









Monthly Magazine of The Institute of Marine Engineers (India)





# The Institute of Marine Engineers (India)

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> Administration Office: **IMEI House** Plot No. 94, Sector -19, Nerul, Navi Mumbai 400 706. Tel.: +91 22 2770 1664 Fax: +91 22 2771 1663 E-mail: editornewsletter@imare.in Website: www.imare.in

#### Editor: Sunil Kumar

Editorial Board: S.M. Rai **Ramesh Vantaram** Jagmeet Makkar **Hrishikesh Narasimhan Krishnamurthy Balaji** Suneeti Bala Vivek D. Prasad (Hon. Sub-editor) Rashmi Tiwari (Sub-editor)

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# Happy New Year

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# From the Editor's Desk

Dear Esteemed Readers,

A very Happy New Year! As we welcome 2025, let us embark on this new voyage with renewed energy, purpose, and commitment to excellence in the maritime world. With every challenge comes an opportunity to innovate, grow, and make a lasting impact. This edition of **iMélange** sets the tone for an eventful year ahead, spotlighting key industry developments, technical insights and inspiring milestones.

The year began on a high note with the **IME(I)** Annual Meet 2025, a grand celebration of maritime excellence. The event brought together industry leaders, professionals and young minds, reflecting on achievements and charting a progressive course for the future.

Keeping seafarers at the heart of our discussions, the Seminar on

**"Seafarers' Rights and Employment"** shed light on crucial aspects of fair treatment and welfare. Furthering this agenda, a **historic agreement between DG Shipping and ITF** was signed to enhance seafarer wellness—a landmark step towards ensuring a safer and more supportive environment for those at sea.

In an effort to bridge knowledge gaps, a **new e-Library** has been launched, providing a vast repository of technical resources to empower maritime professionals. This digital initiative promises to be a game-changer in maritime learning and development.

The month also saw a special milestone—20 years of maritime excellence and alumni unity. This celebration not only honoured past achievements but also strengthened the bonds of the maritime fraternity, inspiring continued collaboration and growth.

Fostering innovation among students, a **Technical Paper Presentation Competition** organised by INSA showcased fresh ideas and groundbreaking research, proving that the future of maritime engineering is in capable hands.

Mental health and well-being were key discussion points in **Navigating Minds: A Dialogue on Mental Health and Abandonment for Indian Seafarers**, addressing pressing concerns faced by those who spend long periods away from home.

Our technical corner explores the Fail Safe Steering Arrangement, ensuring reliability in critical navigation systems. Rounding off this issue is Titanic - Part 1: The Wreck and the Remains, offering an intriguing look at one of the most significant maritime tragedies.

Finally, we came together to celebrate **Republic Day** at IME(I) Headquarters, honouring the spirit of unity, progress and national pride that binds us all.

As we sail into 2025, let us continue to uphold excellence, embrace new challenges, and support one another in our shared mission. Your insights and feedback are always welcome at editornewsletter@imare.in by 7th February 2025.

SUNIL KUMAR Honorary Editor – iMélange



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Branch News

#### Mumbai

# Celebrating Maritime Excellence: IME(I) Annual Meet 2025



The Institute of Marine Engineers (India) Mumbai Branch, along with its Navi Mumbai and Gujarat chapters, hosted its Annual Meet on 11th January 2025, at the MCA Club, Bandra Kurla Complex, Mumbai. This prestigious gathering welcomed over 500+ guests from the maritime industry for an evening of celebration and recognition of maritime excellence.

**Mr. Sanjeev Mehra,** the Master of Ceremony, efficiently steered the event. The occasion was honoured by the presence of esteemed Office Bearers, Executive Committee members and Governing Council representatives of IME(I). Mumbai Branch Chairman, **Mr. David Birwadkar**, warmly welcomed the attendees and expressed sincere gratitude for their participation. He reaffirmed the Institute's dedication to empowering its members and the maritime community with knowledge and expertise in an ever-evolving industry.

A key highlight of the evening was the presence of **Shri Shyam Jagannathan, IAS**, Director General of Shipping, who attended as the Chief Guest. He unveiled the logo of the Directorate General of Shipping (DG Shipping) to mark the commencement of celebrations of its 75 years of service. This milestone symbolised the Directorate's enduring legacy and commitment to maritime safety, professionalism and innovation. It is indeed a huge honour to IME(I) that the Directorate chose an IME(I) event to mark the commencement of their celebrations of such an important landmark.

Among the distinguished guests were **Shri** Ajithkumar Sukumaran, Chief Surveyor-cum-Additional

DG (Engineering); **Capt. B.K. Tyagi**, Chairman and Managing Director of the Shipping Corporation of India Ltd.; **Shri Arun Sharma**, Executive Chairman of the Indian Register of Shipping (IRS); **Shri P.K. Mishra**, Managing Director of IRS; **Shri Bidyut Dutta**, Vice President of L&T; and **Shri T.K. Sahu**, Joint Managing Director of IRS, among others. The event's success was further amplified by the generous sponsorship of the Indian Register of Shipping.

A special moment of the evening was the presence of **Capt. J.C. Anand**, a 102-year-old veteran of the Indian shipping industry. His attendance was a true honour for everyone present, symbolising the rich heritage and progress of the maritime sector.

Adding an element of excitement, a raffle draw took place, with lucky winners receiving exciting prizes, much to the delight of the audience. The celebration continued with a captivating live musical performance and band, creating a lively and engaging atmosphere.

The Annual Meet and Dinner seamlessly blended professional discussions, networking and entertainment, strengthening the bonds within the marine engineering community. It was an evening to cherish, not only celebrating past achievements but also looking ahead to a bright future for the Institute and its members. With a strong spirit of camaraderie and commitment to advancing the maritime industry, the event was a great success, leaving attendees inspired and united in their mission to drive the sector forward.



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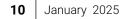






# **()**Mélange





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#### Chandigarh

**Empowering Seafarers: Seminar on** "Seafarers' Rights and Employment"



The Chandigarh Chapter of the Institute of Marine Engineers (India) conducted an impactful seminar on the topic "Seafarers' Rights and Employment" on 27<sup>th</sup> December 2024 at Tagore Theater, Chandigarh. The seminar was organised in partnership with VR Maritime, National Union of Seafarers of India, Maritime Union of India, MTG and Company of Masters Mariners of India, the event brought together over 100 seafarers from diverse regions, including Himachal Pradesh, Punjab, Haryana, Jammu & Kashmir, Rajasthan and cities like Ranchi, Varanasi and Gorakhpur.

The seminar was chaired by prominent maritime leaders, including **Capt. (Dr.) Daniel J. Joseph** (Deputy Director General of Shipping Crew), **Capt. Tushar Pradhan** (General Secretary, MUI), **Shri Milind Kandalgaonkar** (General Secretary and Treasurer, National Shipping Board) and **Capt. Sanjay Prashar** (CEO and Founder of VR Maritime Service Pvt. Ltd.). future initiatives aimed at enhancing safety and welfare for seafarers.

Capt. Pradhan highlighted various welfare schemes launched by MUI and encouraged seafarers from Northern India to reach out to Capt. Karanjit Rai, MUI's representative in Chandigarh, for assistance.

Capt. Prashar shared his experiences of supporting seafarers during critical times, including cases of repatriation during the COVID-19 pandemic, retrieval of mortal remains from abroad and resolving legal issues for seafarers detained in foreign countries.

#### **Recognising Excellence in Maritime Service**

The seminar honoured outstanding contributions to the maritime industry with special awards:

 Lifetime Achievement Awards: Presented to Chief Engineer Mr. Balbir Singh Mangat and Capt. Sekhon.



#### Addressing Seafarers' Concerns

Branch News

During the seminar, seafarers shared the challenges they face in their profession. Capt. (Dr.) Joseph provided a detailed presentation outlining the steps taken by the Directorate General of Shipping to address these issues. He also presented

#### WISHING ALL SEAFARERS AND THEIR FAMILIES Happy New Year 2025

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- Merchant Navy Star of Chandigarh: Conferred upon Capt. T. S. Bhatia.
- Best Maritime Training Institute in North India: Awarded to Chitkara University, Punjab.
- First GP Rating Girls on Merchant Ships: Recognition was given to Trainee Ordinary Seamen Preeti, Neha, and Nisha from Maersk Line.

# Insights into Human Rights and Maritime Challenges

Advocate Abhishek Malhotra, a marine engineer and High Court lawyer, delivered a thought-provoking



presentation titled "The Dark Side of Merchant Navy," shedding light on critical issues faced by seafarers.

The event also marked the release of the book *"Abuse of Human Rights of Indian Seafarers"* authored by Capt. Sanjay Prashar, Advocate Abhishek Malhotra, and Mohamed Abuthahir.



The seminar concluded with the National Anthem. A special lunch arranged by NUSI provided an opportunity for informal discussions and camaraderie among participants.



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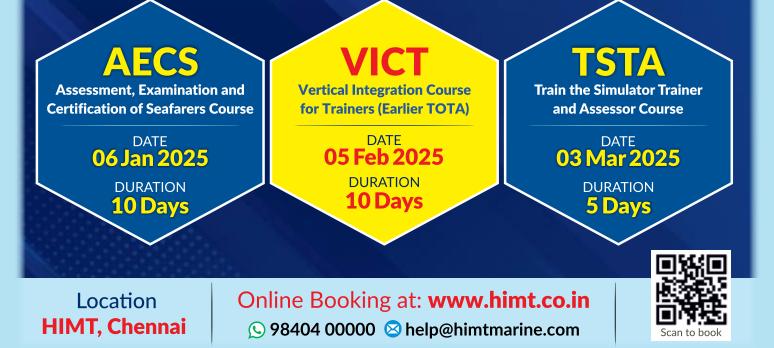
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#### Navi Mumbai

Branch News

# Advancing Maritime Safety: Seminar on MEG-4 and Rope Safety



ME(I) Navi Mumbai Chapter conducted a technical seminar on 21<sup>st</sup> December 2024 on the topic MEG-4 and Rope Safety at IMEI House, Nerul. The event attracted a large gathering of maritime professionals, reflecting the industry's commitment to enhancing safety and operational standards.

#### **Overview of MEG-4 and Rope Safety**

The seminar focused on the Fourth Edition of Mooring Equipment Guidelines (MEG-4), which provides comprehensive standards for mooring operations. A key highlight was rope safety, a critical aspect of MEG-4, given the operational stresses and risks faced by



mooring lines. The session also introduced the latest developments in advanced shipping ropes, such as the X2 range, designed to meet these challenges.

#### Launch of Value-Added Courses and MoU Signing

The event included the announcement of new value-added courses in collaboration with MarinArch Training Academy. During the seminar, an MoU was exchanged between the training academy and the host organisation, with **Ms. Archana S. Sangal**, Director of MarinArch, presenting newly introduced online and offline courses.



#### **Keynote Address and Expert Presentations**

The seminar commenced with a welcome address by **Mr. Arun Kumar Gupta**, Chairman of the Navi Mumbai Chapter, who emphasised the significance of rope safety and the need for marine engineers to stay updated on MEG-4 regulations. He underlined how understanding these guidelines is essential for preventing accidents and ensuring compliance during inspections.

Mr. Gupta invited **Mr. David Birwadkar**, Chairman of the Mumbai Branch, to shed light on the newly signed MoU. This was followed by a presentation by the keynote speaker, **Mr. Kishore Darda**, Vice President at Garware Technical Fibers, who brought 30 years of expertise in the rope industry.

#### **Highlights of the Technical Presentation**

Mr. Darda delivered an in-depth presentation on the updates in MEG-4 regulations and advancements in rope technology. He explained key concepts introduced in MEG-4, such as:

- Ship Design Minimum Breaking Load (SDMBL): The baseline strength required for mooring lines to meet OCIMF standards.
- Line Design Breaking Force (LDBF): The tested breaking force of new ropes.
- Working Load Limit (WLL): The operational safety limit for mooring lines, with WLL values for steel wire ropes set at 55% and synthetic ropes at 50% of SDMBL.

He also introduced innovations in marine ropes, including the X2 series with features like delayed



snapback break indication and low elongation, as well as prefabricated tails and protective sleeves.

The seminar concluded with a lively Q&A session, showcasing the audience's enthusiasm and interest in the subject. Tokens of appreciation were presented to the speakers by the organizers. **Ms. Jyoti Nayak**, **Executive Committee member of Navi Mumbai Chapter** summarised the proceedings, thanking the attendees and guest speakers for their contributions to a highly informative event.





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Branch News

#### Navi Mumbai Chapter

# 76th Republic Day Celebrated with Patriotic Fervour

The 76th Republic Day was celebrated with great enthusiasm and patriotic spirit at IMEI House, Nerul. The event commenced with the ceremonial unfurling of the National Flag by the Honorary General Secretary, **Mr. Sunil Kumar**, followed by the rendition of the National Anthem by the gathering.

Senior members of the Institute, faculty, students, office staff and their families attended the event, fostering a sense of unity and national pride. Several faculty members shared insightful sailing experiences from their professional journeys, while students expressed their gratitude towards IME(I), applauding the faculty and staff for their support and guidance throughout their tenure.

Adding a unique touch to the celebration, members from Shri Ambika Yoga Kutir highlighted the significance of yoga in daily life and extended an open invitation for free yoga classes, encouraging a holistic approach to well-being.

The celebrations continued with interactive discussions among members regarding the Institute's upcoming initiatives and activities. The event concluded on a warm and convivial note, with attendees engaging in discussions over tea and snacks.

**Glimpses of the Event** 









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# IME (I) Awareness Program

As part of the membership drive initiative, Mr. David Birwadkar, Chairman of the IME(I) Mumbai Branch and Head of the Student Sub-Committee, visited the Institute of Maritime Studies, Goa. In his address, he strongly emphasized the importance of student membership in the Institute of Marine Engineers (India), highlighting its role as a crucial stepping stone for students aspiring to build successful careers in marine engineering.

IME(I) News



**Importance of Early Engagement:** Mr. David stressed the importance of students engaging with IME (I) early in their academic careers. He explained that student membership provides a unique opportunity for students to connect with industry professionals, access educational resources, and participate in activities that will shape their understanding of the marine engineering field. He encouraged students to take full advantage of the networking opportunities offered through the membership, which allows them to interact with mentors and senior engineers who can guide their career paths.

**🕻 Mélange** 

**Mentorship and Professional Guidance:** One of the key points Mr. David made was the value of mentorship. He advised students to stay in constant communication with their mentors, who can provide practical insights, career advice, and help them navigate challenges in the industry. He underscored that being part of a professional organization like IME (I) offers students direct access to seasoned professionals who are willing to share their experiences and provide mentorship. This, he said, is a vital aspect of career growth that students should not overlook.

Access to Events and Resources: In his address, Mr. David emphasized the numerous resources available to student members, including access to the institute's E-library, technical publications, and industry-related updates. He also encouraged students to participate in major events such as INMARCO and GLOMARS, where they can learn from industry leaders and gain exposure to the latest developments in marine engineering. These events, he said, are invaluable for students looking to expand their knowledge and gain a competitive edge in the field.



Mr. David highlighted the establishment of the IME (I) **Student Subcommittee for 2023-2025** to foster student engagement and leadership. He explained the structure, led by the Subcommittee Chairperson, Member Secretary,



and Branch Chairman, with oversight from a Faculty-In-Charge.

The subcommittee is headed by the Head Cadet, supported by the Cadet Secretary and Cadet Treasurer, and includes three key committees:

- 1. Academic Committee
- 2. Student Coordination and Resource Committee
- 3. Technology Committee

Mr. David encouraged students to take leadership roles in these committees, emphasizing the benefits of mentorship, skill development, and professional growth within IME (I).

**Career Development Opportunities:** Mr. David reiterated that student membership is not just about affiliation but also about professional development. He highlighted how IME (I) supports students in enhancing their technical skills, gaining industry insights, and preparing for the transition from academia to professional life. By being part of IME (I), students can access workshops, seminars, and conferences that are designed to equip them with the tools they need to succeed in the marine engineering profession.

Through his address, Mr. David conveyed the immense value of student membership in IME (I),

highlighting the opportunities it provides for **learning**, **mentorship and professional growth**. His

message was aimed at encouraging students to actively pursue membership as a way to enhance their career prospects and be part of a larger professional community that supports their development.



Industry News

# New e-Library Launched to Empower Maritime Professionals

The Institute of Marine Engineers (India), The Maritime Union of India and Company of Masters Mariners of India proudly marked a historic milestone by formally signing the landmark eLibrary tripartite agreement.

This digital platform aims to provide seamless access to a comprehensive collection of academic, technical and research resources, ensuring members remain updated with the latest industry developments and advancements.

The e-Library will host a diverse range of materials, including professional books, journals, periodicals, publications and multimedia resources. It is designed to facilitate skill enhancement, continuous learning and career progression by offering members the tools they need to excel in their respective fields. This includes support for exam preparation, designation upgrades and staying informed about advancements in Marine Engineering and Merchant Navy operations.

The e-Library will be freely accessible to members of the three organizations, reflecting their shared commitment to promoting scientific development, maintaining high standards and upholding the traditions of the marine and maritime professions.



THE INSTITUTE OF MARINE ENGINEERS (INDIA) MUMBAI BRANCH



Hydraulics Workshop – Skill Upgradation Course (Online)

for Marine Engineers, Electro Techno Officers & Superintendents

Faculty Name : Mr. Pravin R Marathe, Ex- Chief Engineer (MEO Class I)

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- To understand safe operation and trouble shooting of hydraulic systems.

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Fees : Members - Rs. 11,800/- (Inclusive of GST ) (IMEI, CMMI and INA Members)

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#### MORE INFORMATION

Ms. Anita Patill: +91-7350002757 , +91-9225516456 Ms. Neetha Nair: 91-9930977647



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Industry News

# Celebrating 20 Years of Maritime Excellence and Alumni Unity



The 20<sup>th</sup> Foundation Day and Alumni Meet of the Great Eastern Institute of Maritime Studies on 3<sup>rd</sup> January 2025 at GEIMS Campus, Lonavala marked a significant milestone for the esteemed maritime institution. The event brought together distinguished guests, alumni and students to celebrate two decades of excellence and camaraderie.

**Dr. Malini Shankar, IAS (Retd.)**, Vice-Chancellor of the Indian Maritime University was the Chief Guest of the event. She delivered a thought-provoking keynote address. She highlighted the pressing need for upskilling in the maritime industry to meet future demands and dispelled prevalent myths about seafarers through an engaging and insightful presentation. **Capt. Nikunj Parashar**, Founder of Sagar Defence Engineering was the Guest of Honour who inspired attendees with his remarkable journey, interweaving the mythological tale of *Samudra Manthan* with its practical applications at sea. His unique narrative left the audience deeply motivated and proud of their shared maritime heritage.

**Capt. Subroto Khan**, Principal, GEIMS encouraged alumni to actively promote seafaring careers, fostering awareness and interest in the maritime profession among the next generation.

The event served as a powerful attestation to the institution's enduring legacy and its commitment to shaping the future of maritime professionals.

# **Glimpses of the Event**





















#### Industry News

Golden Jubilee Milestone: 50 Years of Innovation and Leadership



ndian Register of Shipping (IRS) commemorated its Golden Jubilee with a grand celebration in Mumbai, reflecting on its remarkable journey of 50 years of innovation, service, and leadership in the global maritime sector.

Shri Sarbananda Sonowal, Honourable Union Cabinet Minister for Ports Shipping & Waterways graced the occasion as a Chief Guest along with Guest of Honour Shri Shyam Jagannathan Director General of Shipping, Capt B K Tyagi, CMD, The Shipping Corporation of India, Shri Unmesh Wagh, Chairman JN Port Authority and galaxy of industry stalwarts and maritime professionals.

Executive Chairman Shri Arun Sharma delivered a powerful welcome address that shed light on organisation's history, contributions to the maritime sector, its commitment to innovation, and its vision for the future.

A key highlight of the event was the unveiling ceremony led by Shri Sarbananda Sonowal. The ceremony included a Coffee Table Book – A visual narrative of IRS' journey over the past five decades and a commemorative magazine Touch of Class Golden Jubilee Edition Vol. 2. The Chief Guest, along with dignitaries, unveiled these significant publications, signifying IRS' rich heritage and ongoing contributions to the industry. The event also featured a logo release of National Maritime Games 2025 scheduled in March & April 2025, an initiative of Directorate General of Shipping.

Shri Sarbananda Sonowal's address was a moment of pride and inspiration as he recognised IRS' pivotal role in the maritime ecosystem and emphasised the importance of innovation and sustainability. He said "IRS has not only upheld international standards but has also reinforced India's standing as a responsible maritime nation. IRS has been pivotal in supporting India's growth and new areas such as green shipping, hybrid propulsion systems, eco-friendly design, ensuring that our maritime practices remain at the forefront of global innovation."

Shri Sarbananda Sonowal and Shri Shyam Jagannathan were honoured and felicitated by Shri Arun Sharma, followed by a vote of thanks by Shri. P K Mishra, Managing Director, IRS. The evening concluded on a festive note with a captivating performance by a live band, adding a celebratory vibe to this milestone event.





Industry News

# Student's Innovation: Technical Paper Presentation Competition

The Indian National Shipowners' Association (INSA) successfully hosted its highly anticipated 5th edition of the Technical Paper Competition on the theme "Oceans of Opportunity: The Future of the Maritime Industry." This flagship event, organised by the Research & Training Committee, aimed to foster inquiry, innovation and research among pre-sea students in the maritime sector. Held over two days on January 18th and 19th, 2025, the competition featured presentations from 20 shortlisted papers selected from an impressive 127 submissions focused on the theme.



The day began with a warm opening by the Master of Ceremony, **Mr. Sunil Kumar**, CTO and Head - T&A at GESCO, who welcomed the audience and set an enthusiastic tone for the event. This was followed by a welcome address delivered by **Mr. Anil Devli**, CEO of INSA, highlighting the competition's role in nurturing maritime innovation.



#### **Inauguration and Insights**

The event was officially inaugurated by the Chief Guest, Shri C.V. Subba Rao, President of INSA, who



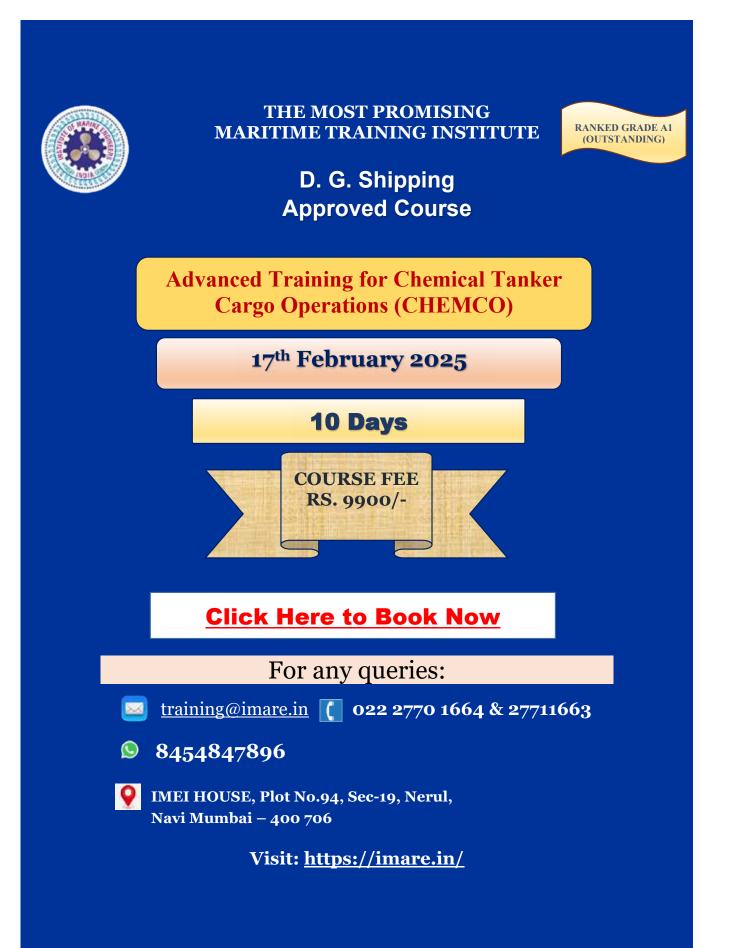
emphasised the importance of nurturing young talent to tackle the challenges of the maritime sector. **Dr. B.K. Saxena**, Chairman of INSA's Research & Training Committee, then provided an overview of the competition, underscoring its objectives and the caliber of research being presented.

To ensure a smooth flow of the day's proceedings, **Mr. David Birwadkar**, Chairman of IME(I) Mumbai Branch and a member of INSA's R&T Committee, explained the rules and methodology for the technical paper presentations.

A series of technical paper were presented both the days, which showcased a rich variety of research topics ranging from renewable energy to digitalisation in ports. Below are the details:









S.No.	Presentation Topic	Presenter(s)	Institute
1	Renewable Energy-Driven Liquid Nitrogen Generation for High-Pressure Work Extraction in an Open-Loop System	Cdt. Manav Gurjar and Cdt. Karan Rautela	Tolani Maritime Institute, Induri, Pune
2	Augmented Reality: A New Horizon in Ship Navigation	Cdt. Ayush Tiwari and Cdt. S.K. Mustafijul	GEIMS, Lonavala
3	Health and Wellbeing of Seafarers	Cdt. Ashik Vinod, Cdt. Arjun K.P., and Cdt. Sherin Thomas Shaji	Seven Islands Maritime Training Institute
4	GHG Emission Reduction: A Study on Alternative Fuels and Carbon Capture Technology	Cdt. Kartik Anand Pandey	Samundra Institute of Maritime Studies, Lonavala
5	Case Studies of Cyber Attacks in Maritime Industry	Cdt. Chetan Biswas	Jeyanthinather Academy of MS, Thoothukudi
6	Indian Ports' Evolution Through Digitalization and Sustainability	Cdt. Anjana Ajith and Cdt. P.A. Janasruti	IMU Chennai
7	Sailing Through Cyber-Space: Maritime Industry Safeguarding Its Digital Future	Cdt. Mohit Parihariya and Cdt. Parth Sareen	Tolani Maritime Institute, Induri, Pune
8	Oceans of Opportunity: The Future of Maritime Industry	Cdt. Abhimanyu Singh and Cdt. Anirban Debbarma	IMU Kolkata
9	Enhancing Efficiency & Optimization of Logistics & Supply Chain Management in Ports	Cdt. Shaik Feroz Ahmed and Cdt. Saurabh Sunilkumar Sahu	International Maritime Institute, Noida
10	Biofuel Production from Biowaste and Efficiency Enhancement to Obtain a Self- Sustainable and Green Port	Cdt. Ishika Dutta and Cdt. Richa Ahirwar	IMU Visakhapatnam
11	Sailwell	Cdt. Aditya Dinesh Shinde, Cdt. Mantosh Rajguru, and Cdt. Mayank Sharma	Samundra Institute of Maritime Studies, Lonavala



The event concluded with a comprehensive summary by **Mr. Chitta Dash**, Advisor to INSA, who recapped the day's highlights and applauded the participants' efforts.

The second day on 19<sup>th</sup> January 2025, was filled with thought-provoking discussions, innovative ideas and ground-breaking research from cadets and maritime professionals.



The proceedings commenced with Mr. Sunil Kumar who welcomed the participants and audience. This was followed by an inspiring address from the Chief Guest, **Shri Vijay Arora**, Retired MD of IRS, who spoke about the growing importance of technological advancements in the maritime industry. Mr. David Birwadkar, then took the floor to explain the rules and methodology for the day's presentations.



The day featured a diverse range of technical papers which is mentioned below:

# () Mélange

S.No.	Presentation Topic	Presenter(s)	Institute
	E-Navigation and Its Future Prospects	Cdt. Tamilselva	Jeyanthinather Academy of
1	for Enhancing Navigation and Safety System		MS, Thoothukudi
	Greenhouse Gas Emission Reduction	Cdt. Crispin Pramod Ronad	Jeyanthinather Academy of
2			MS, Thoothukudi
3	Port Management and Efficiency	Cdt. Tejashava and Cdt. Yesh	IMU Navi Mumbai
	Propelling the Change in Inland Water	Cdt. Abhishek Krishna A J,	Kunjali Marakkar School of
4	Transport: A Case Study on Kochi Water	Cdt. Siva Jayakumar, and Cdt.	Marine Engineering
	Metro	Aswin S.	
	Methanol-Fueled Ships: A	Cdt. Rohit Kumar, Cdt. Pradyot	IMU Kolkata
5	Comprehensive Case Study	Kumar Maiti, and Cdt. Rahul	
		Kumar Singh	
	Development of a Robust Cybersecurity	Cdt. Vinayak Kammar	Institute of Maritime
6	Framework for Maritime Operations		Studies, Bogda, Vasco Da
			Gama, Goa
7	Oceans of Opportunity: The Future of	Cdt. Kharanshu Arora and Cdt.	AMET Deemed to be
/	the Maritime Industry	Sakshi Swarupa	University, Chennai



The day's proceedings concluded with observations and comments from **Dr. Sujata Naik**, Chairperson of Tolani Shipping and Director, INSA, who commended the participants for their efforts and innovative ideas. **Mr. Chitta Dash**, Advisor, INSA, delivered the concluding address, emphasising the importance of collaborative research and knowledge sharing in advancing the maritime sector.



The panel of judges, comprising **Mr. I.N. Bose**, **Mr. D. Mehrotra, Mr. A.B. Dutta, Capt. Kishore** and **Mr. Dash**, shared their insights and provided valuable feedback on the presentations.

The prize winners of the competition were:

1<sup>st</sup> **Prize** - Renewable Energy-Driven Liquid Nitrogen Generation for High-Pressure Work Extraction in an Open-Loop System – Cdt. Manav Gurjar and Cdt. Karan Rautela, Tolani Maritime Institute, Induri, Pune

**2**<sup>nd</sup> **Prize** – Biofuel Production from Biowaste and Efficiency Enhancement To Obtain a Self-Sustainable and Green Port – Cdt. Ishika Dutta and Cdt. Richa Ahirwar, IMU Visakhapatnam

**3**<sup>rd</sup> **Prize** – Greenhouse Gas Emission Reduction in the Maritime Industry, Cdt. Crispin Pramod Ronad Jeyanthinather Academy Of MS, Thoothukudi

**4**<sup>th</sup> **Prize** - Augmented Reality: A New Horizon in Ship Navigation, Cdt .Ayush Tiwari and Cdt. S K Mustafijul GEIMS, Lonavala

5<sup>th</sup> **Prize** – Propelling the change in inland water transport: A case study on Kochi Water Metro, Cdt. Abhishek Krishna A J, Cdt. Siva Jayakumar and Cdt. Aswin S. Kunjali Marakkar School of Marine Engineering

6<sup>th</sup> **Prize** – Sailing through Cyber-space Maritime Industry safeguarding it's digital future, Cdt. Kharanshu Arora and Cdt. Sakshi Swarupa AMET Deemed to be University, Chennai

#### **Special Prizes:**

**For Clarity and Impact** – *Methanol Fuelled Ships*: A Comprehensive Case Study – Cdt. Rohit Kumar, Cdt. Pradyot Kumar Maiti, and Cdt. Rahul Kumar Singh, IMU Kolkata

**For Applied Excellence** – *GHG Emission Reduction*: A Study on Alternative Fuels and Carbon Capture Technology – Cdt. Kartik Anand Pandey, Samundra Institute of Maritime Studies, Lonavala

**For Innovative Perspective** – *Sailwell*: Secure Your Mind, Stabilize Your Journey – Cdt. Aditya Dinesh Shinde, Cdt. Mantosh Rajguru, and Cdt. Mayank Sharma, Samundra Institute of Maritime Studies, Lonavala

Finally, Mr. Birwadkar announced the much-anticipated competition results, followed by a heartfelt vote of thanks from **Mr. Lokanath Tripathy**, Head of Offshore Logistics Services, Greatship India Ltd.

Industry News

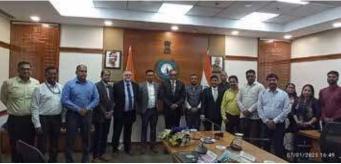
DG Shipping and ITF Join Forces to Boost Seafarer Wellness

**n** a landmark move, the Directorate General of Shipping (DGS) and the International Transport Workers' Federation (ITF) signed an MoU on 7<sup>th</sup> January 2025, in Mumbai to enhance the wellbeing of India's seafarers. This collaboration addresses critical mental and physical health challenges faced by the maritime workforce.

The MoU was signed by Director General of Shipping, Shri Shyam Jaganathan, (IAS) and ITF's Global Inspectorate Coordinator, Mr. Steve Trowsdale. The initiative will create a network of trained instructors across maritime training institutes to deliver advanced wellbeing programmes.

"This partnership adopts global best practices to prioritise the mental health and welfare of seafarers, ensuring a brighter future for the maritime industry," stated Shri Jaganathan.

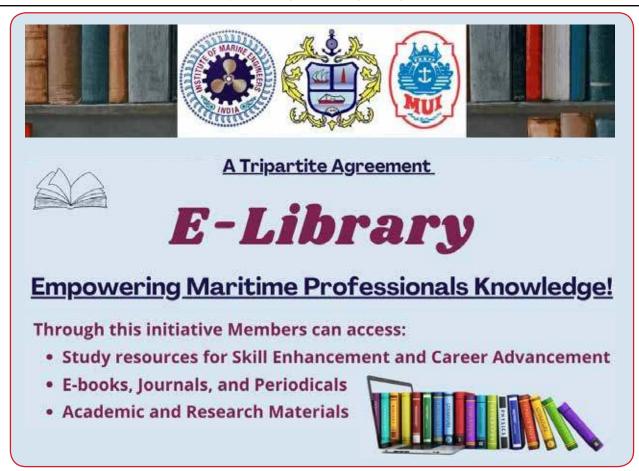
Key representatives from ITF-affiliated unions—MUI, NUSI and FSUI—attended the ceremony, underscoring the collective effort to address seafarers' unique challenges.



NUSI General Secretary **Shri Milind Kandalgaonkar** highlighted the relevance of the initiative during extended voyages, while Mr. Trowsdale reaffirmed ITF's commitment to strengthening the programme.

**Dr. Syed Asif Altaf**, ITF's Global Well-being Program Coordinator, praised the agreement as a culmination of years of planning and a significant step forward.

This partnership sets a new benchmark for global seafarer welfare, solidifying India's leadership in safeguarding its maritime workforce.





#### Industry News

# **Navigating Minds:** A Dialogue on Mental Health and Abandonment for Indian Seafarers

The Forward Seamen's Union of India (FSUI) and International Transport Workers' Federation (ITF) hosted "Navigating Minds: A Dialogue on Mental Health and Challenges of Abandonment for Indian Seafarers" at Novotel Mumbai International Airport. This transformative symposium united maritime leaders, mental health advocates, policymakers and seafarers to address critical issues within the industry.

Mr. Sanjeev Mehra, was the master of the ceremony. The event commenced with Shri. Manoj Yadav, FSUI Secretary, emphasising

the urgency of addressing seafarers' mental health and abandonment. A *deep prajwalan* ceremony marked the event's opening, attended by dignitaries like **Capt. Daniel J. Joseph**, Dy. Director General of Shipping, who highlighted key initiatives by DG Shipping to support seafarers.

**Dr. Syed Asif Altaf Chowdhury**, ITF's Global Wellbeing Program Coordinator, delivered a keynote on seafarers' mental health challenges, emphasising collective accountability and actionable strategies to build resilience onboard vessels.

An interactive session moderated by **Ms. Aishwarya Gupta Pilankar** fostered team discussions on situational questions, reflecting collective insights that informed subsequent dialogues.



A significant highlight was the launch of the FSUI SeaCall app, unveiled by Capt. Joseph. Designed for Indian seafarers, this innovative platform offers tools like guided meditations, stress management resources and sleep aids, with its tagline, "Anchor Your Mind."

The event concluded with a 45-minute panel discussion featuring prominent experts, reinforcing the collective responsibility to prioritise seafarers' welfare. Closing remarks underscored a commitment to ensuring no seafarer feels abandoned—physically, emotionally or professionally—marking the symposium as a milestone in maritime welfare initiatives.



# 

#### **Entry Criteria:**

A Seafarer should hold minimum a Certificate of Proficiency as Rating in charge of a Navigational /engineering watch or Completed sea time required for appearing for a Certificate of Competency Examination.

Officers are required to hold a Certificate of Competency and a Certificate of Proficiency for Basic Training for Liquefied Gas Tanker Cargo Operations and at least three months of approved sea going service on Liquefied Gas Tankers within the last sixty months on liquefied gas tankers, or at least one Month of approved onboard training on Liquefied Gas Tankers in a Supernumerary capacity, which includes at least three loading and three Unloading operations and is documented in an approved training record book as specified in section B-V/1 of the STCW Code.



#### **Course Date: 17th March 2025**

#### For registration, <u>CLICK HERE</u>

FOR MORE INFORMATION please email to **training@imare.in** or **contact on M: 8454847896/ 022 2770 1664 & 27711663** 



# Alumni Meet 2025: A Landmark Celebration

The DMET-MERI Ex-Cadets Association (DMECA) hosted its largest and most successful alumni meet at The Westin, Powai on 25<sup>th</sup> January 2025 bringing together over 750 DMETians, sponsors and media partners. This grand gathering set a new benchmark for alumni events. Under the leadership of **Mr. Uday Purohit** and **Mr. Mudit Mehrotra**, with dedicated efforts from **Mr. Pradeep Singh, Mr. Shashi Dhar Mishra** and **Mr. Prateek Khanna**, six months of meticulous planning resulted in an unforgettable evening.



One of the highlights of the event was the felicitation of a DMETian mountaineer **Mr. Satyadeep Gupta**, who set a world record by summiting Everest and Lhotse twice in a single week in 2024. In recognition of this extraordinary achievement, DMECA awarded INR 1 lakh, reinforcing the importance of honouring exceptional accomplishments within the community.







The evening was filled with excitement and entertainment, featuring lucky draws where attendees won exciting prizes, including an iPad. Interactive zones such as an interview corner, tarot card reading and a photo booth added to the engagement.

### **O**Mélange



Indian Idol stars Salman Ali and Vinti Singh delivered electrifying performances, keeping the audience captivated. Guests indulged in a lavish dinner with unlimited drinks, while thoughtfully curated mementos ensured everyone left with cherished souvenirs.













DMECA reaffirmed its commitment to strengthening the DMET alumni network and announced future collaborations with the DMECA Hong Kong Alumni Association and DMET Club to expand its reach and impact. Encouraging all DMETians to join as lifetime members, the association aims to create greater opportunities for networking, mentorship, and community-building.



# बुढ़ापा!!...

चेहरे पर झुर्रियां हैं, और चाल में शिथिलता, पर, दिल अभी जवान है, एक सदी गुज़र चुकी है... पर दिल है, कि, मानता ही नहीं |

झुर्रियों के झरोखों से, झांकती हैं आँखें.. आँखें..जो अब भी चमकती हैं, जैसे बचपन में चमकती थीं | आँखों में झुर्रियां थोड़े ही पड़ती हैं ....

दिल में ताजा हैं यादें.... बचपन..जवानी के अनेकों किस्से, जैसे, कल की ही बात हो |

बचपन में, बगीचे की तितलियों को दौड़ाना, जवानी में , तितलियों ने लिया नया स्वरूप ...

खूब दहके जवानी भर, खुले भट्टे की तरह, आंच भी तेज, जो भी मिले, पचा जाएं । सम- विषम, सभी कुछ ...

अब जीवन के इस पड़ाव पर, सब कुछ भारी लगता है, दिन भी...रात भी....

जिस दिन स्नान कर लेता हूँ, लगता है, हिमालय की, किसी चोटी पर, झण्डा गाड़ आया हूँ,.....

> - संतोष कुमार गुप्ता मरीन इंजीनियर, F 13664











उनके खून से सींची गई, आज़ादी की ये फुलवारी, अब तुम्हें संभालनी है, देश की बागडोर सारी।

कभी मत झुको अन्याय के आगे, साहस की मशाल जलाओ, ज्ञान और परिश्रम से तुम, भारत का नाम ऊंचा उठाओ। सपनों को अपनी आंखों में, एक आकाश दो उड़ने का, हर कदम पर ये संकल्प लो, नया इतिहास रचने का।

तिरंगे की शान बढ़ानी है, ऐसा प्रण हमें निभाना है, भारत को स्वर्णिम युग देना, ये सपना साकार बनाना है। युवाओं, तुम्हारे हाथों में है, इस मिट्टी का हर मान, जागो, बढ़ो, लिख दो तुम, भारत की नई पहचान।



तिरंगे की छांव में खड़े, हम भारत के उजाले हैं, हर कदम पर जो गूंजे, वो आजादी के नग़मे हैं। संविधान की लकीरों में जो, हमारे सपने बसते हैं, कर्तव्य और अधिकारों से, नित नए दीप जलते हैं।

- युवाओं, ये समय तुम्हारा है, इतिहास नया बनाना है, अपने लहू की हर बूँद से, वतन को चमकाना है। शहीदों के सपनों को, असलियत में लाना है, भारत को दुनिया में, फिर से सिरमौर बनाना है।
- मिट्टी की हर खुशबू कहती, कहानी वीर जवानों की, उनके बलिदानों से खिली ये धरती हिंदुस्तान की।



## Fail Safe Streering Arrangement

#### **Overview:**

n March 1978, the VLCC Amoco Cadiz, encountered rough weather. She developed a heavy leakage of Steering oil, caused due to sheared studs in Steering Ram gear. This resulted in to total loss of steering and vessel ran aground and spilt up. About 220,880 Tons of crude oil spewed into the ocean causing irreparable damage to the environment.



SOLAS (CH II-1 Regulation 29) underwent amendments and currently the requirements include, but are not limited to, the main steering gear is to be arranged such that after a single failure in its piping system or in one of the power units, the defect can be promptly isolated so that steering capability can be regained within 45 seconds. Further,

measures to isolate the leaky circuit must be provided. The following discussion covers this aspect.

#### NORMAL OPERATION

The diagram below illustrates a 2-Ram steering system, but the principles apply equally to a 4-Ram Steering Gear. The diagram shows the rudder moving in an Anti clockwise direction. The four spool valves used in this circuit are known as 3-position; 4-way; Tandem centred valves. The position of Spool Valves #1 and #2 will change for a clockwise movement of the rudder as shown in inset. The usual practise in open seaways is that only one unit is operating while the other is on standby mode and units are typically changed-over at Noon.

The left half of the illustration shows the Pump #1 is "ON", whilst

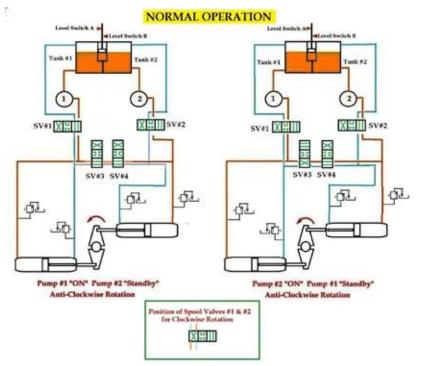
Pump #2 is on "Standby" likewise; the right half shows Pump #2 is "ON", whilst Pump #1 is on "Standby".

In both the cases the Spool valves #3 and #4 permit the free passage of hydraulic oil to the cylinders and back to the header tank. Tank #1 and Tank #2 are separate from each other. Tanks have a float with level switches to activate an alarm in case of drop of hydraulic oil level.

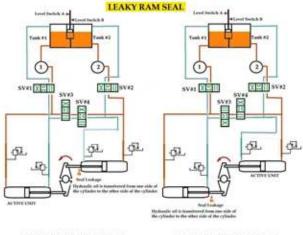
#### **OPERATION WITH LEAKY CIRCUIT**

Consider pump #1 is in operation, and a leak has developed in circuit #2, (RHS ram seal) the level in the tank #1 will drop and the Level switch A will be activated. This will trigger the Spool valve #4 to isolate the offending unit. Spool Valve #3 remains in normal position. The Ram and cylinder on the left side is the ACTIVE unit, whilst the ram on the right side is a dummy. The spool valve #4 facilitates the side-to-side transfer of hydraulic oil in the affected cylinder. Likewise if there is a leakage in circuit # 1 (LHS Ram), the spool valve #3 will isolate the offending unit. Spool valve #4 remains in normal position.

As the level of oil drops, the level Switch B will be activated. This will automatically stop pump #1 and standby pump #2 will cut in, thus preventing further loss of oil.



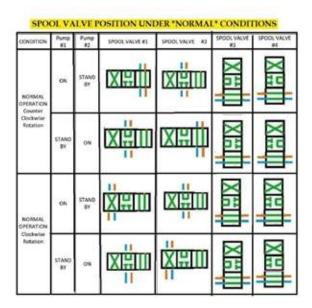


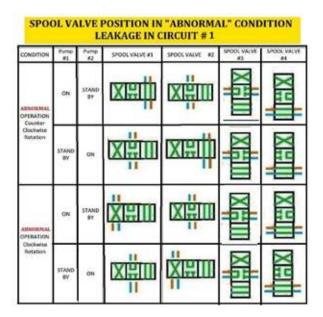


LEAKAGE IN CIRCUIT #2

LEAKAGE IN CIRCUIT #1

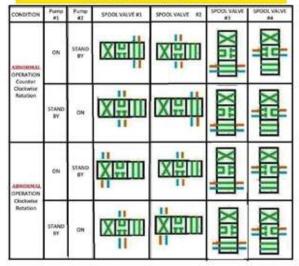
Spool Valve positions under various configurations are shown below.







SPOOL VALVE POSITION IN "ABNORMAL" CONDITION LEAKAGE IN CIRCUIT #2



### About the Author



**Mr. Ramesh Vantaram** an alumnus of D.M.E.T. (1974-1978), embarked on a sea career with The Shipping Corporation of India. He gained MEO CI II certificate, serving with Hongkong-Borneo Shipping Company, then MEO CI I in 1983, with Anglo Eastern Management Services until 1987. He contributed to an FAO (UN)

project for 3 years, aimed at providing fisher-folk alternatives to Outboard Motors. Later, he worked with Lloyd's Register of Shipping from April 1992 to June 2005. He served as Chief Engineer with South India Shipping Company and United Ocean Ship Management Co. In 2008, he joined Great Offshore as Head of Quality, HSE, overseeing the Company's safety certifications. In 2014, he became Senior VP at Ocean Sparkle Limited, eventually overseeing IMS and certifications. Retiring in February 2022, he now teaches part-time at the Institute of Marine Engineers, Navi Mumbai, and writes technical articles for iMelange.

Email: ramesh.vantaram@rediffmail.com



Ithough the event took place over a hundred years ago, the sinking of the Titanic with its colossal loss of lives, has remained forever embedded in the collective memory of human consciousness. Being made into a film in the 1990s, with all its flaws, has only made it more appealing to the human mind as a romanticised tragedy.

Although the loss of more than 1500 lives - with the Titanic sinking - is no small matter, there have been other ships that have had a larger loss of lives.

The MV Wilhelm Gustloff was a German hospital ship that had been converted into a military transport ship. She was torpedoed by a Soviet submarine on 30th Jan 1945. 9400 people lost their lives.

Be that as it may, the Titanic remains in our historical annals as a memory, a shining light, a marvel of engineering and the ability of man to sacrifice and give up

his own life in favour of others. The Titanic's peculiar construct in not just maritime history, but also mankind's history which started with the hype of the construction itself, spread through word of mouth, the Owners and, eventually, the newspapers of that period.

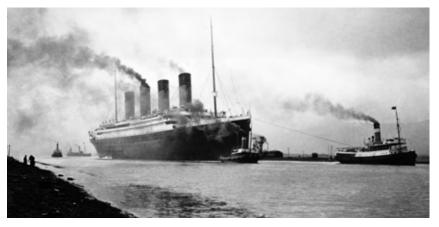
The hype introduced the size of what was being constructed - the largest ship in the world (in that period) -, the glamour of travelling on such a ship, the flamboyance of the First Class accommodation, the comforts that the passengers would

be pampered with - basically, a public build up that mesmerised two sections of people.

The first were the poor, who gobbled up the news about the 3 sisters - the Olympic, the Titanic and the Britannic (the last was initially named the Gigantic, but after the Titanic tragedy changed to a more modest Britannic) - in awe and wonder, often thinking when they would get a chance of travelling on such a fine ship, which thought brought some glitter into their humdrum lives.

The second group were the rich of the nations, who felt the entitlement of belonging by travelling First Class on these ships.

The Titanic sank, after hitting an iceberg, on the 14th of April 1912. The finding of its wreck took 73 years, on 01st Sept 1985.



The Titanic leaving Belfast, on her way to her Sea Trials 1912.

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The wreck, scattered over a large area, was lying at depths of around 3780 metres.

The coordinates for the wreck of the Titanic are 41°43'32"N 49°56'49"W. The ship's wreck is located in the Atlantic Ocean, about 400 nautical miles (740 km) from Newfoundland, Canada.

It lay undiscovered for those 73 years, as mankind had not attained the technology and sophistication required to operate at deeper depths in the water, without succumbing to the pressure those depths create.

The first deep sea diving vehicle, the "Bathysphere" was built and operated in 1930. It was a spherical steel chamber with quartz windows and could reach depths of around 435 metres, mainly used for spotting shoals of fish.

By the 1980s, Remotely Operated Vehicles (ROVs) were exploring ocean depths upto 10,900 metres.

The spotting of the wreckage of the Titanic was more by accident than by design.

I would call the spotting of the wreckage more of a 'quid pro quo' deal by the US Navy with Richard Ballard, as the latter had developed a deep sea diving Remote Operated Vehicle, but had no means to finance the operation for testing it. The US Navy wanted him to check the whereabouts of two lost submarines, keeping it a clandestine operation. And so it came about that the ROV "Argo" was used on a top secret US Naval operation to discover the wreckage of a couple of lost submarines, the USS Scorpion and the USS Thresher (source : Google) that were lost in the area, rather than a search for the Titanic's remains.

During this search, Ballard noted the presence of a lot of debris and, knowing he was on to something big, requested the Navy to help him after he found their submarines.

The Woods Hole Oceanographic Institution's (WHOI) imaging vehicle "Argo" discovered the wreck of the Titanic on 01st Sept 1985. The ROV was towed from the Research Vessel Knorr and deployed by Dr. Robert Ballard and his team.

While **Argo** was the vehicle equipped with sonar and towed behind a ship, it had a robot named **Jason** tethered to it that could roam the ocean floor, take close up images and collect specimens.

(In Greek mythology, '**Argo**' was the ship that the Argonauts sailed on to retrieve the Golden Fleece. **Jason** was the hero who led them).

Robert Ballard and Jean-Louis Michel found the wreckage 73 years after the ship sank.

A boiler was spotted first which led to the debris trail.

The wreck was found about 400 miles off the coast of Newfoundland, Canada. The Titanic lies in two main pieces, separated by about a third of a mile (slightly more than 500 metres apart). The bow is mostly recognizable,



but the stern is ruined from damage during the sinking, mostly because of her almost vertical dive into the depths of the North Atlantic, after shearing off from the forward section.

The fascination of more details of the wreckage and recovery of more pieces of the wreckage has not diminished since the discovery of the remains.

Some of the first photographs of that 1st Sept 1985 dive was published in Time Magazine.

Following were taken later circa 1988 ~ 1991

COURTESY - TITANIC BELFAST





The insides of a power turbine of the Titanic. RALPH WHITE-CORBIS



The iconic forecastle/ prow of the vessel, that has captured the imagination of millions through the movie "Titanic", the photograph taken sometime after 1985.

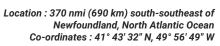
**RALPH WHITE-CORBIS** 





Starboard Wing Propeller from Titanic Shipwreck RALPH WHITE-CORBIS





RALPH WHITE-CORBIS



China dishes are part of the debris left from the wreck of the Titanic.

RALPH WHITE-CORBIS





The Low Pressure cylinder head of the port steam engine of the shipwrecked Titanic

RALPH WHITE-CORBIS

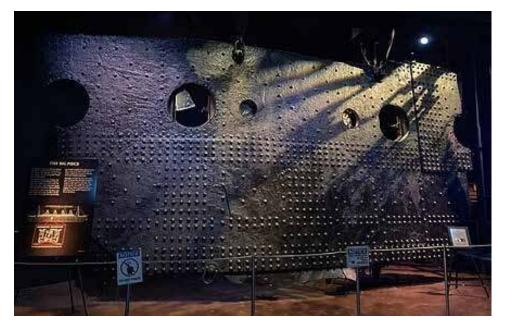


Some of the items salvaged from the debris of the Titanic is kept in a warehouse in the UK.



The Big Piece (right) is a large section of the Titanic's starboard hull extracted from its wreck. Recovered in 1998, it is the largest piece of the wreck to be recovered and weighs 15 short tons (14,000 kg). It is currently located at the Titanic: The Artifact Exhibition at Luxor Las Vegas. Note the riveting of the hull plates, as they are suspected to have played a key part in the sinking of the Titanic.

Although the first few dives of remote controlled vehicles were unmanned, it did not take long for Bollard to find himself in a manned



vehicle - 1986 - which reached 3900 metre depth, in order to survey and photograph the wreckage. He was on a research vessel **RV Atlantis II**, which had on board a deep sea diving submersible **DSV Alvin.** 

With the **DSV** Alvin, they descended the depths and were the first persons to visually spot and see



the wreckage after she sank in 1912. A Remote Operated Vehicle is reputed to have even descended (unsubstatiated) the iconic stairs of the lounge on the Titanic and "photographed the remarkably well preserved interiors, including the chandeliers that were hanging from the ceilings." (Wikipedia).

> After the location of the wreckage, it became a free-for-all race to reach the site and, controversially, remove artefacts from the site, more than 2000 such items having been salvaged.

> So nuch so, the site of the Titanic resembled an underwater carnival. In a really morbid event, one couple even decided to get married in an underwater vehicle resting on the bow of the Titanic. (The ghosts of the dead were probably stirred by this sacrilege).

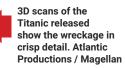
> Since then, numerous dives have taken place, mostly for scientific reasons. A few of them were to ascertain the condition of the steel. A few of them were to study the eco system that grew around the wreck.

> It is estimated that very little of the wreckage will be left by 2035, having succumbed to the ravages of the sea and metal eating bacteria. The hopes of finding any bodies has long been shelved and most have now come to believe that the site is a watery grave for the 1500+ who perished and, as such, should not be desecrated or disturbed.

The DSV Alvin in 1978, exploring hyperthermal vents. The rack hanging at the bow holds sample containers

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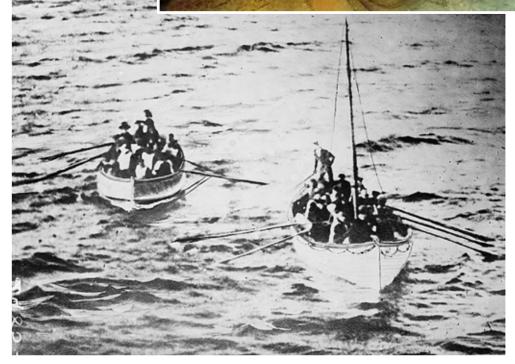


(SUPPOSEDLY IN APRIL ~ MAY 2023)

The Steering Telemotor One of the very few items that have managed to, remarkably, defy corrosion is the Bridge Steering Telemotor. - Emory Kristof / National Geographic via NOAA

(SUPPOSEDLY IN APRIL ~ MAY 2023)

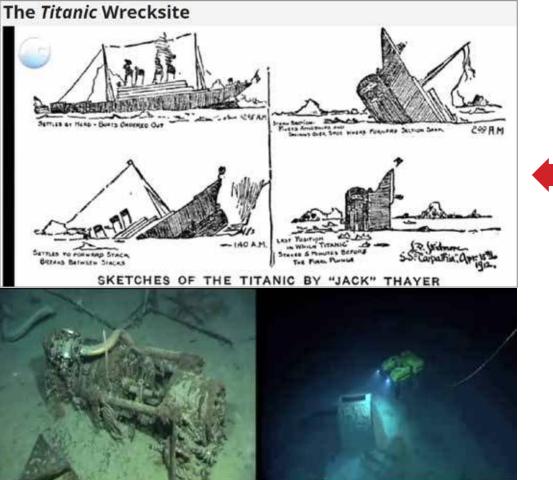




Titanic survivors in lifeboats on their way to the RMS Carpathia in 1912.Library of Congress

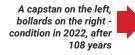
> RALPH WHITE-CORBIS

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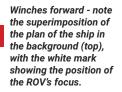


IT IS DIRECTLY ON THE SITE OF THE WRECKAGE. - NOAA

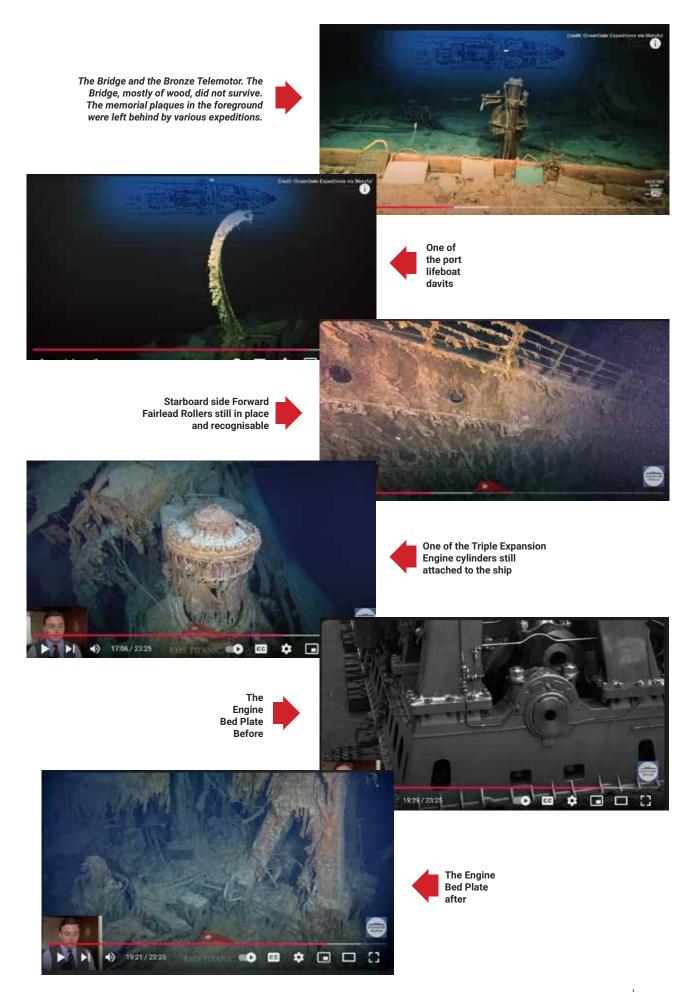




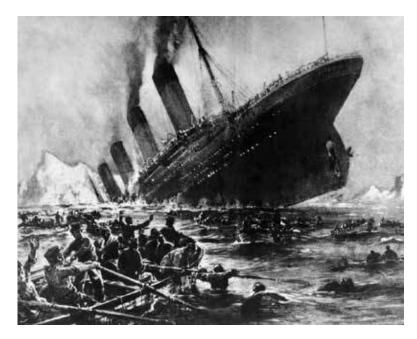




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"The Titanic became a UNESCO cultural heritage site in 2012 (exactly a hundred years after she sank). The site is also protected by other international agreements and domestic laws, including:

- UNESCO Convention on the Protection of Underwater Cultural Heritage: This 2001 treaty aims to protect underwater cultural relics, including wrecks, and restrict and, sometimes, promote public access to them for research purposes.
- US-UK International Agreement on Titanic: This agreement gives the UK and US governments the power to grant or deny licenses for entry to the wreck and removal of artifacts.
- R.M.S. Titanic Maritime Memorial Act of 1986: This US law called for the international agreement and NOAA guidelines.
- Section 113 of the Consolidated Appropriations Act, 2017: This US law prohibits anyone from disturbing the wreck without authorization from the Secretary of Commerce.
- The Protection of Wrecks (RMS Titanic) Order 2003: This UK law protects the Titanic.

The Titanic is located in international waters, so no single state can claim rights to the site. The wreck is slowly deteriorating due to metal-eating bacteria, and some predict it could vanish in decades.

On 14 April 2012 (the 100th anniversary of the ship's sinking), the wreck of the Titanic became eligible for protection under the 2001 UNESCO Convention on the Protection of the Underwater Cultural Heritage."

Although the site was protected by various bodies and statutes, some companies made it a tourist site and charged exorbitant fees for viewing the wreckage up close. Under the guise of 'scientific research', it became a tourist spot, costing each one of them as much as \$250,000.

In 2023, June 18th, a submersible morbidly named the 'Titanic', imploded during one of those dives, with 5 people on board, including a father - son party, with 3 of the 5 being businessmen, having no business being in the vehicle. The wreck of this submersible was spotted a few months back.

Theories abound as to the cause of the implosion - imperfections in the design and the materials used. But my take is that the submersible had completed one too many dives where it had been subjected to about 350 times the atmospheric pressure at sea level repeatedly and had been subjected to fatigue, like all materials that work at the outer edge of their capacity. The submersible was subjected to around 354

bar pressure = 35400 kilonewtons / square metre and returned to 1.01325 bar pressure at sea level, when raised. The fatigue caused by this extreme variation may have imploded the submersible.

Post Script : This is the first part of a series on the "Titanic". I anticipate that it will, finally, resemble an article with several chapters of

- The Wreck (as above) The Construction Period The Voyage Period
- The Events that led to the Collision with the Iceberg
- The Sinking and the Rescue

The Fall Out from the accident and the huge impact it had on Marine Laws.

All the details that I am enumerating are from material available in the print media, research papers, books. Most of the events that I write about will have an engineer's slant, rather than that of a story teller. I have also ventured to add my conjectures and my theories - they will be, mostly, interspersed with the main articles.

> CREDITS TO: ALAMY; SHUTTERSTOCK; OCEANLINER DESIGNS; BRITANNICA; GOOGLE; SCIENCE MUSEUM

#### About the Author

**Mr. A. Ranganathan**, 1970 batch of DMET, now retired worked in Sisco and Barber SM. Of the 38 years at sea, 28 where as Chief Engineer, served on Car Carriers, Container Vessels, Bulk Carriers, MPCs and Self Unloaders. After leaving sea, he has been a Consultant and Vessel Manager with Maersk USA for 6 years.



E-Mail: ranganathan.blog@gmail.com



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**For General Queries:** 

(Except Courses, TAR Book, Membership and MER / iMélange): The Institute of Marine Engineers (India) "IMEI House" Plot No. 94, Sector-19, Nerul, Navi Mumbai – 400706, India Phone: +91 22 2770 1664, +91 22 2770 6749 E-mail: hgs@imare.in

### For Training/Admission: Training Programmes:

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### Send your Articles to:

The Institute of Marine Engineers(India) "IMEI House" Plot No. 94, Sector-19, Nerul, Navi Mumbai – 400 706, India Tel.: +91 22 2770 1664 | Fax: +91 22 2771 1663 E-mail: editormer@imare.in / subeditor@imare.in

### For iMélange Queries and Articles:

The Institute of Marine Engineers(India) "IMEI House" Plot No. 94, Sector-19, Nerul, Navi Mumbai – 400 706, India Tel.: +91 22 2770 1664 E-mail: editornewsletter@imare.in / subeditor@imare.in



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