness of an alternate to fossil fuel emerges very clearly. And that is the where the fossil fuel free future based on renewable means finds the entry point. Thus the change is going to commence from low to medium powered vessels on short trips, eg typically ferries. We find this is exactly the segment where some battery operated vessels have been tested successfully. This will typically expand now for longer voyages and higher power as storage costs come down, storage efficiency increases and costs keep coming down. Not planning coastal and inland shipping to a future with the options for alternate propulsion may be risky as all indicators show more energy being packed per unit of weight as well as costs coming down drastically.

### Battery power for Inland and coastal ships.

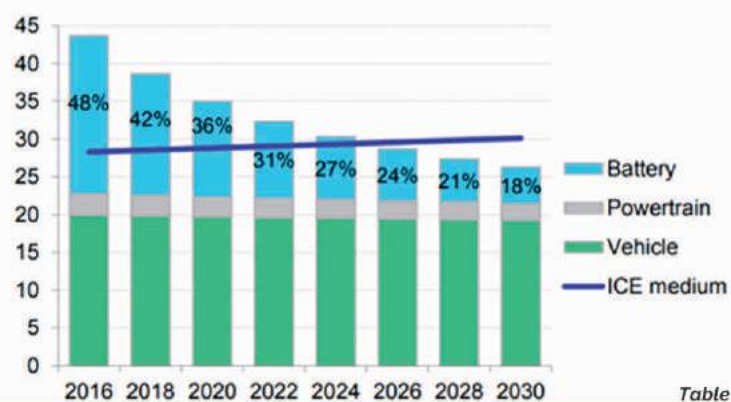
Inland and coastal vessels fall precisely in that category of both power and voyage length. Thus any decision we making regarding choice for kind of vessels for the next few years must include propulsion through alternate means. It is here important to understand there is only a particular limit to making our hull hydro dynamically efficient by modeling hull forms or rudder and propeller design changes improvements. The improvements will be in a few fractions of a percent and can reduce drastically due to fouling shaving off the actual savings even further. So while we save lesser each year by working on these aspects, we may have a much higher saving if we start to transition to hybrid vessels that have a percentage of power that is fossil fuel free origin. Now it would be possible to cut cost very significantly by a full few percentage points instead of the fractions that is being achieved through conventional means.

The chart above shows how the Li-ion battery costs & prices have trended. Starting with a cost of about \$1000/kWh in 2010, the costs have dropped to just over \$200/kWh in 2018 – an exceptional drop of 80% in just 8 years.

Moving forward, the cost is expected to drop to sub-\$200 in 2019 and continue decreasing. The magic number of \$100/kWh is expected to



BEV and ICE pre-tax prices in the U.S. for medium segment price, 2010-2030 (thousand 2016\$ and %)



be reached around 2025-2026

\$100/kWh is a significant milestone and the chart below depicts why it is so for electric vehicles: (Table: 2)

As per the graph above we can see in 2018, costs of EVs are on average about 25% higher than ICE vehicles. As battery costs keep coming down, the gap will reduce and by 2026 when the battery costs touch 100 USD/ kWh parity between battery vehicles and ICE vehicles is achieved. Beyond 2026, electric vehicles will cost less than ICE vehicles and run at a fraction of the cost. The Maritime industry can be expected to follow similar if not exactly the same trajectory with an expected offset cost due to industry specific factors, yet the trajectory cannot be expected to be different. Thus today a slightly higher capital cost is offset by the significantly lower costs for propulsion as compared to a diesel propelled vessel particularly for vessels on short voyages and up to about 1000 KW power requirements. Higher capital costs are offset by far lower operational costs and bring

about a high return to make it more cost effective in a few years as compared to conventional designs. Further we can see that 2026 the capital costs as well as operational costs will be far lower than any conventional vessel running on fossil fuel. That simply implies building a conventional vessel today will possibly have a competitive shelf life of only about 7 years from now, and will not be cost competitive if a non conventional battery based alternative is started in competition to it in a few years. Thus a financial risk analysis on such conventional constructions has become imperative today.

*(Manu Singh is a marine engineer, inventor, consultant and a pundit. He has several patents to his credit and has provided many innovative solutions to the industry. He has been a Technical Director and DPA in the shipping industry.)*



# HIMT Offshore

32, 4th Street, Dr.VSI Estate(Phase II), Near Hotel Holiday Inn, Thiruvanniyur, Chennai -41, INDIA  
 Phone (91-44) 3010 3010, 4343 9696 Email : admin@himtoffshore.com web: www.himtoffshore.com

## MCA [UK] Approved

Course	Days
Advanced Training for Oil Tanker Cargo Operations (TASCO)	5
Advanced Training for Chemical Tanker Cargo Operations (CHEMCO)	5
Advanced Training for Liquefied Gas Tanker Cargo Operations (GASCO)	5
Advanced Fire Fighting (AFF)	4
Proficiency in Survival Craft & Rescue Boats other than Fast Rescue Boats (PSCRB)	4
Medical First Aid (MFA)	4
Tanker Fire Fighting (TFF)	1
Electronic Chart Display and Information Systems (ECDIS)	5
Human Element Leadership and Management (HELM) (Operational / Management)	3/5

Attractive Discounted packages also available



## HIMT COLLEGE

Approved by D.G Shipping, Govt. of India  
 Affiliated to Indian Maritime University\*



Regd. Office : 11, Millers Road, Kilpauk, Chennai - 600010 - INDIA.  
 Campus : 55, East Coast Road, 72B, Vengambakkam, Kalpakkam - 603102, Tamil Nadu.

(91-44) 3010 3010, 4343 9696

admission@himtcollege.com

Duration : 6 Months  
 Starts : 1<sup>st</sup> July 2019

### GENERAL PURPOSE RATING (GP RATING)

Course Fee  
 ₹ 1,50,000/-

B.Tech*	B.Sc*	GME	ETO	OCCP
Marine Engineering	Nautical Science	For Graduate Mechanical Engineers	Electro Technical Officer	Orientation Course for Catering Personnel
<b>Duration</b> 4 Years	<b>Duration</b> 3 Years	<b>Duration</b> 1 Year	<b>Duration</b> 4 Months	<b>Duration</b> 12 Days
<b>Starts</b> August	<b>Starts</b> August	<b>Starts</b> Mar / Sept / Nov	<b>Starts</b> Mar / Jul / Oct	<b>Starts</b> Every Month
<b>Eligibility</b> +2 Pass with PCK 60% Min 50% in English	<b>Eligibility</b> +2 Pass with PCK 60% Min 50% in English	<b>Eligibility</b> BE Mech with final year 50% min 50% in English	<b>Eligibility</b> B.E / B.Tech with Min 50% in Final Year	<b>Eligibility</b> 10th / 12th Pass with 40% Min 40% in English

Online booking: [www.himtcollege.com](http://www.himtcollege.com)



# Fearnleys Weekly Report

(Published with permission)



## Rates

DIRTY (Spot WS)	Size	This week	Change
MEG/WEST	280 000	29.0	-4.0 ↓
MEG/Japan	280 000	59.0	-8.5 ↓
MEG/Singapore	280 000	60.0	-9.0 ↓
WAF/FEAST	260 000	57.0	-9.0 ↓

WAF/USAC	130 000	52.5	-10.0 ↓
Sidi Kerir/W Med	135 000	55.0	-12.5 ↓
N. Afr/Euromed	80 000	85.0	0.0 →
UK/Cont	80 000	97.5	-15.0 ↓
Caribs/USG	70 000	100.0	0.0 →

### 1 Year T/C (USD/Day)

VLCC	Modern	\$30,000	\$0 →
Suezmax	Modern	\$24,000	\$0 →
Aframax	Modern	\$18,750	\$0 →

VLCCs fixed in all areas last week	52	0 →
VLCCs available in MEG next 30 days	125	0 →

### 1 Year T/C Crude



## TANKERS

### VLCC

With the March VLCC MEG program behind us the Owning community was looking forward to a sprout of activity for early April with ambition to push rates up in to the ws60 eastbound. However, activity has thus far been disappointing. Ws59 is last done for a MEG/China run, although still about USD 30k per day in t/c returns on a non eco modern ship - well above historic returns for time of year. USG activity has also halted, and a handful of Owners having ballasted their ships from the east on spec are nervously awaiting fresh export cargoes to take them back east.

### Suezmax

Continued sparse activity in the West has allowed Charterers to pull rates even further down. The 1st decade in West Africa has been worked at a pedestrian pace with ships being picked off quietly and owners just content to cover cargoes closest to their dates. Meanwhile there has been a reversal of fortunes in the MEG with a flurry of action for first decade April dates and owners managing to wrestle back some control as the list has tightened. The Turkish delays have slowly decreased, and this has allowed more fluidity in the availability for the Black Sea. T D6 has come off to ws70 at the time of writing. The week ahead has a softer tone with still too many ships available and cargoes not seemingly increasing in volume.

### Aframax

The market for Aframax trading in the North Sea and Baltic came off significantly this week. Rates came under downward pressure due to lack of activity and tonnage building up. Everyone is now waiting to hear when ice restrictions in certain Baltic ports will be lifted. We expect this soft trend to continue. In the Mediterranean and Black Sea we have seen T D19 (cross-Med) drop to ws85 levels at the time of writing. Over the past week rate levels ex Black Sea have dropped from more than ws100 to sub-90 levels. On a lighter note, the current week started with a boost in activity as a steady flow of cargoes have come into the market decreasing the tonnage build up in the area and creating an optimistic vibe among Owners, who hope to see an upturn towards the end of the week, as there currently aren't any obvious alternative markets to flee to.





# Fearnleys Weekly Report

(Published with permission)

## Rates

Capesize (USD/Day, USD/Tonne)	This week	Change
TCT Cont/Far East (180' DWT)	\$13,700	-\$2,600 ↓
Tubarao/Rotterdam (Iron Ore)	\$5	\$0 →
Richards Bay/Rotterdam	\$5	\$0 →

Panamax (USD/Day, USD/Tonne)	This week	Change
Transatlantic RV	\$6,000	\$1,500 ↑
TCT Cont/Far East	\$14,000	\$2,000 ↑
TCT Far East/Cont	\$2,500	\$300 ↑
TCT Far East RV	\$8,300	\$300 ↑
Murmask h.13-ARA 15/25,000 sc	\$7	\$0 ↑

Supramax (USD/Day)	This week	Change
Atlantic RV	\$8,250	\$450 ↑
Pacific RV	\$9,500	-\$750 ↓
TCT Cont/Far East	\$13,250	\$350 ↑

1 Year T/C (USD/Day)	This week	Change
Capesize (180 000 dwt)	\$11,500	\$0 →
Capesize (170 000 dwt)	\$9,500	\$0 →
Panamax (75 000 dwt)	\$11,000	\$400 ↑
Supramax (58 000 dwt)	\$11,250	\$450 ↑

Baltic Dry Index (BDI)	This week
	709.0

### 1 Year T/C Dry Bulk



## LPG Rates

Spot Market (USD/Month)	This week	Change
VLGC (84 000 cbm)	\$560,000	\$101,000 ↑
LGC (60 000 cbm)	\$500,000	\$0 →
MGC (38 000 cbm)	\$495,000	-\$15,000 ↓
HDY SR (20-22 000 cbm)	\$490,000	-\$10,000 ↓
HDY ETH (17-22 000 cbm)	\$750,000	\$0 →
ETH (8-12 000 cbm)	\$430,000	-\$20,000 ↓
SR (6 500 cbm)	\$500,000	-\$40,000 ↓
COASTER Asia	\$260,000	\$0 →
COASTER Europe	\$280,000	-\$80,000 ↓

LGP/FOB Prices (USD/Tonne)	Propane	Butane
FOB North Sea/ANSI	\$413.00	\$473.00
Saudi Arabia/CP	\$490.00	\$520.00
MT Belvieu (US Gulf)	\$354.93	\$308.00
Sonatrach/Bethioua	\$420.00	\$490.00

## LNG Rates

Spot Market (USD/Day)	This week	Change
East of Suez 155-165 000 cbm	\$25,000	\$0 →
West of Suez 155-165 000 cbm	\$35,000	-\$4,000 ↓
1 Year T/C 155-160 000 cbm	\$73,000	\$0 →

## DRY BULK

### Dry Bulk

#### Capesize

After a period with improving levels, rates again turned red this week. Mainly as a result of a lack of miners in the market. Average index value is presently at disappointing USD 5,000 level. However, there were some good news from Brazil, were operations at Brucutu mine is expected to resume. So far, the effect has been seen in rising dry-bulk shares and improved FFA values. The closure of the mine after the dam burst 2 months ago is estimated to have caused approximately 5 million tons loss in production.

#### Panamax

More activity and positive sentiment this week, as rates have been increasing in both hemispheres. A transatlantic round voyage currently yields about USD 5,500 per day, while a short fronthaul from the Continent yields around low USD 13,000's. In the East, a Pacific round voyage pays around the USD 8,000's. The BPI 4T C-index is up 123 points for the week, currently at 962 points.

#### Supramax

The Atlantic market remained steady, with more cargo flow in ECSA/USG, lacking FH. East Mediterranean-Continent areas slow with limited fresh cargoes on the market. Flat market in Asia with slightly weak sentiment. Indian ocean stable with good levels achieved in South Africa. Tess 58,000 fixed for a trip delivery South Africa redelivery Pakistan-WC India close to USD 12,000s plus around USD 200,000 ballast bonus.

## Gas

### Chartering

At the time of writing the West market continues its upward trend. Vessel availability for April is relatively scarce for US Gulf and a West Africa cargo tender 18-20 April is seemingly pretty much down to the faith of one or two vessels, if that. We expect short term freight to continue strengthening and overhang of vessels available from April going into May will be reduced significantly. In the East - Saudi April acceptances came out over the weekend where as expected most lifters got delayed (or even deferred into next month) due to upstream oil cuts. A logical effect to this would usually mean lack of shipping requirements as most cargo dates are now quite forward, but as shipping availability is becoming increasingly tighter in the East; some players have started to move for 2H April dates. Last done deal in the MEG was done in the mid/high USD 30s, and there are still a handful of uncovered cargoes to be fixed for 2H April.

# Fearnleys Weekly Report

(Published with permission)

## Newbuilding

### Activity Levels



## Prices

Prices (Million USD)	Size	This week	Change
VLCC	300 000	\$91	\$0 →
Suezmax	150 000	\$61	\$0 →
Aframax	110 000	\$51	\$0 →
Product	50 000	\$37	\$0 →
Capesize	180 000	\$50	\$0 →
Kamsarmax	82 000	\$29	\$0 →
Ultramax	64 000	\$27	\$0 →
LNGC (MEG1) (cbm)	170 000	\$188	\$0 →

## Commodity Prices

### Brent Spot

\$67.54 ↑ \$0.85

### Bunker Prices

Singapore			Rotterdam		
380 CST	180 CST	MGO	380 CST	180 CST	MGO
\$431	\$463	\$6.18	\$411	\$448	\$579
↓ \$11	↓ \$6	↓ \$5	↓ \$6	↓ \$8	↓ \$7



## Sale & Purchase

### Prices

	2014	2009
<b>Dry</b>		
Capesize	\$40.0	\$24.0
Kamsarmax	\$25.0	\$16.5
Ultramax	\$24.0	\$14.0
<b>Wet</b>		
VLCC	\$67.0	\$45.0
Suezmax	\$49.0	\$34.0
Aframax / LR2	\$34.0	\$23.5
MR	\$29.0	\$17.0

## Market Brief

### Exchange Rates

<b>USD/JPY</b>	111.39 ↑ 0.01	<b>USD/KRW</b>	1130.65 ↑ 0.90
<b>USD/NOK</b>	8.52 ↓ -0.11	<b>EUR/USD</b>	1.13 ↑ 0.01

### Interest Rates

<b>LIBOR USD (6 months)</b>	\$2.67 ↓ -\$0.01	<b>NIBOR NOK (6 months)</b>	kr 1.37 ↑ kr 0.03
-----------------------------	------------------	-----------------------------	-------------------



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.

## NEWS FROM IME(I) BRANCHES

### MUMBAI IME(I)

The Mumbai Branch of the Institute of Marine Engineers (India) and Sea Commerce (UAE) organised International Technical Seminar on Sulphur Cap 2020 and Methanol as a Marine Fuel recently at IRS auditorium in Mumbai on 16th February 2019.

Chairman Mumbai Branch Mr Rajeev Nayyer welcomed the Chief Guest Mr Sekhar and thanked him for his continuing support to the IMEI and for gracing the occasion despite not being well. A special welcome was accorded to speakers from abroad Capt. Saleem Alavi, President Sea Commerce, UAE; Mr. Ben Iosefa, Methanex Corporation, Canada and Mr. Mark Penfold, ABS, London.

Inaugurating the seminar Mr. Sekhar in his address briefed the audience on Sulphur Cap regulations coming into force from January 2020 and explained how Methanol could become an alternative fuel like LNG. Methanol is produced commercially from natural gas and it can also be produced by the waste sources such as biomass. Everything in this world is complementary to each other therefore we all need to be in sync with the nature.

In the pre-lunch session topics covered Sulphur Cap 2020 and the speakers included Mr. Kunal Sharma Surveyor IRS, Mumbai on "Low Sulphur Fuel Regulations" updating audience on changes and amendments made to the Marpol Annex VI, particularly to the regulations 14 and 18.

"Owners perspective and preparation for compliance" was presented by Mr. I N Bose, Advisor, Great Eastern Shipping Co, Mumbai. He covered operational aspects of low sulphur fuel. Options for

compliance, including bunkering & storage onboard, preparing vessels for long voyages on low sulphur fuel and implications on engines.

Mr. M V Ramamurthy, President (Shipping), Reliance Industries Limited spoke on legal and insurance aspects once Low Sulphur fuel is introduced. He elaborated at length on the issues of Supply of Bunkers under TCPs and obligations of the charterers and supplies under VCPs. He also highlighted on Charter Party Precautions and concerns of BIMCO.

Alternative option of "Exhaust gas cleaning systems" was taken up by Mr. R C Bhavnani, VISWA group, Singapore. He explained on issues related to scrubbers, their viability, reservations imposed by few countries on open loop systems discharge ashore and on retrofits.

Mr. A B Dutta, Former Senior Dy Director General of Shipping (Tech), spoke on a very sensitive and critical issue of Monitoring by regulatory authorities and inspections by the Port state controls on implementation of sulphur cap. He was one of the regular members from India at meetings of IMO. Wearing a new hat, he spoke on guidelines of Port State control, Initial Inspections, Bunker delivery notes, Clear grounds for detailed inspections and the detainable deficiencies.

In the post lunch session Capt Saleem Alavi a former Director of UAE flag, introduced "Methanol as an alternative fuel". Giving an overview, he highlighted on positives of Methanol from commercial as well as technical & environment point of view. He compared various alternatives and

options available to the maritime sector and why Methanol is preferred to LNG.

Mr. Ben Iosefa, I/c Global market Development and stakeholder relations at Methanex, Corpn. Canada presented "Owners perspective on using Methanol as fuel, economics and availability". He spoke on the fears of the stakeholders and possible solutions. "Likely hurdles on the use of Methanol as Marine fuel" was elaborately covered by Mr. Mark Penfold, Manager, ABS Global Gas Solutions, London. Technical issues like low Flash point, low Calorific value and regulations under SOLAS were taken up by him. He explained implications of various regulations and safe implementation.

Cdr Sandeep Kumar, Surveyor, Indian Register of Shipping, Mumbai summarised the session with an overview of using Methanol in the Maritime sector. He stated that Methanol is a very promising and viable option but practicality and safety aspects needs to be further analysed.

Each half of the seminar was followed with a Question Answer session where very relevant and burning issues were raised and answered by the speakers. Entire seminar was well controlled and moderated by Mr. S M Rai, a veteran of the industry and included his crisp and sharp comments on the presentations.

Seminar concluded with a vote of thanks by Mr Girish Sreeraman, Secretary of the Mumbai Branch of the IME(I).

## PUNE IME(I)

Pune branch organized a lecture on December 27, 2018e by Mr. Pradeep Paranjape, B.E. (Electrical).

The topic installation of Solar Rooftop with Net Metering dealt with the basic concept of harnessing Solar Power for Individual, Commercial & Industrial purpose. The Solar Modules/ Panels via an Inverter can convert DC voltage to grid suitable AC voltage single phase or three phase as the connection may be. The excess energy produced in the daytime will be sent back to grid which will be utilized by somebody else. Details were discussed including the cost-benefit analysis of putting us such a solar panel.



## NERUL IM E(I)

On 23rd February 2019 IMEI, Nerul conducted a Technical Session on Maintaining Electronic Oil Record Books. The session was headed by Captain Amitabh Sankranti, Proprietor, Ingenium Marine Solutions Pvt. Ltd., which specializes in innovative products for the marine industry and provision of advanced data analytics.

Speaking on the topic, Mr. Sankranti explained that significant importance has been given to the latest IMO guidelines on electronic record keeping which is expected to be transposed as a regulation by mid2019. Speaking on the topic, Mr. Sankranti explained that significant importance has been given to the latest IMO guidelines on electronic record keeping which is expected to be transposed as a regulation by mid2019. He further described, as to how various operations relative to tanks, listed under item 3.1 and 3.3 in the Supplement to the IOPPC, are carried out; elaborated on tank capacities, tank sounding, oil transfer, incineration, evaporation and how record keeping is expected to be maintained in a digitised format, including how missing entries could be entered at a later mentioning.



Mr Sankranti speaking at IME(I) Nerul



## KARNATAKA IME(I)

IMEI Karnataka chapter conducted a technical meet on "Hazard Identification and Risk Assessment - ISM Code 2015", on 20th March, 2019 at Eden Club, Mangalore, India.

Mr. Keshava Rao, welcomed the members and the guests from IMEI Karnataka Chapter, Mangaluru, and other members from CMMI, Mangaluru Chapter and MNOA, Mangaluru. Mr. Amithabh Bhargava introduced the speaker.

The speaker of this technical meet was Mr. Ravi Rao, Ex. B.V. Surveyor who gave a detailed presentation on "Hazard Identification and Risk Assessment - ISM Code 2015" and explained that this is the latest in this field.

IMEI Karnataka chapter conducted a technical meet on "Hazard Identification and Risk Assessment - ISM Code 2015", on 20th March, 2019 at Eden Club, Mangalore, India.

Mr. Keshava Rao, welcomed the members and the guests from IMEI Karnataka Chapter, Mangaluru, and other members from CMMI,

Mangaluru Chapter and MNOA, Mangaluru. Mr. Amithabh Bhargava introduced the speaker.

The speaker of this technical meet was Mr. Ravi Rao, Ex. B.V. Surveyor who gave a detailed presentation on "Hazard Identification and Risk Assessment - ISM Code 2015" and explained that this is the latest in this field.

ISM Code 2015 is explained in such a way that a common man can easily understand what is the objective evidence, objective, ISO 45001-2018, OCCUPATIONAL HEALTH AND

SAFETY MANAGEMENT SYSTEM, the aim of system, purpose of managing the OH&S risks etc. Ultimately reducing the OH&S harms and thereby increasing the OHS performance. He emphasized the success of the system depends upon the leadership, commitment and participation from all levels and functions of the organization.

Mr. T. Narayana chaired the whole meeting, announced the assistance given by the speaker and presented a memento to the chief guest, Mr. Kasaragod Prakash Pallath gave the vote of thanks.



## VISAKHAPATNAM IME(I)

The Institute of Marine Engineers (India) Visakhapatnam conducted a Technical Meet on 22nd February 2019 at the branch. The topic of the session was "Dry Dock Gates" presented by Dr. Bh. Nagesh., IMU, Vizag.

In his presentation he explained how the different gates are manufactured as per the requirements and for the easy operations. He explained in detail about mitre type dock gates. He also highlighted contemporary trends in the design of dry dock gates for graving docks particularly for mitre type dock gates.

Mr. C Sriramamurthy, Chairman of the branch, Dr. D.S. Anand, Hon. Secretary, Mr. V. Lakshmi pati Rao, G.C. Member, Prof Dr. V.V.S. Prasad and the members took active part in the discussion after the presentation.



## KOCHI IME(I)

On 01 March 2019, upon the successful completion of the inspection, by MMD, of the IME(I), Kochi branch, the Directorate General of Shipping, granted the branch an approval for conducting the Refresher and Updating Training (RUT) course for all Engineers.

With this approval, IME(I) Kochi branch now has the requisite approval to run three courses:

- 1.) MEO Class I, (Preparatory)
- 2.) MEO Class II, (Preparatory) &
- 3.) RUT

IME(I) Kochi branch participated in the Friendship Tournament (NMDC Cup) organised by the Merchant Navy Club, Kochi in connection with the National Maritime Day Celebrations 2019. Teams from IME(I) Kochi participated in the Table Tennis, Football and Cricket tournament conducted from 16th March '19 to 29th March '19.



CMMI jersey was released to team leader by IME(I) Chairman Mr. NMC Nair



# MASSA MARITIME ACADEMY (CHENNAI)






83 & 84, NEHRU NAGAR, 1<sup>ST</sup> MAIN ROAD, KOTTIVAKKAM (OMR), Chennai - 600041  
 TEL: 88070 25336; 72000 25336  
 AOH: 9884042103  
 E-mail: [massa.academychennai@gmail.com](mailto:massa.academychennai@gmail.com)  
 WEBSITE: <http://massa-academy-chennai.org>

ISO 9001:2015 Certified By ABS & Graded A1 (Outstanding) By NKK

COMPETENCY COURSES	COMMENCEMENT	FEES
MEO Class I - Preparatory course	Commencement: 1st of every month	Rs. 30000
MEO Class II - Preparatory course	1 <sup>st</sup> of every month	Rs. 41000
MEO Class IV - Prep. (Non DG) 2 months	1 <sup>st</sup> of every month	Rs. 10000
2ND Mate (FG) Function course	15 <sup>th</sup> Feb, 15 <sup>th</sup> June, 15 <sup>th</sup> Oct	Rs. 33000
Chief Mate (FG) - Phase 1 Course	15 <sup>th</sup> Mar, 15 <sup>th</sup> June, 15 <sup>th</sup> Sept, 15 <sup>th</sup> Dec	Rs. 41000
Chief Mate (FG) - Phase 2 Course	15 <sup>th</sup> Jan, 15 <sup>th</sup> Apr, 15 <sup>th</sup> July, 15 <sup>th</sup> Oct	Rs. 46000
Advanced Shipboard Management course	1 <sup>st</sup> Jan, 1 <sup>st</sup> March, 1 <sup>st</sup> May, 1 <sup>st</sup> July, 1 <sup>st</sup> Sep, 1 <sup>st</sup> Nov	Rs. 30000

MODULAR/SIMULATOR COURSES	COMMENCEMENT	FEES
Diesel engine combustion gas monitor simulator	1 <sup>st</sup> of every month	Rs. 10000
Engine Room Simulator - Management level	4 <sup>th</sup> of every month	Rs. 10000
Engine Room Simulator - Operational level	4 <sup>th</sup> Monday of every month	Rs. 5000
Radar Observers Simulator course (ROSC)	2 <sup>nd</sup> Monday of every month	Rs. 8000
Automatic Radar Plotting Aid Simulator course	4 <sup>th</sup> Monday of every month	Rs. 5000
RADAR, Arpa, Navigation Simulator course	1 <sup>st</sup> Monday of every month	Rs. 10000
Ship maneuvering simulator & bridge teamwork course (SMS & BTW)	3 <sup>rd</sup> Monday of every month	Rs. 16000
Liquid cargo handling Simulator course	1 <sup>st</sup> Monday of every month	Rs. 10000
MEO Refresher & Upgradation Course	4 <sup>th</sup> Monday of every month	Rs. 7000
High voltage Course (Mgmt & Ops level)	1 <sup>st</sup> & 4 <sup>th</sup> Monday of every month	Mgmt Rs. 15000 Ops Rs. 3000
Medical First Aid (4 days)	1 <sup>st</sup> Monday of every month	R. 5000
Medical Care (10 days)	3 <sup>rd</sup> Monday of every month	Rs. 10000
Ship Security Officer	2 <sup>nd</sup> Monday of every month	Rs. 5000



**WINNER OF BEST INSTITUTE**  
For Post Sea Competency Courses Award  
South & East India Region  
Based on maximum votes  
polled from Seafarers



**BEST INSTITUTE FOR**  
Post Sea Competency Courses Award  
Winners  
Massa Maritime Academy (Chennai)



**INDIAN MARITIME ACADEMY AWARDS**



**ANAB**  
ISO 9001 : 2015



**Grade A1**  
(Outstanding)

SPECIALIZED ENGINEERING COURSES	FEES
MAN B & W - ME Engines - Operation and Analysis Course: 5 days - Every 3 <sup>rd</sup> Monday of the month	Rs. 35000
Practical Marine Electrical Workshop: 6 days. - Every 2 <sup>nd</sup> Monday of the month	Rs. 30000
Hydraulic Breakdown Management Workshop : 2/3 days (in-house course on demand)	

DNV-GL COURSES	FEES
Internal Auditor for ISM/ISPS/MLC	Rs. 20000
Designated Person Ashore	Rs. 20000
Practical Incident Investigation & Root Cause Analysis	Rs. 20000
Vetting Inspections - 2 day	Rs. 20000
Surveys and Certificates - 1 day	Rs. 10000

ATTRACTIVE PACKAGE DISCOUNTS AVAILABLE



## The Institute of Marine Engineers (India)

IMEI HOUSE, Plot No.94, Sector-19, Nerul, Navi Mumbai. **Tel.** : 2770 1664, 2770 6749  
**Telefax:** 27711663 (Direct), **Email:** training@imare.in. **Website:** www.imare.in

### REGISTRATION OPEN FOR Following DGS APPROVED COURSES

- MEO CL. I (FG) 2 months course commencing on 2nd May 2019/1st July 2019/2nd Sep. 2019/1st Nov. 2019 and will be followed by Diesel Engine Gas combustion Simulator course in the same premises
- MEO CLASS III (NCV\_CEO) UPTO 3000kW - STCW 2010- 2months course - 2nd May 2019/1st July 2019/2nd Sep. 2019/1st Nov. 2019
- MEO CL. III (NCV\_SEO) Part-A - STCW 2010 -2months course - 1st April 2019/1st June 2019/1st Aug. 2019/1st Oct. 2019/2nd Dec. 2019
- MEO CL. III (NCV\_SEO) Part-B - STCW 2010 -4months course - 2nd May 2019/1st July 2019/2nd Sep. 2019/1st Nov. 2019
- MEO CL. II (FG) - 4 months Prep. Course commencing on 1st April/2nd May/1st June/1st July/1st Aug./2nd Sep./1st Oct./1st Nov./1st Dec. 2019
- MEO CL. IV (NCV) 4 months Course Commencing on 1st April 2019/1st June 2019/1st Aug. 2019/1st Oct. 2019/2nd Dec. 2019
- MEO CL. IV (FG) non mandatory course (2months duration) - On request
- 2 weeks Induction course for Naval candidates - on request
- Revalidation course For Engineer Officers commencing shortly

### - Features -

- ✓ Experienced Faculty
- ✓ Air Conditioned Class Rooms.
- ✓ Well-Stocked Library
- ✓ Individual Attention
- ✓ special tutorials for orals.

### Note: Payment can be done through the ICICI Bank

(IFSC Code: - ICIC0000151)

on A/C No.015101031872 in the name of

**"The Institute of Marine Engineers (India)"**

only after confirming the availability of seats.

Please make the payment from saving bank account only

(not from NRI/NRE account)

For enquiries contact on **022-27711663**

(between 1400 1700 hrs.)

## MARITIME DESTINATION HOSTED “HONOURING THE AUTHORS” EVENT AT MUMBAI



**Pic: Left to Right: Capt Naphade handing the awards to co-authors, Mr Vikram Gokhale and Mr. Nanda.**

Till about a few decades ago, the Indian Seafarers / Trainees, as well as the Indian Maritime training institutes, relied heavily on costly books written by foreign authors, primarily from the United Kingdom.

Subsequently, veterans of the Indian Maritime industry felt that there was a need for books by Indian authors and took the lead to publish text books for mariners.

There are now excellent Marine books, published by the Indian Authors, who have dedicated themselves to serve the shipping industry. This has considerably eased the financial burden (of costly

foreign books) on the cadets / trainees / officers.

Though these authors have devoted their time and talent for writing and updating these books, their efforts have not been duly recognized by the Maritime Industry.

“Maritime Destination”, a popular Monthly Maritime Journal, intends to felicitate these stalwarts for their hard work, by honouring them at a suitable occasion for their efforts.

It hosted “Honouring The Authors” event on 8th March, 2019 at Acres Club, Chembur, Mumbai, India.

It is proud to state that two of our members from IMEI have been

honoured by such prestigious award in this event. Mr. Achyut S. Tambwekar (F-708) and one of our faculty Mr. Vikram Gokhale have been honoured by Maritime Destination for their effort and dedication in this regard.

IMEI congratulate both of them for this achievement!







## FULL MISSION ENGINE ROOM SIMULATOR INSTALLED AT IMEI(I)'S TRAINING CENTRE AT NERUL, NAVI MUMBAI

- Krishna K Nair

A Full Mission Engine Room Simulator (FMERS), was installed and commissioned at IMEI House, Nerul, Navi Mumbai, on 07 March 2019.

**IMEI(I) is indebted to the generous support of The DL Shah Trust, Mumbai which made possible the setting up of this FMERS. We thank the Trustees of The DL Shah Trust for their magnanimous gesture.**

The acquisition, represents the fulfilment of IMEI(I)'s long-standing need for a FMER Simulator & makes

IMEI(I) a 'one stop shop' for the CoC Preparatory Courses that IMEI(I) run.

This DNV- GL certified, FMER Simulator meets and exceeds current STCW requirements for ER Simulator Courses (at both the Operational and Management levels), those described as at IMO model course 2.07(2017 Edition) as well as DGS guidelines for approval of Simulator Courses and facilities.

The Kongsberg, Norway, make K-Sim® Full Mission Engine Room Simulator is a dynamic, real-time, process based, High Fidelity

simulator based on real engine physics that enhances realism in training.

This FMER Simulator simulates the latest L-11, MAN 6570 ME Engine for a Suezmax Crude Carrier and runs the most recent version of the K-Sim® Simulator OS & simulation software.

Simulations include overall running of the engine, its subsystems and crisis management exercises.

The new Simulator Centre at IMEI House consists of four acoustically isolated spaces or rooms, namely

## ADVANTAGES OF FMER SIMULATOR BASED TRAINING

- - A Full Mission Engine Room Simulator (FMERS) enables high quality training in every aspect of the complex behaviour of a ship's engine room machinery; from single sub and auxiliary systems to the overall running of operations.
- - A FMERS offers a physical familiarity with the real shipboard environment and includes a fully equipped engine room, engine control room, interactive mimic panels, consoles and an instructor room.
- - Simulator based training , vis-à-vis conventional training, offers a structured, experiential level of training, better suited for adult learning. Simulation offers learner participation. It provides an opportunity for the learner to apply theoretical knowledge by performing critical operations ; quickly learn from any mistakes without serious implications ; develop and hone attitudes for situations that demand complex decision making and gain vital skills crucial for handling emergencies.
- - Simulator training is an effective way to build competence and confidence & maximise performance leading to enhanced operational safety and efficiency.
- - Learners whet their hands-on and thinking skills; demonstrate knowledge-in-action ; use standard ship board operating procedures to address malfunctions / crisis situations and learn the importance of effective communication in their decision-making.
- - Simulation learning can be customised to suite beginners, intermediates and experts to hone their skills.
- - Feedback can be given to learners immediately and allow them to understand exactly what went wrong and how they could improve.

the

- Engine Room (ER),
- Engine Control Room (ECR)
- Instructor Room / Station
- Briefing Room

1. The ER: Four nos., 'Big View ®' 65-inch touch screen 'mimic panel' monitors make up the Engine Room, with its interactive and schematic

display of all ER systems and subsystems . Along with the LOS (Local Operating Station) the 'Big View'® can be used for the operation of the ship's machinery and subsystems, mimicking local ER operation of machinery on a ship.

An, included, 3D Walkthrough presentation of selected Engine Room spaces allows the student, a

very realistic, 3D, virtual, 'walk around' of ER spaces and enables the operation of machinery (e.g. opening / closing valves, switching on/off equipment et al ), using hand held X-Box controls.

Sound systems and alarm annunciators complete the simulation of an ER.

### 2. The ECR



Housed here are three touch screen Control Room Consoles ( Data Chief® and Big Chief®) & five in number touch screen Main Switch Board consoles that display the various (switchable) main machinery controls and power management ( generator) information respectively , much the same way as one would expect to see in a ship's Engine Control Room . The five MSB consoles can display a total of 12 nos. console information .



### 3. The Instructor Room

This consists of an instructor, monitoring and assessment system that allows the running of customised exercise modules and scenarios based on various variables and inbuilt malfunction setup situations which require student action. The station can also be used to transmit customised 'e-coach' messages / instructions to the trainee . Recording of training exercises enables reruns and its

review at a later stage.

### 4. Debriefing Room

This room is equipped with a white board , LCD projector / laptop & provides for a recapitulation , review or a rerun of the student exercises.

This simulator is something that each one of our 11500 + members should be rightfully proud of. It represents the best in class and most advanced FMER simulation technology available in the market today.



## IIRE's "Global Seafaring Human Resources Report 2019" Released!

The Global Seafaring Human Resources Report 2019 was released amidst the who's who of the Indian maritime fraternity at a well attended knowledge seminar organized by the ISF Group on the 20th March 2019. This day marked the 15 th Anniversary celebrations of ISF Maritime Services at which the Director General of Shipping, Shri Amitabh Kumar was the Chief Guest. The report was released by the Chief Guest, Capt. Navin Passey-Chairman FOSMA, and Capt. Mahesh Garimella from MASSA. This comprehensive report which serves as an excellent ready reckoner, covers analysis of data from the key seafarer providing nations from Asia, European Union, Eastern Europe, Russia and Other CIS Countries who collectively account for nearly 80% of world seafaring population. The report is an effective assistive tool to understand the growing need of shipping in the global economy and the availability of seafarers from various regions, their numbers, future potential, and relative



competitiveness. The report assists the ship owners and operators spread across the globe, to arrive at better decisions with regards to the choice of seafarers to run their ships efficiently and effectively. The chapters of this extensive 110 page report include international trade and shipping environment, seafarer demand and supply, wages analysis of various nationalities, and budgets of wages for all levels of seafarers for all types of ships. IIRE has been conducting and

publishing the Compensation and Benefits Survey Report on Indian seafarers working on foreign ships annually since 2009. To commemorate the 10th year since commencement of this report and expand IIRE's reach to the world shipping community, the institute undertook the ambitious project with technical support from members of the key industry associations, namely FOSMA and MASSA.

## Contribution from Ocean Sparkle Ltd to IME(I) Benevolence Fund.

IME(I) gratefully acknowledges the contribution of INR 20,00,000 (Indian Rupees Twenty Lakhs), towards its Benevolence Fund, from Ocean Sparkle Ltd – India's leading Port Operations and Marine Services Company.

This generosity is appreciated very much by the beneficiaries of the fund.

This is a second donation received from the company to the Fund.

The Benevolence Fund, was instituted for affording relief, through the grant of financial assistance, to indigent members of the Institute and the families of deceased members.

Such support from donors goes a long way in IME(I) fulfilling its stated objectives, including benevolence.

# LEARNING TO LEARN - EXPERIENTIAL LEARNING

- Debabrata Pattrea



*"All knowledge of reality starts from experience and ends in it"*

- Albert Einstein

**We hear and we forget; we see, and we remember; but we understand only when we do.**

So, nothing beats experiential learning especially in today's day and age of fast evolving technology and digitisation. Our traditional approach towards training where class room based taught courses were the norm would fall well short when it comes to equipping trainees with the right skill sets to take on the rapidly changing information technology-based models that focuses on innovation and out of the box thinking!

So, it is important to introduce trainees to environments that give an impetus to their innate creativity and allow them opportunities to explore their latent creative potential.

Many would argue what is the need for experiential learning?

To understand the need, first we need to have clarity regarding the term "competence" vis a vis "training".

Training is about enabling acquisition of skill not simply knowledge. However, a trained person need not necessarily be a competent person. Competence is the ability to demonstrate use of knowledge, skills and attitude to achieve results which are the objectives of a job.

Under class room conditions, or a training environment which enables practice of techniques, a person may have acquired the necessary skills, but he may fail to demonstrate same at the actual workplace where these skills need to be applied. This can be due to

several factors which affects his ability to produce results required of a job.

So, it is obvious that a trained person need not necessarily be a competent person!

Training can be a combination of theory and practice, taught courses, on job training etc. However, competency has several aspects, of which training may be only one. Other aspects can be skills, pre-existing knowledge, experience, aptitude, attitude, understanding of job objectives, surrounding environment, wide array of human factors etc.

So, qualifications accrued from training or any amount of training does not necessarily guarantee competence. Inherent aptitude, experience, intuition etc. all singly or in combination can ensure achievement of objectives of a job.

Now the question arises, how does one ensure competence? To be able to answer this question, one must first ascertain the expectations or objectives of a job role or function. Surely, this will require a review of job descriptions, responsibilities and roles as also minimum standards such as industry best practices and required training /certification.

For high risk jobs like in maritime industry, higher competency is required due to the degree of complexity and expertise besides of course the degree of risk

Experiential learning provides opportunity to the trainees to explore their "competence" or how far they are from same, in an environment of simulated tasks that mimic the challenges faced at actual job place

For new trainees this can be through OBL (OUTWARD BOUND LEARNING ) and for those already in different ranks, this could be through OBL, simulators, on job training ora combination of them.

Many argue that in the context of seafarer's training and certification, assessments of seafarers form the basis upon which they are granted a COC (certificate of competency) for roles and levels of responsibilities, thus licensing them to operate and

maintain a vessel and its equipment. Then why duplicate the exercise at the recruitment stage of different companies?

But we are all aware that accidents on and involving ships have often resulted in loss of life or limb and damage to marine environment. Analyses of these accidents and incidents have proved conclusively that major percentage of such accidents can be attributed to human error. Operational mistakes and errors by ship's crew have negatively affected all stakeholders in maritime industry besides of course taking toll on human life and limb and marine environment. This clearly points to the obvious fact that seafarers' competence levels have been far from that required to operate ships safely and efficiently. Assessment methods used prior issuing COC's are hence not reliable. And that further points to inadequacy of STCW standards that are used by administrations and training institutes to certify, train and re-train! In fast changing regulatory regime and engineering developments, standards like STCW are bound to get obsolete by the time they are released leave alone implemented!

The traditional approach is surely not working and/or would not continue to work in such rapidly changing scenario of technological advancements.

We need to explore methods like experiential learning which helps learners imbibe complex skill sets, behavioural changes and innovative ideas in an engaging and animated environment. Such learning can supplement traditional methods if not replace them.

After all "safety" when it is a "behaviour" is more potent than when it is a "skill."

We can well conclude by quoting Aristotle

"For the things we have to learn before we can do them, we learn by doing them."

**(Debabrata Pattrea is a DMET passout of the 1997 batch. He has sailed extensively and presently working with the Synergy Group at Chennai.)**



**MSC taking YARD deliveries of 23000 TEU vessels**

Work with an **Ownership Company**  
 MSC offers the best terms & conditions,  
 internet on board, Indian food,  
 one of the best round the year medical insurance  
 scheme in the industry and a safe environment to work.  
**Make a change for the Better!!**

Please send your CV for careers on Cargo Ships to:  
[jobs@msccs.com](mailto:jobs@msccs.com)



**MSC Cruises** is the world's largest  
 privately-owned cruise line.  
 MSC Cruises takes real pride in the people who make  
 a difference every day on our ships and in our offices  
 around the world.  
 Various jobs on Cruise ships for Chefs, Cooks, Restaurants,  
 Bar, Room Service, Pool Department, etc..

Please send your CV for careers on Cruise ships to  
[cruisejobs@msccs.com](mailto:cruisejobs@msccs.com)



 2013 to 2017	 2018							
*MSC Shipmanagement Ltd wins "Sailor Today Awards" for the Prestigious category "SHIP MANAGER OF THE YEAR" for fifth year in a row	MSC Shipmanagement Ltd awarded the "GREEN COMPANY OF THE YEAR" at the prestigious 17th Annual Sailor Today Sea Shore Awards ceremony	MSC Crewing Services Pvt. Ltd awarded the "BEST FOREIGN EMPLOYER OF THE INDIAN SEAFARER" on National Maritime Day 2015 & 2017	MSC Crewing Services Pvt. Ltd awarded "CARING COMPANY OF THE YEAR 2016" "BEST MANNING COMPANY 2017" & "SHIPOWNER-SHIP MANAGER MANNING TRAINING CO. OF THE YEAR 2018"	MSC Shipmanagement Ltd awarded "CYPRIOT MARITIME INDUSTRY AWARD 2017"	MSC Crewing Services Pvt. Ltd awarded "BEST EMPLOYER FOR DRY CARGO VESSELS LARGE SEGMENT" ON DRYING MARITIME CHOICE AWARDS 2018	MSC Shipmanagement Ltd wins "Seafarer of the Year Award" at prestigious CREW CONNECT GLOBAL AWARDS at Manila	MSC Crewing Services Pvt. Ltd bestowed with "BEST EMPLOYER OF THE YEAR" at SEALING INDIAN ANCHOR AWARDS 2018	

**TRUST, RELIABILITY, STABILITY & GROWTH**

For further details please call us on our toll free number 1800 209 2555 or simply walk into

**MSC CREWING SERVICES PVT. LTD.**

**Regd. Off:** MSC House, 2nd & 3rd Floor, Andheri-Kurla Road, Andheri (East), Mumbai- 400059. (INDIA)

Tel : +91-22-6752 2555 | Fax : +91-22-6752 2525 | Website: [www.msccs.com](http://www.msccs.com)

CIN No: U63090MH2005PTC151320

New Delhi - Tel: +91 11 43017707/08/09 Email: [delhi@msccs.com](mailto:delhi@msccs.com)

Cochin - Tel: +91 484 4039010/9011 Email: [cochin@msccs.com](mailto:cochin@msccs.com)

Chennai - Tel: +91 44 40155305/06/07 Email: [chennai@msccs.com](mailto:chennai@msccs.com)

Kolkata - Tel: +91 33 40393402/03/08 Email: [kolkata@msccs.com](mailto:kolkata@msccs.com)

Patna - Tel: +91 612 2260211/58 Email: [patna@msccs.com](mailto:patna@msccs.com)

License No. : RPSL-MUM-052 Valid from 06/12/2016 to 05/12/2021

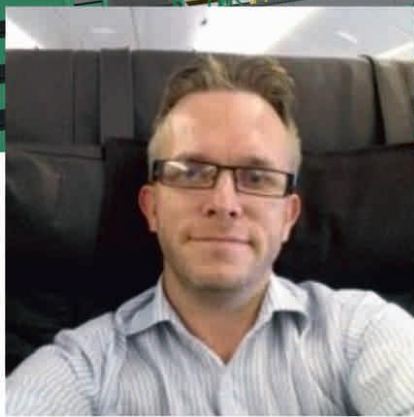
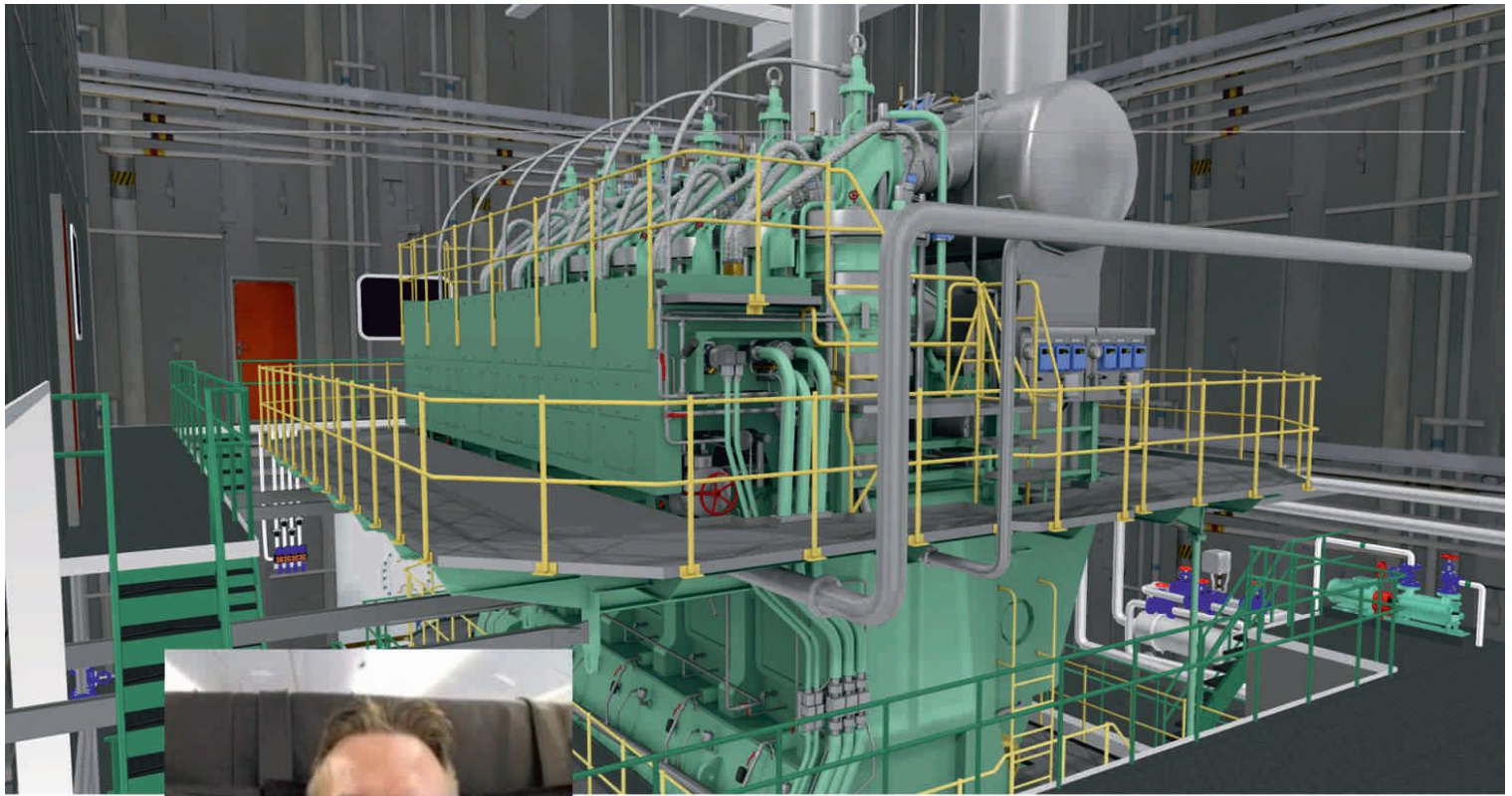
We have NO AGENTS acting on behalf of the company. Be aware of fraudulent job offers misusing our name and report immediately to us

<p><b>Marine Machineries</b> 2nd Edition <b>By T.B. Srinivasan</b></p> <p>List Price - Rs. 450 For Members - Rs. 400 For Students - Rs. 350</p>	<p><b>Safety of Ships and Marine Environment Protection</b> 4th Edition <b>By A.S. Tambwekar</b></p> <p>List Price - Rs. 400 Member's Discount - 10%</p>
<p><b>Introduction to Practical Marine</b> (Two Volumes-Indian Edition) List Price (per set) - Rs. 700 Price for Members - Rs. 600 Engineering Price for Students - Rs. 500 Bulk Orders, 25 or more sets - Rs. 500</p>	<p><b>Auditing the ISM – A Guide for ISM Auditors</b> 3rd Edition (Hard Bound) <b>By Ajoy Chatterjee</b></p> <p>List Price - Rs. 1200 Price for Members - Rs. 1100</p>
<p><b>Energy Efficiency and Ships</b> <b>By Indra Nath Bose</b></p> <p>List Price - Rs. 800 Price for Members - Rs. 700</p>	<p><b>Strength of Ships and Ocean Structures</b></p> <p>List Price - Rs. 425 Price for Members - Rs. 375 Price for Students - Rs. 300</p>
<p><b>The Process of Shipbuilding</b> <b>By Rajesh Singh</b></p> <p>List Price - Rs. 900 Price for Members - Rs. 800</p>	<p><b>Corporate Transformation Without Tears</b> <b>By Dr. L.R. Chary</b></p> <p>List Price - Rs.150 Price for Members - Rs.135 Price for Students - Rs. 105</p>
<p><b>Naval Architecture and Ship Construction</b> <b>By A.S. Tambwekar</b></p> <p>List Price - Rs. 400 Price for Members- Rs. 350</p>	<p><b>MER (I) Archives Now on CD</b> Inaugural Issue September 1980 – Rs.300 1982-2006 – Rs.250 per year Cost of the full set for 26 years – Rs.5000 (Price inclusive of postage within India)</p>
<p><b>Guide to Data Collection System Reduction of GHG Emission from Ships</b> <b>By Indra Nath Bose</b></p> <p>List Price - Rs. 600 Price for Members - Rs. 500</p>	<p><b>Boilers For Motor Ships</b> <b>By A. K. Ramanujan</b></p> <p>List Price - Rs. 500 Price for Members - Rs. 400</p>

**For placing orders, please contact:**

IMEI House, Plot No. 94, Sector 19, Nerul, Navi Mumbai-400706.

Phone: 91-22-27701664, Email: [administration@imare.in](mailto:administration@imare.in), All Postage charges extra



## INTERVIEW

**Excerpts from an interview with Mr Brede Olsen, Project Engineer for the Kongsberg make K-Sim® Full Mission Engine Room Simulator installed at IMEI House, Nerul, Navi Mumbai.**

*Brede Juvik Olsen, Project Engineer with Kongsberg Digital (KDI), Norway, has over 20 years of varied experience in the running, maintenance, installation and troubleshooting of advanced automation equipment and simulators, having worked for Kragerø Elektriske AS and Royal Caribbean Cruise Lines prior to joining Kongsberg Digital as a Commissioning Engineer in 1999.*

*In a brief interview for MER, Mr. Olsen, spoke to Ms Rashmi Tiwari, Sub Editor, MER about the simulator at IMEI and his overall experience during the installation of the simulator at IMEI House, Nerul, Navi Mumbai. A transcript of the interview is reproduced below.*

**Q. From an overall perspective, please brief us as to how this simulator can help build and hone the competence of sea going engineers?**

**A.** First and foremost a simulator provides an engineer, especially fresh engineers, the much needed familiarity with the shipboard environment. With a simulator, besides a hands on experience in the overall operation of the main engine, various shipboard systems and subsystems, the trainee can, through crisis management exercises, experience simulations of real life emergencies and how these can be handled -- via ECR consoles or the Local Operating Station (LOS) in the

"Engine Room".

For example, a fire, in say the purifier room or on the cylinder head platform, can be simulated, with the trainee being tasked to take appropriate actions to put off the fire. This installation can thus play a vital role in ensuring safety on board. Understanding processes is crucial for engineers to achieve optimum engine control in day-to-day operations and for handling emergencies and abnormal situations that might occur on board.

A 3D walkthrough and X box Control enables the student to 'walk around' the ER, open doors, enter spaces and operate specific controls, open / shut



valves&push buttons on a local panel to stop and start equipment.

It is a well-known fact that the majority of marine accidents at sea can be attributed to human error or unfamiliarity with the operation of shipboard equipment. This is where a simulator training helps in mitigating and avoiding errors on board.

Simulators can be used (by the Instructors) to build student exercises that incorporate malfunctions which the student would be required to identify and set right.

Simulator training thus reduces the risk of human error in the operation and maintenance of marine equipment. It will help the engineers to recognise risks and be aware of specific points of attention in the operation of shipboard machinery and subsystems.

The FMER Simulator at IME(I) simulates the latest L-11, MAN 6570 ME Engine for a Suezmax Crude Carrier.

**Q. How long have you been installing and commissioning simulators and how many simulators have you installed worldwide, as we speak?**

**A.** I have been doing this work for the past 15 years and my best guess would be 60-70 simulators, globally, up until now.

**Q. Tell us something that is unique about this simulator.**

**A.** The unique thing about this simulator is that this simulator runs simulations for the latest, camless, L-11, MAN 6570 ME engine.

To meet the present and future training needs in the maritime industry, Kongsberg has developed this model. This is a highly realistic

training tool which has been developed based on actual ship specifications and performance data, making simulations as realistic as possible.

Secondly, it is a cost-effective solution to fit every requirement and budget. It can be configured from a PC desktop to an operational full mission engine room simulator using custom panels and ship equipment.

It has been designed to enhance the quality of simulation training by providing complete, intuitive and user-friendly control of student exercises. In addition, this gives a new level of realism, as students can train on (simulations of) identical equipment that they will later operate onboard ships.

**Q. How can students benefit from this simulator?**

**A.** The Human Factor is one of the major reasons for incidents and accidents on board. Training of the entire crew both in procedures, communication as well as emergency situations is important and is key to improving knowledge and reducing the risk of human failures.

This simulator will provide students with highly realistic training using objects and equipment that behave and interact as in real life. The students will learn a vast array of skills thanks to the high fidelity realism this engine room simulator system offers. They can be trained for handling of emergencies and failures, fault diagnosis and tracking, crisis management, restoring the systems to normal operation, factoring in external conditions etc. Overall, this training will assist the trainees not to repeat the errors onboard.

Recordings of exercises can be rerun during debriefing to learn from.

**Q. What were the challenges you faced during installation of this simulator, in this instance, at IME(I)?**

**A.** There were really no challenges with this installation per se. None at all.

Usually, at almost every site there is always something missing, something broken, something not in place. But, this site was perfect. There's nothing that could be termed as a challenge here. Overall, a good experience for me. I appreciate the invaluable support of the management and staff of IME(I).

**Q. Have you had any previous experience working in India? Have you installed simulators at other sites in India as well?**

**A.** I have been to India, once previously, to install a simulator at Chennai some 10 years ago. But that was an old type of simulator with push buttons. There were no touch screen technology then. So, this is my second visit to India, for the IME(I) project, and I am really happy that this is next-gen simulator has been installed here.





**KALYAN BHATTACHARYA (F 4754)**  
**20-9-1950 to 27-2-2019**

The Members of the Institute of Marine Engineers deeply mourns the sudden passing away of Shri Kalyan Bhattacharya on 27th February 2019. He was sixty-nine.

A prominent and active member of the Institute of Marine Engineers (India), he was a frequent member of events organizing committees, always volunteering to help out in on-the-ground activities.

A good student, he passed his school board examinations in the 1st division and completed his B.E. (Mechanical) from Bengal Engineering College, Shibpur, with a 1st class.

He later obtained 1st Class Engineer (Motor) Certificate of Competency from the Directorate General of Shipping, Govt of India. He sailed with the Shipping Corporation of India Ltd on crude oil tankers, oil-bulk-ore carriers, product carriers, general cargo ships, container and passenger ships, for about fourteen years, of which more than four years were as Chief Engineer.

On leaving sea he worked ashore with Kquality Ice Creams (India) Ltd, Kolkata as General Manager (Technical); then in Frigerio Conserva Allans Ltd, Mumbai as Project Coordinator; and, lastly, in Western Refrigeration Ltd, Mumbai as Operational Head.

He launched and conducted various STCW modular courses at Seacom Marine College, Kolkata from 1998 to 2002 and Trident College of Marine Technology, Kolkata from 2002 to 2007 as Principal.

He was the 'Competent Engineer' with SHM; Kolkata, a Member of Eastern Academic Council, Kolkata and External Examiner to the Govt. of India, Ministry of Shipping, at MMD, Kolkata.

He was a person with a pleasant disposition, easy going, friendly and approachable and always willing to lend a helping hand.

This very visible and active mariner will be dearly missed by the marine community.

**IRCLASS ACADEMY**

YOUR PARTNER IN MARITIME PROFESSIONAL DEVELOPMENT



## COURSE CALENDAR & FEES: APRIL-JUNE, 2019

All courses listed below will be delivered at our Head Office in Powai, Mumbai

	COURSE	DURATION	DAY	DATE	FEE (INR)*
1	Ship Surveys & Certification (Class & Statutory)	One-day	Tue	9-Apr	9,000
2	Hull Inspections (For Bulk Carriers & Oil Tankers)	One-day	Wed	10-Apr	9,000
3	Cyber Safety - Awareness	Half-day	Tue	23-Apr	6,000
4	Condition Assessment of Port Assets	One-day	Fri	3-May	9,000
5	Sulphur Cap, Exhaust gas cleaning -Scrubber	One day	Tue	28-May	9,000
6	Ballast Water Management (latest developments)	One-day	Wed	5-Jun	9,000
7	QAP For Shipbuilding & Control of Weld Distortion	One-day	Mon	10-Jun	9,000
8	WPS - PQR - Welder Qualification for Ship Building	One-day	Tue	11-Jun	9,000
9	Non-Destructive Testing in Ship Building	One-day	Wed	12-Jun	9,000

\*Above course fees are exclusive of 18% GST

### FOR MORE INFORMATION & PAYMENT INSTRUCTIONS, PLEASE CONTACT US:

**IRCLASS ACADEMY**  
Indian Register of Shipping  
52A, Adi Shankaracharya Marg,  
Opp. Powai Lake, Powai  
Mumbai 400 072, India

Ph : (Direct) : +91-22-71199 620 & 71199 520  
(Operator) : +91-22-71199 400

E-mail : [academy@irclass.org](mailto:academy@irclass.org)





## CALL FOR PAPERS GLOMARS - 2019



# GLOMARS - 2019

will be held from 16th & 17th August, 2019  
at The Taj Gateway Hotel, Beach Road, Visakhapatnam

### THEME OF THE CONFERENCE

**India - Emerging Global Maritime Power Challenges**

#### **PARTICIPATION : A CALL FOR PAPERS**

Full paper in soft copy latest by 31-01-2019, with consent to publish  
the paper in souvenir, MER & selected professional publications.  
Acceptance of paper for presentation will be informed by 31-03-2019.



For any information /query  
regarding GLOMARS 2019  
please contact :

**CONVENER**

**Mr. V.Lakshmipati Rao**  
(+91 98481 99565)

Email : [glomarsvizag@gmail.com](mailto:glomarsvizag@gmail.com)  
Website : <https://glomars2019.wixsite.com/glomars2019>

Address: Institute of Marine Engineers (India), 1<sup>st</sup> floor,  
Department of Marine Engineering,  
A.U. College of Engineering(A), Andhra University,  
Visakhapatnam-530 003,  
Andhra Pradesh, INDIA