

ANNUAL REPORT 2025

Europe-Korea Marine and Ocean Engineers Association

EKMOA Europe Korea Marine and Ocean Engineers Association



Annual Report 2025

EKMOA

Create
Memories For
A Lifetime

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I. Association Overview

About

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President's Foreword



Foreword by President

It is my great pleasure to present the 2025 Webzine of the Europe–Korea Marine & Ocean Engineers Association (EKMOA). This edition captures a year marked by strengthened collaboration between Europe and Korea in ship and ocean engineering research.

Important are our community-building and knowledge-exchange activities. The Workshop on Korea and Europe's Ship & Ocean Research and Partnership Strength (WSOS) has become a flagship event for fostering strategic dialogue between researchers, industry leaders, and policymakers across regions. Building on its success, WSOS 2026 in Gothenburg will further strengthen collaboration and set new directions for joint research initiatives. In addition, upcoming global events such as EKC 2026 in Toulouse and G-NAOE 2026 in Houston underscore EKMOA's growing international footprint and its role in connecting Europe, Korea, and the wider global maritime community.

In 2026, EKMOA will celebrate its 10th anniversary, marking a decade since its foundation in July 2016 in Berlin. What began as a small but ambitious initiative has grown into a vibrant international community connecting marine and ocean engineering experts across Europe, Korea, and beyond.

Over the past ten years, EKMOA has served not only as a professional association, but as a trusted platform for dialogue, collaboration, and friendship. The strength of EKMOA lies fundamentally in its people—our members—whose active engagement has fostered enduring academic, technical, and personal connections. In particular, the Association has played a vital role in strengthening exchanges among European-based experts and Korean researchers, enabling joint research, knowledge transfer, and long-term partnerships that extend well beyond individual projects or events.

I would like to extend my sincere appreciation to all EKMOA members, contributors, and partners who have accompanied us on this journey. Your commitment and collegiality have shaped EKMOA into the dynamic and forward-looking Association it is today. I look forward with confidence and anticipation to the next chapter of our shared endeavour.

12. 2025

President
Byoungug Jeong

About

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EKMOA Member Highlights

KRISO Europe Centre Magazine “Sea Frontier”

This section of the EKMOA Annual Report introduces the KRISO Europe Centre Magazine “Sea Frontier,” a collaborative publication between the KRISO Europe Center (KEC) and EKMOA.

This magazine is a specialized maritime mobility publication issued monthly by the KRISO Europe Center (KEC) since September 2024 under the support of the R&D program funded by the Korean Ministry of Oceans and Fisheries. The publication is produced in close collaboration with EKMOA, drawing on its expert network and field insights across Europe. By delivering the latest maritime policy and technology trends collected directly from Europe, the magazine serves as a key information platform that promotes technological exchange and joint research between Korea and Europe in the field of advanced maritime mobility.



KEC Magazine, Sea Frontier

In particular, amid the global trends of Decarbonization and Digital Transition, the magazine provides in-depth analyses of leading cases and innovative technologies in the European shipping, shipbuilding, and mobility sectors. Through this, it identifies major issues shaping the future maritime mobility industry and connects areas requiring Korea–Europe collaboration, contributing as a strategic enabler that drives positive change.



Special Report

Each monthly issue consists of a **Special Report**, which presents a thorough analysis of key topics such as eco-friendly fuels, IMO policies, and autonomous shipping; a **Maritime Monitor**, which highlights the latest developments in AI-based safety and navigation technologies as well as digital twin applications; **Nautical Notes**, which deliver field-oriented policy and industry updates; and a **Newsletter**, which provides information on major maritime events and forums. Together, these sections offer practical insights to experts in Korea and abroad.

Online access:
KRISO Europe Centre Magazine *"Sea Frontier"*
Available at : https://www.kriso.re.kr/gallery.es?mid=a10409040000&bid=0026

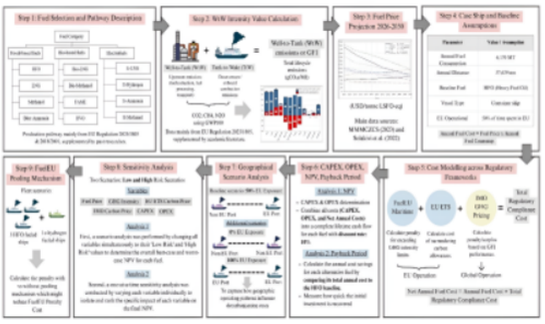
EKMOA & KORIES Joint Research

"Analysis of Trends and Outlook on Maritime Environmental Policies and Lifecycle Impact"

This report was developed as part of an external research initiative under the KORIES Green Ship Full-Cycle Innovation Program, with contributions from experts of the Europe–Korea Marine and Ocean Engineers Association (EKMOA).

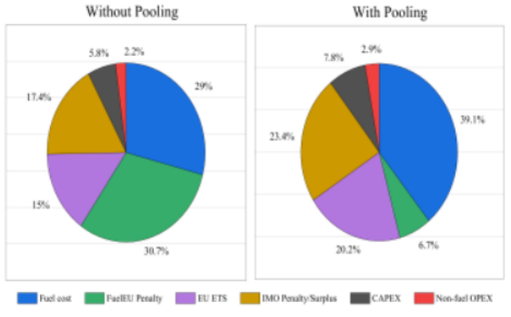
Background and Rationale

The global shipping industry, a central driver of international trade, is undergoing major change as it faces increasingly stringent environmental regulations and the global push for carbon neutrality. As rules tighten across the IMO, the European Union, the United Kingdom, and other key regulators, there is a growing need to systematically review new policies, eco-friendly ship technologies, fuel-efficiency measures, smart-ship systems, and frameworks such as FuelEU Maritime. This study addresses that need by examining the main technological and policy shifts that are shaping the future maritime landscape.



Findings

The report provides a multifaceted analysis of global Green Corridor initiatives and the potential impact of FuelEU Maritime, which is scheduled to take effect in 2025, on the Korean shipping industry. It also reviews the IMO's work on Lifecycle Assessment (LCA) guidelines and evaluates the characteristics of various alternative fuels, proposing technical and policy measures to support the achievement of carbon neutrality. Furthermore, it explores how the deployment of advanced technologies such as digital twins, big-data analytics, and AI-based autonomous navigation can contribute to improving and optimizing the maritime environment.



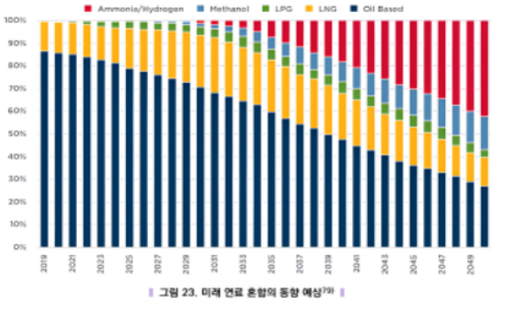


그림 23. 미래 연료 혼합의 동향 예상[29]

Conclusions and Implications

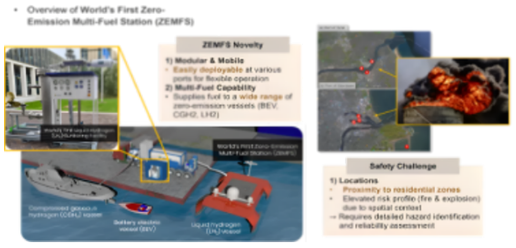
The research, supported by EKMOA's expert insights, emphasizes that innovation in eco-friendly ship technologies and operational efficiency must go beyond mere regulatory compliance and drive structural change across the maritime sector. It also highlights international collaboration, policy support, technology commercialization, and infrastructure development as key enablers for Korea's maritime industry to accelerate its green transition and strengthen its global competitiveness.

Research Output

"Data-driven and scenario-based risk and reliability assessment framework: a case study for hydrogen bunkering"

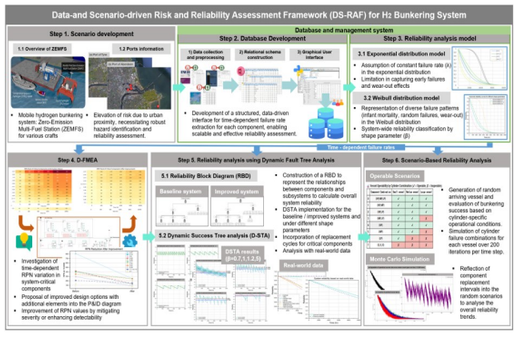
Background and Rationale

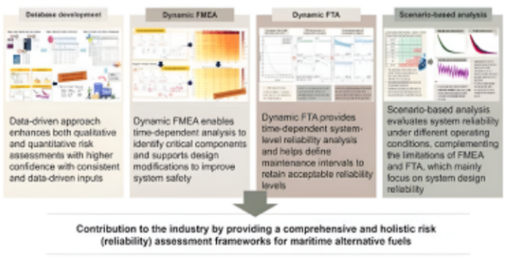
Although global decarbonization regulations such as FuelEU Maritime and the IMO net-zero framework are accelerating the adoption of alternative fuels, safety regulations for emerging technologies, including hydrogen bunkering systems, remain immature and non-prescriptive, necessitating risk-based approaches beyond rule-based design. To address this gap, a comprehensive and standardized risk and reliability assessment framework is essential to ensure the safe and reliable integration of alternative fuels into maritime practice.



Findings

This paper proposes a data-driven and scenario-based risk and reliability assessment framework that integrates Dynamic Failure Modes and Effects Analysis (D-FMEA), Dynamic Fault Tree Analysis (D-FTA), and Scenario-based analysis. D-FMEA enables time-dependent, component-level evaluation by identifying critical components sensitive to operating time and by suggesting design options to enhance system safety. D-FTA supports time-dependent, system-level analysis by capturing critical components and appropriate maintenance intervals. In addition, Monte Carlo–based scenario simulations complement these methods by incorporating scenario variations in vessel types and operational hydrogen cylinders type, allowing the framework to compare various operational conditions.





Conclusions and Implications

The proposed framework, which integrates database-driven inputs, time-dependent modeling, and scenario variability, provides a robust, scalable, and comprehensive approach to risk and reliability assessment. By systematically incorporating component failure-rate data, the framework enables more consistent and reliable safety evaluations. Furthermore, it is designed to accommodate evolving datasets, allowing flexible application across a wide range of alternative-fuel systems in the maritime industry. The time-dependent formulation captures the dynamic nature of component degradation, while the scenario-based analysis reflects operational variability, thereby providing more robust and context-specific safety insights to support risk-based design and decision-making.

EKC 2025 Highlights & Achievements

“Strengthening Korea–Europe Collaboration by Leading the Marine & Ocean Engineering (MO) Division”



Overview

EKC2025, held in Vienna, Austria on 25–28 August 2025 under the theme *"Global Innovative Frontiers: Bridging Research and Industry: Exploring Fundamentals and Driving Prosperity"* convened researchers, industry leaders, and policymakers from Europe and Korea. EKMOA led the Marine & Ocean Engineering (MO) Division, coordinating key sessions that strengthened technical exchange and supported future Korea–Europe cooperation in maritime and ocean engineering.



Key Activities

EKMOA coordinated six MO technical sessions and two special sessions, including a keynote by Kevin Koosup Yum (Hyundai Europe R&D Center) and Special Sessions ST12 (with KIMST) and ST13 (with KRISO), which launched the Korea–Europe Sustainable Maritime Mobility Forum. The programme strengthened Korea–Europe collaboration in sustainable maritime mobility and advanced marine technologies.





M&O PROGRAMME	
Session	**Key Themes**
MO1	KRISO-EKMOA Joint Session : Advanced Future Marine Mobility
MO2	Innovative Cryogenic and Computational Solutions for Decarbonized Maritime and Offshore Systems
MO3	Innovations in Electric (Hybrid) Propulsion Systems for Sustainable Maritime Applications
MO4	HDERC-EKMOA Joint Session : Technologies and Strategies for Decarbonizing Global Shipping
MO5	LR-EKMOA Joint Session : Maritime Safety - Current Challenges and Future Pathways
MO6	KMC-EKMOA Joint Sessions

Impact and Outlook

At EKC2025, EKMOA demonstrated international leadership by successfully coordinating six MO sessions and two special sessions in collaboration with key partners including KRISO, KOMERI, KMOU, HD-ERC, Lloyd's Register, KIMST, and KMC. The launch of the Korea–Europe Sustainable Maritime Mobility Forum provides a foundation for long-term joint research and network expansion, reinforcing EKMOA’s role as a strategic bridge between Korea and Europe for innovation and a sustainable maritime future.

WSOS 2025, Norway

"Workshop on Korea and Europe's Ship & Ocean Research and Partnership Strength"



Overview

WSOS 2025 was hosted by EKMOA from 30 May to 2 June 2025 in Oslo and Fevoldstranda, Norway, bringing together experts from Korea, Europe, and the UK to strengthen international cooperation in ship and ocean research. As the main organizer, EKMOA facilitated meaningful exchanges on emerging maritime challenges and future-oriented collaboration.



Key Activities

The 8th WSOS focused on “Korea–Europe–UK Collaboration and Exchange,” featuring two workshop days and discussions across six key themes:

- Ocean Energies
- Advancements in Marine Technology
- Maritime Decarbonization
- Maritime Digitalization
- Sustainable Shipping Practices
- Autonomous & Intelligent Vessel Solutions



Participants also joined a DNV Oslo headquarters tour on 29 May and attended the EKMOA General Assembly on 1 June, reinforcing transparency and long-term organizational development.

Impact and Outlook



WSOS 2025 strengthened cross-regional collaboration by providing a platform for deeper dialogue on future maritime priorities and technological innovation. Through its partnership with DNV and engagement with experts across Korea, Europe, and the UK, EKMOA reinforced its role as a key facilitator of sustainable maritime cooperation. Building on this momentum, EKMOA is positioned to expand research partnerships and contribute to a more resilient and innovative Korea–Europe maritime ecosystem.

KIRD Mid-Career Training Program

Strengthening Mid-Career Research Capacity through Training and Industry–Academia–Research Mentoring







Overview

The KIRD Mid-Career Training Program was a five-week course in the UK, organized by EKMOA with support from KIRD. It aimed to strengthen practical capabilities and foster international collaboration through hands-on training and structured industry–academia–research mentoring.

Key Activities

Beginning with an orientation in Glasgow, participants received practice-oriented training in propulsion system modelling, digital twin design, autonomous navigation, computer vision, and sensor integration. The programme also included technical visits to the Kelvin Hydrodynamics Laboratory, ZELIM (Edinburgh), and the Virtual Engineering Centre at the University of Liverpool (DIF/TACPS), alongside industry mentoring (including engagement with HD Hyundai Europe R&D Center) and team-based projects with interim/final presentations.

Outcomes

Participants enhanced core skills in propulsion modelling, digital twins, and system integration, supported by hands-on work and expert feedback. The programme also expanded networks across institutes, companies, and universities, generating follow-up discussions on joint research and technical cooperation.

Overview of MOUs and Partnerships

EKMOA has established a robust network of domestic and international partners through strategic MOUs, enabling sustained joint research, technical exchange, and industry–academia collaboration in marine and ocean engineering.

No.	Country / Region	Partner Institution	Date Signed	Scope of Collaboration	Status
1	South Korea	National Korea Maritime & Ocean University (KMOU)	15 Sept 2025	Joint research collaboration and knowledge exchange on next-generation marine mobility technologies	Active
2	South Korea	Busan Technopark	31 July 2024	Joint research collaboration on ship GHG management and ammonia bunkering safety technologies	Active
3	South Korea	Pohang Technopark	31 July 2024	Joint research collaboration on hydrogen and fuel cell technologies for maritime applications	Active
4	South Korea	IREA Chemical Enterprise	07 Dec 2020	Joint research and technology exchange on marine engineering and anti-corrosive materials	Active
5	South Korea	Univeristy of Inha	25 Oct 2019	Research cooperation and technical exchange in shipbuilding and ocean engineering between Korea and Europe.	Active
6	South Korea	Pusan National University (PNU)	25 Oct 2019	Research cooperation and technical exchange in shipbuilding and ocean engineering between Korea and Europe.	Active
7	South Korea	Korea Research Institute of Ships & Ocean Engineering (KRISO)	22 Aug 2018	Research cooperation and technical exchange in shipbuilding and ocean engineering between Korea and Europe.	Active
8	South Korea	Korea Offshore & Shipbuilding Association (KOSHIPA)	02 Sept 2017	Networking and information exchange in shipbuilding and marine engineering	Active
9	South Korea	Society of Snaval Architects of Korea (SNAK)	27 July 2017	Networking and technical exchange Joint maritime R&D collaboration	Active

EKMOA — KMOU MOU Signing

"Strengthening Research and Educational Cooperation for the Next-Generation Maritime Mobility Free Regulatory Zone"

Overview

On 19 September 2025, the Europe–Korea Marine and Ocean Engineers Association (EKMOA) and Korea Maritime & Ocean University (KMOU) signed a Memorandum of Understanding (MOU) to jointly advance the Next-Generation Maritime Mobility Free Regulatory Zone initiative. The agreement aims to formalize research, technical exchange, and educational collaboration to support international joint research and talent mobility.



Signing ceremony

Activities

Through this MOU, the two institutions agreed to cooperate on identifying joint research themes, developing educational programs and internships, and facilitating field training and academic seminars. The signing was held in conjunction with EKMOA-led training and site visits, contributing to practice-oriented learning and expanded industry–academia–research networking. Participants also explored potential areas for future joint research and technical cooperation.



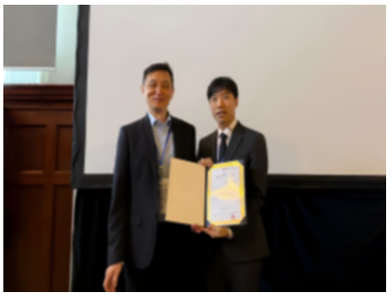
Group photo

Outcomes

The MOU establishes an institutional foundation for sustained collaboration in research and education, enabling smoother joint research activities and personnel exchange between EKMOA and KMOU. This partnership is expected to accelerate the development and practical application of next-generation maritime mobility technologies.

01. 2025 KSEAUK Outstanding Research Awards

The 2025 KSEAUK Outstanding Research Awards, presented by the Korean Scientists and Engineers Association in the UK, recognize Korean researchers in the UK for exceptional research excellence and potential. In 2025, two EKMOA members were selected as awardees.



Rising Future Leader: Dr. Hayoung Jang
(Research Associate, University of Strathclyde)



Junior Future Leader: Hyeong Jin Kim
(PhD Student, University College London)

02. EKMOA Committee Activities Summary

On 31 May 2025, during WSOS 2025 in Oslo, Norway, EKMOA members convened for the annual General Assembly. The meeting provided a platform to review key achievements, discuss future directions, and further strengthen the Korea–Europe expert network.

Key Activities

- Review of EKMOA's major activities and accomplishments
- Discussion on future development strategies and operational plans
- Exchange of ideas to enhance member engagement and collaborative initiatives
- Reaffirmation of commitment to sustained cooperation in global maritime and ocean engineering fields



Group photo



Outlook briefing



Discussion session

III. Appendix

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Committee

Steering Committee

President

Dr Byongug Jeong (University of Strathclyde)

Vice President

- Dr Koosup Yum (HD ERC, Germany)
- Mr Baejun Kwon (DNV GL, Norway)
- Prof Hyungju Kim (NTNU, Norway)

- Director of General Affairs: Dr Hayoung Jang (University of Strathclyde, UK)
- Director of Finance: Dr Injun Yang (University of Strathclyde, UK)
- Marketing Assistant : Solji Yun (KIOM, South Korea)
- Secretary: Eunseok Kwon (EKMOA, UK)

- Representative of Scandinavia : Prof. Taesung Kim (Technical University of Denmark)
- Representative of UK: Dr Sungil Ahn (ABS, UK)
- Representative of Korea: Dr Mingyu Kim (KMC, South Korea)

Audit

Auditor: Mr Sungsoo Lim (Fugro Norway AS, Norway)

Advisory Committee

- Dr Yongwon Lee (Lloyd's Register, UK)
- Dr Dohan Oh (Hongik University, South Korea)
- Dr Dong Nam (Korea Maritime Transportation Safety Authority)
- Dr Seungdeog Yoo (Microvortex, Germany)
- Dr Keunjae Kim (SSPA, Sweden)

Communication Channels

Website: https://www.ekmoa.org

LinkedIn: https://www.linkedin.com/company/europe-korea-marine-and-ocean-engineers-association-ekmoa/

KakaoTalk Open Chat: https://open.kakao.com/o/gYthz5Sh

2026 Plan & Outlook

In 2026, EKMOA will strengthen Korea - Europe collaboration and global engagement through major international conferences and flagship events:

- WSOS 2026 | Gothenburg, Sweden | 28 - 29 May 2026
- EKC 2026 | Toulouse, France | 20 - 23 July 2026
- G-NAOE 2026 | Houston, USA | 20-24 October 2026

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