

BUNKERSPOT

SHIPPING AT AN INTERSECTION

INSIDE:
EMISSIONS TRADING
CIRCULAR FUELS
ONSHORE POWER SUPPLY
TRAINING FOR
NEW FUELS

People-powered

Pacific Environment's **Jie Ying Lim**, Singapore Maritime Academy's **Capt. Chatur Wahyu**, and the Centre of Excellence in Maritime Safety's **Daniel Zhang** highlight Singapore's leadership in strategic maritime workforce development amid a critical transition to green shipping



The International Maritime Organization's (IMO) approval of the Net-Zero Framework in April sent a clear signal: the transition to net zero starts now. As a consultative member at the IMO, Pacific Environment has actively been participating in negotiations. While several elements of the framework remain to be finalised and are contingent on its formal, and critical, adoption in October, the global maritime sector has been readying itself for a fundamental change. The adoption of

zero- or near-zero (ZNZ) fuels is no longer an aspirational target in decarbonisation, but an essential pathway to make the cuts needed for compliance and a baseline to address the mounting climate crisis in a sector that accounts for 3% of total global greenhouse gas emissions.

As the industry moves full steam ahead in scaling up the adoption of these clean fuels, the importance of the true engine of the maritime industry – its people – has never been clearer. Seafarers, bunkering personnel, and

scores of other people who work in global supply chains must navigate this transition firsthand, managing the complexities and hazards of handling new fuel types and technologies aboard ships and onshore.

Ensuring a resilient and well-prepared workforce in this evolving maritime landscape was one of the topics explored at the International Safety@Sea Week held from 15 to 18 July 2025 in Singapore. Organised by the Maritime and Port Authority of Singapore (MPA), a particular highlight of the forum was

a methanol spill exercise involving 11 vessels and over 150 personnel from various local authorities and industry partners.

SAFETY IN SINGAPORE AND BEYOND

The methanol spill exercise formed part of MPA's broader preparations for methanol bunkering, which aligns with Singapore's strategic ambition to position itself as a sustainable, multi-fuel bunkering hub. It also underscores the nation's integrated approach to maritime decarbonisation – one where ambitious environmental goals are pursued with a strong emphasis on operational safety and practical implementation.

This is a robust and necessary strategy on several fronts. At its core, workplace safety must never be compromised – no one should be exposed to harm simply for doing their job. Adopting ZNZ fuels is both an environmental imperative and a regulatory requirement. However, many alternative fuels such as ammonia and methanol come with complex safety challenges. They are often highly flammable, toxic, or corrosive, and pose significant risks if mishandled.

Second, prioritising safety is critical to workforce sustainability. A strong safety culture is more than just a compliance measure; it is a prerequisite for attracting and retaining talent. In an increasingly complex and technologically advanced maritime landscape, the industry cannot afford to lose personnel to preventable incidents or poor working conditions. This is especially so in Singapore, where the maritime sector is a significant contributor to its economy and where trade is seen as existential.

Third, the pace of the fuel transition is directly tied to workforce development. Until the workforce is fully equipped to handle new fuels safely, shipowners and operators will be cautious about adopting cleaner fuels at scale. According to the second edition of the Global Maritime Decarbonization Survey by the Global Centre for Maritime Decarbonisation (GCMD) and Boston Consulting Group (BCG), safety was cited as the top challenge in adopting ammonia by more than a quarter of Frontrunners surveyed – shipowners and operators leading decarbonisation – and nearly half of Followers, who are committed to decarbonisation but trail Frontrunners.

As the maritime industry accelerates its transition toward cleaner fuels, the way forward must be underpinned by safety. Frontline personnel must be adequately trained and equipped to manage these new hazards. Comprehensive safety protocols, emergency response readiness, and rigorous skills train-

ing must form the foundation of this transformation. Through such a holistic approach, decarbonisation efforts can be effective and sustainable, protecting lives while advancing environmental stewardship.

SINGAPORE LEADS INDUSTRY TRANSITION EFFORTS

Singapore, as the world's largest bunkering port, has undertaken several on-ground exercises on alternative fuels bunkering and operations apart from the abovementioned methanol spill exercise. These include the world's first use of ammonia as a marine fuel in the dual-fuelled, ammonia-powered *Fortescue Green Pioneer* in 2024, as well as the world's first ship-to-containership methanol bunkering on the *Laura Maersk* in 2023. These exercises complement parallel efforts to ready the industry for the transition, including the development of standards for methanol and ammonia bunkering.

Importantly, their successful completion demonstrates the country's outstanding ability to rally the ecosystem of stakeholders –

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including industry, research institutions, and regulatory bodies – that need to work together to safely scale up operations for clean fuels. Multi-stakeholder collaboration also underpins its workforce training strategy, which includes the Maritime Energy Training Facility (METF), a comprehensive network of local and international partners who co-develop training facilities and courses.

BUILDING A FUTURE-READY WORKFORCE AT SINGAPORE POLYTECHNIC

One of the METF's key partners is Singapore Polytechnic (SP), which plays a pivotal role in maritime training and innovation through the Singapore Maritime Academy (SMA) and the Centre of Excellence in Maritime Safety (CEMS). These two entities are central to SP's mission of advancing maritime safety and operational excellence through applied technology, rigorous training, and close collaboration with industry stakeholders, regulatory authorities, and other Institutes of Higher Learning.

Key assets include an integrated engine room and bridge simulator managed by SMA, providing immersive and realistic training environments for shipboard operations. Complementing this is the VR-enabled, scenario-based training platform developed by CEMS, which enhances safety competencies by replicating real-world challenges and decision-making scenarios for handling methanol as a fuel. To enable easy access to immersive learning, CEMS has also developed a computer-based training package which allows overseas trainees to go through methanol handling scenarios remotely through internet access. Together, these facilities and tools help to prepare seafarers and mari-



time professionals for the complexities of modern vessel operations.

A notable initiative by SMA is its specialised training course on the use of methanol as a marine fuel. This course equips participants with essential competencies in fire safety, emergency response, and fuel handling procedures specific to methanol-powered ves-

sel. This course is one example of how the country is sharing its knowledge and best practices with the international maritime community. So far, more than 650 seafarers, maritime professionals, and firefighters have attended the basic and advanced training courses for handling methanol; out of the 650, about 50% are non-local.

of the discussions also addressed the development of a regulatory framework to enhance safety measures in support of greenhouse gas (GHG) emission reductions from ships, particularly in the context of adopting new technologies and alternative fuels. SP's participation at HTW11 exemplifies its commitment to contribute to international training standards for seafarers on ships using alternative fuels.

CONCLUSION

Singapore's approach to advancing common global interests through cooperation and knowledge sharing is particularly valuable at a time when cross-value chain and multi-stakeholder collaboration is essential to meeting decarbonisation goals.

Furthermore, its experience offers valuable lessons for other players navigating the fuel transition. Countries with ambitions to decarbonise their maritime sectors, including significant maritime centres such as South Korea and Japan, can take a leaf from Singapore's book. The climate crisis is only accelerating, and we must counteract this pace by scaling up investments in safety training, establishing standards and protocols, and collaborating openly to pilot solutions and share insights. This will build confidence across the industry, particularly among the workers at its core.

Finally, the IMO's Net-Zero Framework is a starting point. Analyses have shown that its targets fall short of the IMO's own revised GHG strategy and even further behind the pace required to align with the Paris Agreement. Pacific Environment, among others in the industry, have called for greater ambition to accelerate the adoption of truly sustainable ZNZ fuels and technologies. We must be ready for this future.

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CEMS showcasing VR technology on safe methanol handling at COP29 in Baku in November 2024

'CEMS has developed a computer-based training package which allows overseas trainees to go through methanol handling scenarios remotely through internet access'

sels. Through a combination of theoretical instruction and hands-on practical firefighting exercises, trainees gain the knowledge and confidence to operate safely in high-risk situations. This is particularly relevant as the industry anticipates wider adoption of methanol in support of global decarbonisation goals.

Looking ahead, SMA and CEMS are actively expanding their training portfolio to cover other alternative marine fuels, including ammonia – another promising but hazardous ZNZ fuel. By proactively developing these capabilities, SP plays a leading role in ensuring that Singapore's maritime workforce remains future-ready and resilient in an evolving energy landscape.

ON THE INTERNATIONAL STAGE

In a transition that is a global imperative, Singapore also extends its expertise beyond its own shores. SMA's methanol handling

Singapore's learnings also feed into various global workstreams on maritime competency development. Through the METF, it contributes to the work of the Maritime Just Transition Task Force (MJTTF), which complements the IMO's ongoing work on the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).

Additionally, it actively contributes to the Human Element, Training and Watchkeeping (HTW) Sub-Committee in the Maritime Safety Committee (MSC) at the IMO. At the 11th session of the HTW held in London in February 2025, SMA formed part of the Singapore delegation led by MPA and contributed to discussions aimed at enhancing international maritime safety standards and promoting sustainable practices across the sector.

The session, which was attended by delegates from IMO Member States, focused on a comprehensive review of the STCW Convention and Code. A significant portion