THE REPORT

The Magazine of the International Institute of Marine Surveying

JUN 2025 | ISSUE 112

ENSURING THE SAFETY OF AUTONOMOUS SHIPPING

ENGINE ROOM FIRES ARE STILL A MAJOR CONCERN

THE BENEFITS AND CHALLENGES OF ELECTRIC PROPULSION FOR RECREATIONAL BOATS

IS SHIPPING READY TO EVOLVE WITH AI AND DATA-DRIVEN DECISION-MAKING?

MTF's report highlights critical safety issues of transporting electric vehicles

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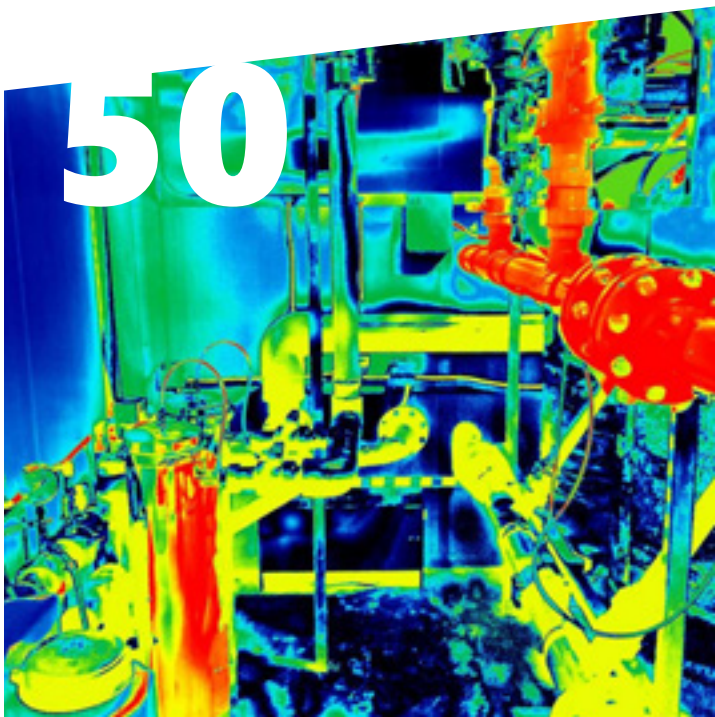

EDITOR'S LETTER

Dear Member and Fellow Industry Professional

Welcome to the June edition of The Report Magazine, issue 112. The shipping and boating industry really is one of the most fruitful sectors for news and innovation right now, with an abundance of topics to share with readers. Compiling this edition reminded me, once again, how we are transitioning as an industry from the traditional to the new. Never before has the marine surveyor been faced with so many significant challenges as new technologies emerge at an alarming rate. Acquiring fresh knowledge and gaining new skills should be at the top of every surveyor's to do list.

Let me start with the traditional. The article *'Soon to open, a new research centre for wooden boats'* (page 82). In many parts of the world, wood is far less popular as a boatbuilding material these days, but the good folk of Brooklin, Maine are working to establish a facility to showcase the history of wooden boatbuilding in an unprecedented way.

Sticking with another issue that is centuries old, the feature on page 118 *'Corrosion in ballast water and cargo tanks'* highlights the fact that corrosion rates can differ and discusses the significant contributors to the deterioration process.

Marine disasters are never far away as we all know, sadly. Out of mounting frustration, I was motivated to pen an article following a spate of large yacht fires since the start of 2025. I have no answers to this conundrum, which is growing exponentially, but it is yet another wake up call for the industry and must be causing marine insurers sleepless nights! All I can do is to bring these incidents to your attention to stimulate wider debate. Read *'What's behind the latest spate of boat fires'* on page 126. In a similar but different vein, the UK Health & Safety Executive has issued a safety alert given the increase in offshore collisions. You can read *'Rise in collisions of attendant ships with offshore structures'* on page 124.

As with recent previous editions of the Report Magazine, there are a number of articles and features that explore and discuss new technologies. I would steer you to page 54 *'Is shipping ready to evolve with AI and data-driven decision making'*, page 56 *'Ensuring the safety of autonomous shipping'*, page 60 *'MTF's report highlights critical safety issues of transporting electric vehicles'*, page 88 *'The benefits and challenges of electric propulsion for recreational boats'*, and page 134 *'Yacht design: AI is not accountable'*. There's plenty to get your mind around and as surveyors constantly remind me, every day is a school day – and ain't that the truth!

It is not so often that I reference member news (page 31), but this time I will. There are some short reports on the many IIMS training seminars and conferences that we have delivered over the past three months, which have been well attended. In particular, I wanted to reprint John Stawpet's keynote address to open our London Conference, held at the Thomas Miller building in central London in May. On the subject of training seminars, I am travelling to host IIMS events at Auckland (11 July) and Brisbane (17-18 July). Perhaps I will meet you at one or other of the events.

And finally, I was delighted that Capt Nick Sloane agreed to be interviewed as the subject of the *'A day in the life of'* feature (page 145). Nick is well known for his work leading the team that raised Costa Concordia. He talks about his fascinating life and work.

Enjoy this edition of the Report Magazine.

Survey well,

Mike Schwarz
Chief Executive Officer

PRESIDENT'S COLUMN

Dear Members and Fellow Maritime Professionals

As we progress through the year, I continue to be both inspired and encouraged by the momentum within the global IIMS community. The last quarter has been particularly active, with training and knowledge-sharing taking centre stage at many different locations.

The recently concluded IIMS London one day Conference on 13th May for the commercial ship surveying sector was a resounding success. It brought together a wide cross-section of professionals and industry stakeholders, including representatives from the P&I Club sector. I had the privilege of opening the event virtually, and used that platform to address a topic close to my heart - the structure by which marine surveyors are appointed, particularly for critical work where the conduct of the survey may have a direct impact on the safety of life at sea.

In today's framework, surveyor appointments often flow through established networks, sometimes limiting access to the most qualified specialists. I believe there is a real opportunity to leverage the credibility and competence of the IIMS in consultation with insurers and P&I clubs to strengthen the appointment process, especially for critical assignments. When a highly competent, impartial professional is deployed, everyone benefits - most importantly, the seafarer, whose safety depends on that competence.

This period has also seen a surge of high-quality, well attended hybrid training events hosted in Baltimore, Southampton, Dublin, and Palma, alongside online sessions on report writing and the Workboat Code 3. Our new learning portal, set to launch imminently, will take our training efforts to the next level, offering surveyors worldwide an on-demand, flexible education platform that reflects the standards of the modern maritime professional.

Looking ahead, the India Conference tentatively scheduled for August 2025 promises to bring together regional expertise and perspective at a time when India's maritime sector is

undergoing a transformation, fuelled by significant government investments in port and logistics infrastructure.

In the UK, we are witnessing a landmark regulatory change with the introduction of the new proposed MCA Sport & Pleasure Code - the most comprehensive update to small commercial vessel regulations for a quarter of a century. It underscores the importance of staying ahead of the curve, something IIMS has always strived to do.

Here in Goa, the monsoons have arrived earlier than expected. This is traditionally the time of year when we reinforce awareness around the dangers of cargo liquefaction. Inspections and adherence to IMSBC Code protocols that are not just about ticking boxes - they are directly linked to the safety of ships and those who sail them.

Lastly, it is impossible to ignore the impact of Artificial Intelligence and Large Language Models (LLMs), which are rapidly transforming how industries function, including ours. As marine surveyors, we too must explore how these tools can support our work, be it in document processing, case assessments, or even technical reporting. Embracing these technologies will be essential to keeping our profession relevant and responsive.
As always, I am proud of what the IIMS continues to achieve and grateful to all members for their dedication to raising standards globally. Together, let's continue to drive progress, with those who work at sea or use it for pleasure purposes at the centre of all we do.

Sincerely,

Capt Ruchin Dayal
IIMS President - Master Mariner (MMI), FIIMS (UK), AMS – SAMS (USA), MAIMS (Australia), AFNI (London)

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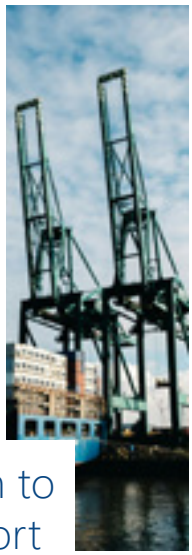
Beneteau to launch redesigned Gran Turismo range

Beneteau has announced plans to update its Gran Turismo range with a new generation of 'crossover express cruisers,' which the French boating brand says are designed to align more closely with evolving customer preferences.

The company plans to launch three new models within the next six months: the Gran Turismo 35, the Gran Turismo 40, and the Gran Turismo 50.

Beneteau says the new models offer high-end materials, connectivity options and the ability for customers to select personalised touches and finishes. The long-term partnership between Beneteau and Alpine, the sports speciality brand, will also result in limited-edition collaborations across the new Gran Turismo line-up in the coming months.



Antwerp-Bruges overtakes Rotterdam to become Europe's busiest container port

Antwerp-Bruges overtook Rotterdam in the first quarter of 2025 to assume the mantle of Europe's busiest container port, handling 3.43 million TEUs against its Dutch rival's 3.36 million TEUs. While Rotterdam's container volume in the first three months rose 2.2% year over year, throughput at the Belgian hub was up 4.5%, increasing Antwerp-Bruges' market share in the Hamburg-Le Havre range by 0.6 percentage point to 30.5%.

"These quarterly figures emphasize how valuable the complementarity between Antwerp and Zeebrugge actually is," Dirk de Fauw, mayor of Bruges and vice president of the Port of Antwerp-Bruges board of directors, said in a statement.

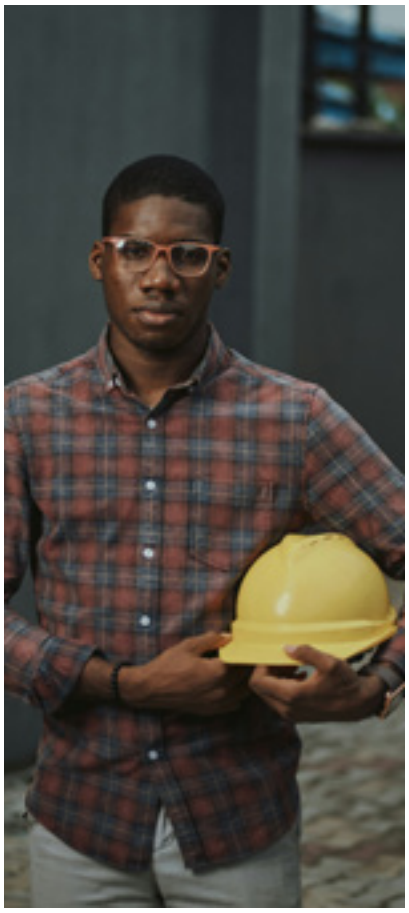
Surveyor shortage adds to skills shortage headache

A shortage of surveyors is hampering South African marine manufacturing, a senior government maritime official told delegates at a maritime careers conference in Cape Town, Maritime Review Africa reports. The surveyor shortage is symptomatic of a broader skills shortage affecting the sector despite ongoing efforts to ramp up local skills training programmes.

Captain Vernon Keller, deputy chief operations officer of the South African Maritime Safety Authority (SAMSA), said the surveyor shortage was negatively impacting the maritime sector. SAMSA was short at least 14 surveyors, Keller said.

The surveyors are needed to conduct inspections required to keep abreast of international certification requirements.

South African boatbuilders have also repeatedly raised concerns about a shortage of skilled artisans, with industry growth far exceeding the pool of available talent. The South African Boat Builders Export Council (SABBEX) is actively working to alleviate the problem.



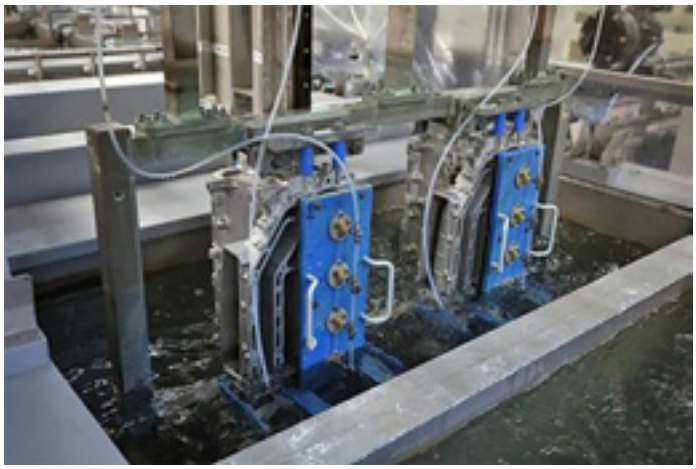
World's first hydrogen-powered cruise ship set to launch in 2026

Viking Cruises will launch the world's first hydrogen-powered cruise ship in partnership with Italian shipbuilder Fincantieri. The vessel is already under construction at the company's Ancona yard in Italy. The next-gen vessel will be called the Viking Libra.

Viking currently has two vessels in production. The Libra is set to be delivered in late 2026, while the Viking Astrea is set to launch in 2027. The Astrea will also be hydrogen-powered.

The Libra will feature a hybrid propulsion system that uses liquified hydrogen to power a PEM (polymer electrolyte membrane) fuel system. According to Viking and Fincantieri, the system will generate up to six megawatts of power and will enable the ship to sail with zero emissions, allowing access to more environmentally sensitive regions.

Torstein Hagen, chief executive of Viking, said in a press release: "From the outset, we have designed our river and ocean ships thoughtfully to reduce their fuel consumption, and we are very proud the Viking Libra and the Viking Astrea will be even more environmentally friendly."



Suzuki develops more sustainable corrosion-resistant anodizing tech for outboards

Suzuki Motor Corporation has developed a new technology to apply a corrosion-resistant anodizing treatment to outboard engine components which it says cuts CO2 emissions in half from those of previous treatments.

The new manufacturing process, which protects key components including the cylinder block, cylinder head and crankcase, is being introduced on some specifications of the company's popular DF140B outboard engine and will be progressively adopted to other models. Beyond significantly lowering greenhouse gas emissions during product manufacturing, further key features of Suzuki's new anodizing technology include enhanced heat resistance and improved sealing for improved product durability.

"The technology that we have adopted in Suzuki's outboard motors not only enhances product quality through improved corrosion resistance but also contributes to carbon neutrality by reducing CO2 emissions during manufacturing," said Suzuki Marine executive general manager, Shuichi Mishima. "This is a world-first technology for mass-produced outboard motors. We have taken on the challenge of developing new technologies as Team Suzuki and have successfully developed anodizing treatment for mass-produced engine parts."

The 2025 Multihull of the Year winners announced

After months of anticipation, the 2025 Multihull of the Year (MOTY) winners have been revealed during a packed ceremony at the International Multihull Show in La Grande Motte, France. Organised by Multihulls World magazine and Multicoques Mag, the awards celebrate innovation, performance, sustainability, and liveability across the global multihull market. With voting closed on April 20 and thousands of votes cast by multihull enthusiasts from around the world, the winners reflect what the boating public values most in today's designs.

This year's shortlist of 24 boats across four categories showcased the breadth of design thinking now shaping multihulls: from solar-electric propulsion and hybrid systems to foldable trimarans and ultra-luxury cruising cats. While some boats like the Lagoon 43 and Sixty Solar Sail made strong showings during the nomination phase, the final vote showed a distinct preference for innovation combined with usability.

The 2025 Multihull of the Year Awards not only highlight design excellence but give voice to the real-world sailors who use these boats. And with more eco-conscious and high-performance designs entering the market each year, the competition for 2026 already promises to be even tighter.

Here's a breakdown of the category winners.

Sail Cruising category winner: Leopard 46
Built by Leopard Catamarans, South Africa

Sail Performance category winner: Dragonfly 36
Built by Quorning Boats, Denmark

Multipower category winner:
60 Sunreef Power Eco
Built by Sunreef Yachts, Poland

Multiyacht Category Winner: MODX 70
Built by Ocean Dévelopement, France

IMS Premiere winner: Excess 13
Built by Excess Catamarans, France

Capt'n Boat winner: Nautitech 44 Open
Built by Nautitech Catamarans, France

Intercargo welcomes ILO move to recognise seafarers as key workers

The International Association of Dry Cargo Shipowners (Intercargo) has welcomed the International Labour Organization's (ILO) recent decision to officially classify seafarers as key workers under the Maritime Labour Convention (MLC).

This recognition highlights the essential role seafarers play in global trade. It is a crucial advancement in promoting fair treatment and protecting the rights of seafarers, enhancing their access to medical care, mobility, and legal protections, Intercargo stated.
Intercargo chairman John Xylas said: "This recognition of seafarers as key workers by the ILO is both symbolic and substantive — a major win for the maritime community and a direct response to the urgent calls we and others made throughout the Covid-19 crisis.

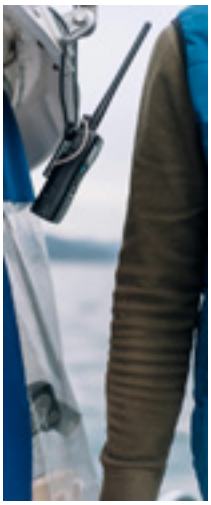


Photo credit: Boating Industry Association

Sydney set to host two premier boat shows in 2025

The multi-billion dollar boating industry in Sydney is gearing up for an exciting 2025 with the announcement of two distinct boat shows, both presented in a new format by the Boating Industry Association (BIA), in partnership with its event delivery partner Mulpha Events.

The first event, the Sydney Boat Show, will take place from August 14 to 17, 2025, at the Sydney Showground, Sydney Olympic Park. This show will make the most of the expansive indoor venue as well as the substantial outdoor areas to showcase a comprehensive range of boat accessories and gear. Attendees to the multi-day event can look forward to engaging activations, including a giant indoor pool that will serve as a central feature for a variety of demonstrations and activations, from try boating experiences to crucial safety demonstrations.

Following this, the Sydney International On-Water Boat Show will be held at Cockle Bay, Darling Harbour, from November 13 to 16, 2025. This event will provide a dedicated on-water platform to showcase a wide array of vessels ranging from alternative fuel powered sports boats to luxury motor cruisers.

Heesen Yachts founder, Frans Heesen, passes away

Heesen Yachts has confirmed the death of its founder, Frans Heesen, who passed away peacefully on 23 April 2025 in Oss, Netherlands. He is survived by his wife Petra, as well as his children and grandchildren.

Frans Heesen founded the Dutch shipyard that bears his name and was closely involved in its development. In a statement, the shipyard sayid, "Frans' visionary leadership, courage and exceptional ability to identify and nurture talent have been fundamental to Heesen Yachts' success and growth."

One of his most well-known decisions involved the construction of the yacht Octopussy, a breakthrough project seen at the time as an audacious move and a real risk for the company.

German boating associations merge

The German Boat and Shipbuilders' Association (DBSV) and the Federal Association of the Water Sports Industry (BVWW) merge to form the German Maritime Industry Association (VMWD). The two major German organisations representing the interests of the maritime industry, DBSV in Hamburg and BVWW in Cologne, are merging. The negotiations were "harmonious and always constructive", according to internal sources.

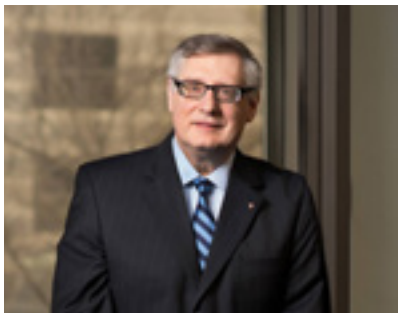
The BVWW represents companies from the water sports industry, including dealers, importers and service providers, and promotes the economic interests of its members. A merger of these two organisations thus pools the strengths of the German water sports industry and is intended to create a stronger, unified voice vis-à-vis politics, business and the public.

Feadship enters new chapter as Henk de Vries retires from executive role

Feadship has announced that long-standing director and CEO Henk de Vries will officially step down from his executive role on 1st May 2025, marking the end of a remarkable chapter in the company's history. After nearly four decades of service, he will remain with the business in a new capacity as Feadship Ambassador.

Henk de Vries joined the family-run business in 1987 and became a director and shareholder in 1996 alongside his cousin Tom de Vries. Under their leadership, Koninklijke De Vries Scheepsbouw evolved into a group of seven companies with over 1,200 employees, becoming a key pillar of the Feadship brand. The business remains fully family-owned and holds a 50% stake in Feadship.

A passionate advocate for sustainable innovation in yachting, Henk de Vries also co-founded the Water Revolution Foundation in 2018 and continues to serve as its chairman. The foundation plays a leading role in driving science-based sustainability across the sector and promoting ocean conservation.



ABS CEO Christopher J. Wiernicki to retire

Christopher J. Wiernicki, chairman and CEO of the American Bureau of Shipping (ABS) has announced that he will retire at the end of 2025, concluding a 14-year tenure leading the global classification society. The announcement was made during the 163rd ABS Annual Members Meeting held in New York. Effective Jan. 1, 2026, leadership of ABS is set to transition to John McDonald, the current president and chief operating officer, who is expected to be elected by the board of directors to serve as chairman and CEO.

"We have faced many challenges during my tenure, including the pandemic, the marine and offshore industry downturn, and unprecedented and disruptive technology- and regulatory-driven change," said Wiernicki. "In spite of these events, we were able to move forward with a number of strategic investments that have allowed us to become an industry recognized technology and safety leader."

Greenline Yachts accepts its first Bitcoin payment

Greenline Yachts has become a pioneer in the yachting industry by accepting a full payment in Bitcoin for the first time. The purchase of a Greenline 45 Coupe was finalized at boot Düsseldorf 2025. The transaction was a success, confirming the brand's openness to innovative and digital payment solutions.

"We have been allowing customers to pay in Bitcoin since 2018, but this is the first one to take us up on it," said Vladimir Zinchenko, Greenline Yachts owner. "We have got close a couple of times but never cleared the final hurdle. This time it was different, and the transaction proceeded very smoothly. We would welcome future payments in cryptocurrency".

The buyer, introduced by Yacht Partners International in Greece, quickly moved into the contractual phase for the purchase of the Greenline 45 Coupe. By signing the contract in Düsseldorf, he was able to take advantage of an exclusive boat show offer, securing a priority production slot with delivery scheduled for the summer of the same year. The new owner is therefore expected to take delivery of the yacht by June.

NTSB calls for better preparedness of land-based firefighters

The US National Transportation Safety Board (NTSB) has recommended that land-based firefighters be better prepared for marine vessel firefighting following a fatal fire on the roll-on/roll-off container vessel Grande Costa D'Avorio in Newark, New Jersey.

The Grande Costa D'Avorio was docked at Port Newark on July 5, 2023, when a vehicle used by shoreside workers to push used vehicles onto the vessel caught fire on an interior garage deck. The ship's captain ordered use of the vessel's carbon dioxide extinguishing system, but the crew was unable to close a large rampway door because the control panel was located inside the fire protection zone (where the carbon dioxide would be released). The lack of operating controls on the outside of the door prevented the crew from safely closing the door and directly led to the ineffectiveness of the fire extinguishing system, contributing to the fire's duration and severity.

Two land-based firefighters died while attempting to put out the fire. Six additional emergency responders were injured during the firefighting and rescue operations. The damage to the vessel was estimated to be over $23 million.

The NTSB found that directing firefighters to enter the area where the CO2 extinguishing system had been activated, contrary to general marine firefighting convention, exposed firefighters to additional and unnecessary risk. The Newark Fire Division was also not adequately prepared to respond to a vessel fire and lacked marine vessel firefighting training.

Bold statement by India as large cruise terminal in Mumbai comes online

India is making a major statement in its quest to become a global cruise tourism destination with the inauguration of the country's largest terminal at Mumbai Port. After eight years of construction and $67 million of investment, the Mumbai International Cruise Terminal (MICT) has started operations, a development expected to boost India's determination to grow cruise tourism.

MICT has been in development since 2018 and has faced a myriad of challenges, including funding and pandemic-instigated construction delays. The inauguration of the terminal is thus a significant milestone in efforts to attract leading cruise lines to India and drive the growth of cruise tourism. Currently, the cruise tourism market in India is valued at only $100 million, which is a mere one percent of the global market.

With the new terminal developed through a public-private partnership, India is upbeat about changing the narrative. MICT is the country's largest cruise terminal spreading over an area of more than 415,000 square feet at Ballard Pier. The terminal is designed to handle over one million passengers annually, approximately 10,000 passengers per day. MICT can handle five cruise ships simultaneously, with an 11-meter (36-foot) draft and up to 300 meters (984 feet) in length.

Product tanker makes near-zero emissions Atlantic crossing

A product tanker operated by Odfjell has finished a near-zero-carbon transit of the North Atlantic, demonstrating the cost-effectiveness of sail power and biofuel.

Bow Olympus just completed a voyage from the U.S. Gulf Coast to Terneuzen, powered by four suction sails and a bunker stem of 100 percent biofuel in her tanks. Without even paying the steep cost of electrofuels, the tanker met both FuelEU Maritime Targets for 2050 and IMO "direct compliance" carbon targets for 2044, decades ahead of time.

The unexpectedly high power of Bow Olympus' suction sails helped make it possible, Odfjell said. The 72-foot sails have driven fuel consumption down by as much as 40 percent in the best wind conditions, and 15-20 percent in "good, but not perfect" conditions, according to Odfjell VP of Technology Erik Hjortland. "That translates to five tons of fuel saved per day, equivalent to a reduction of 15 tons of CO2 emissions per day," he said.

PowerCell's new M2Power 250 system converts methanol into clean electricity onboard

Gothenburg, Sweden-headquartered marine fuel cell specialist PowerCell has booked its first order for its M2Power 250 system. Launched late last year, the fully integrated solution converts methanol into clean electricity onboard, offering an efficient and low-emission alternative to traditional maritime power sources.

The M2Power 250 system is designed with modularity and scalability in mind, offering tailored solutions for diverse vessel types. The system features a high-performance fuel cell stack optimized for marine applications, a methanol reformer for on-demand hydrogen production, and digital safety features to ensure resilience in line with industry standards.

Worth SEK 150 million (about $16 million), the first order has been placed by an undisclosed European shipyard and includes a 2 MW installation of PowerCell's innovative methanol to power technology.

Delivering 250 kW of reliable and environmentally-friendly electricity, the M2Power 250 is designed to replace traditional marine diesel generator sets and provides shipowners with a smooth transition to net-zero-emission maritime operations.

Trelleborg to deliver China's first automated mooring system

Trelleborg Marine and Infrastructure has secured a contract to deploy its advanced AutoMoor technology at one of the world's leading container terminals in China. This collaboration marks the first time an automated mooring system will be introduced at a port in China.

The project will integrate AutoMoor into the terminal's existing infrastructure, which is designed to accommodate the latest ultra-large container vessels. The implementation of AutoMoor is set to enhance operations by improving vessel stability, increasing efficiency, and reducing turnaround times.

Additionally, it will support the terminal's sustainability goals by lowering vessel emissions during mooring. The system will also boost the berth's capacity to handle 400-metre-long MegaMax container ships, ensuring the terminal remains at the forefront of modern maritime capabilities.

Besenzoni hosted captains from the Italian Yacht Masters association

For the third consecutive year, Besenzoni hosted the captains from the Italian Yacht Masters association for the Captains' Experience held on 2nd and 3rd April.

Besenzoni opened the doors of its headquarters to host a selected group of captains from the Italian Yacht Masters association, including Board Member, Marco Nocenti. The association is made up of captains who are not only highly competent but also passionately committed to maintaining high standards of professionalism and innovation in the boating industry. The mission of a superyacht captain is not simply to live, but to excel in navigation, surpassing the boundaries of the ordinary. Through this event, Besenzoni has renewed its commitment to promoting direct dialogue with yachting professionals, with the goal of constantly improving the onboard experience, and the captains are undoubtedly the direct protagonists of all this.

The meeting provided a valuable opportunity to discuss key topics related to the evolution of the yachting sector. The presence of Architect Christian Grande and Professor Architect Filippo Rossi (CCO of Floating Life) enriched the discussion with insightful reflections on the latest onboard requirements and emerging market trends. Thanks to their expertise, the group was able to delve into crucial aspects of design, functionality, and onboard comfort – features that are increasingly in demand by yacht owners and their guests.

BYD takes delivery of world's largest car carrier

The China Merchants Industry Nanjing Jinling shipyard has delivered the world's largest car carrier to date, the BYD Shenzhen, a 9,200-car capacity LNG dual-fuel vessel built for Chinese automaker BYD Co. Ltd. This marks the first of four such vessels ordered by BYD, designed by Deltamarin, with two under construction at the Nanjing Jinling yard and two at the China Merchants Jiangsu shipyard.

The BYD Shenzhen features a hybrid power system with a 1 MW battery, shaft generator, shore power connectivity, and operates at 19 knots across 16 decks. The delivery reflects BYD's growing vehicle export ambitions following record sales of 4.27 million new energy vehicles last year. However, the ship's "world's largest" title may be short-lived, as Wallenius Wilhelmsen's upcoming Shaper class vessels, with capacities of up to 9,300 CEU, are expected to enter service next year.

ICS updates Guide to Helicopter/Ship Operations

Over the past decade, the global fleet has grown by 40%, prompting a significant rise in helicopter-ship operations, both in frequency and complexity. In response to these evolving operational realities, the International Chamber of Shipping (ICS) has released an updated edition of its Guide to Helicopter/Ship Operations, ensuring modern best practices and safety protocols are in place for medical evacuations, pilot transfers, and other critical missions.

The guide emphasises the importance of robust communication frameworks, coordination, and risk assessment to prevent incidents, particularly in high-stakes scenarios such as medevacs or evacuations during vessel attacks. Developed through collaboration with aviation authorities and maritime experts, the guide reflects a cross-sector approach that maintains an extraordinarily low incident rate despite thousands of helicopter-ship interactions annually.

For more details go to **https://bit.ly/4lLMhLv**.

Barcelona loves new quiet, zero emission 84 passenger electric ferry

The air and water are getting cleaner in yet another city as Barcelona launches the Ecocat Tres electric ferry that will carry passengers from the popular Las Ramblas district to the almost as popular Barceloneta Beach.

While electric hydrofoiling ferries and water taxis from companies like Candela, Artemis Technologies and Vessev are making lots of headlines for new services in Stockholm, Seattle and Wellington, New Zealand, there are also thousands of routes in other cities all over the world that can benefit from electrifying traditional displacement hull boats.

The Ecocat Tres is an interesting electric ferry case because it uses the low voltage safe-to-touch propulsion system of Molabo. It is the only company in the world that makes a 50 kiloWatt (65 hp) electric motor that runs on 48 volts. Every other system requires 96 volts or more.

The Ecocat Tres was designed by Naval Architecture Marine Engineering and built by the Metaltec Naval shipyard in northern Spain's Cantabria district. The 15-meter aluminium catamaran has seating on the main deck and a rooftop with additional seating to enjoy the views of Barcelona.

Photo credit: Paula Keech

Marine Search and Rescue Responder Duncan Peacock wins 12th Annual Tim Jones Award

Duncan Peacock, resident of Kitimat BC and member of Kitimat Marine Search and Rescue and RCMSAR Unit 63, has been awarded the 12th annual Tim Jones Award for Outstanding Contribution to the Outdoor Community in British Columbia.

Peacock has been a member of Kitimat Marine Search and Rescue and RCMSAR Unit 63 for 31 years, making him one of the longest-serving members in the province.

His contributions to the organization include leading rescue missions as a coxswain, mechanical operations and repairs, writing grants to secure funding, training and mentoring new volunteers, and organizing community events such as Canada Day parade. He has responded to more than 120 search and rescue missions and contributed more than 4,300 hours to training.

Photo credit: Hampshire and Isle of Wight Fire and Rescue Service

Three teenagers arrested after Portsmouth boatyard fire

Three teenagers were arrested following a fire that engulfed five boats at a boatyard in Tipner, Portsmouth, on the UK south coast. The blaze caused plumes of smoke to be visible across the city and led to more than 40 calls to the Hampshire and Isle of Wight Fire and Rescue Service.

Hampshire and Isle of Wight Constabulary said all three teenagers were from Portsmouth. A 13-year-old boy was arrested on suspicion of arson and assaulting an emergency worker, while two girls, aged 13 and 15, were arrested on suspicion of arson. The fire destroyed five boats and a storage container at the yard on Tipner Lane, just off the M275.

Navantia accelerates investments in Harland & Wolff

Three months after completing the acquisition of the bankrupt Harland & Wolff shipyard in Belfast and the other yards of the group, Spain's Navantia outlined its plans for increased investment to create what it is calling one of the "UK's most advanced shipyards." The investments that are intended to improve productivity, provide faster delivery, and more sustainable manufacturing processes as designed to position the UK group as the UK and European governments are increasing defence spending.

Navantia partnered with Harland & Wolff in 2023 to win a UK contract to build three naval support ships for the Royal Navy Auxiliary. As part of that program, the companies committed to an investment of £77 million ($100 million) to modernize the yards and increase capabilities for the Fleet Solid Support (FSS) contract. The Spanish group stepped in in late 2024 to save the UK shipyard group from liquidation and maintain the FSS program reporting that it would increase the planned investment in the yards.

"The modernization program will significantly enhance the Belfast yard's ability to build the FSS vessels and support future programs," said Navantia UK detailing its plans. "The investment is designed to deliver a comprehensive regeneration of UK shipbuilding capabilities, leveraging the opportunity presented by the FSS program."

15-19 SEPTEMBER 2025
LONDON INTERNATIONAL SHIPPING WEEK

Global maritime matters and London is at its centre, former Shipping Minister tells LISW25 gathering

London is "unquestionably the centre of the world's maritime industry", and London International Shipping Week is the place where we champion everything the industry does so well, former Shipping Minister Robert Courts said.

Speaking at an LISW25 Supporting Organisations' event ahead of this year's London International Shipping Week (LISW25), he highlighted the strength and depth of London's maritime skills set to be showcased during the capital's week of maritime events.

He told guests:

- "If you want to know where to look for the latest high-tech innovation – you come to London.
- "If you want to look at where the most professional people are in their industries – you come to London.
- "If you want to see where people are being brought together from industry, from operators, through to Government – you come to London."

Drawing on his experience of LISW while in office, Mr Courts emphasised the event's strategic importance to UK trade and innovation, stating, "It's a place in which we champion everything that we do as an industry so well. It's incredibly important and the reason is because maritime matters and it is"hugely popular and great fun."

Restoration of historic Braunston bridge set to enter final phase

The works involves repairing and, where necessary, replacing historic brickwork on the northern face of Bridge 91a, at the entrance to Braunston Marina. The bridge deck, which carries the Grand Union Canal towpath over the marina entrance, will also be cleaned and a new resin-bonded surface laid down. Works are expected to be completed by mid-June, in time for the annual Braunston Historic Boat Rally which attracts colourful boats from around the country.

The project has been given a helping hand by local volunteers who have carried out preliminary works to carefully remove render, revealing the brickwork underneath for the first time in decades and enabling repairs to take place. The volunteers have also removed loose mortar and crumbling bricks from the southern side of the bridge and carried out repairs with reclaimed bricks and traditional lime mortar. They will soon be back out on site cleaning and repainting the bridge's metal parapets.

The project has been made possible thanks to a generous legacy of over £160,000 from the late waterways supporter and local resident Peter Andrews. On completion of the works the bridge will be renamed 'Peter's Bridge'. A new bridge number plaque, reading '91A, Peter's Bridge', will be fitted providing a lasting tribute to Mr Andrews' generous gift to his local canal.

Heysham Port to increase capacity in £10 million boost

Peel Ports Group is investing £10 million ($13.3 million) in Heysham Port to increase capacity and efficiencies at the site—a key trade link between the UK mainland, the Island of Ireland and the Isle of Man.

Peel Ports will invest in future-proofing operations and resilience and support customers in increasing the volumes they can pass through the port. The project will include reconfiguring the port's trailer park, a new multi-lane smart gate operating system, and a new terminal operating system for the facility.

The investment will benefit all operators at Heysham Port, with Isle of Man Steam Packet, CLDN and Stena Line all set to gain from improved efficiency, increased capacity and enhanced terminal operations.

Study finds that half of Scotland's coastal vessels go untracked

Over half of vessels operating in Scotland's coastal waters are effectively "invisible" to standard maritime tracking systems, according to a new Heriot-Watt study. The researchers have found that only 43% of vessels within 10 km of the Scottish coast broadcast an Automatic Identification System (AIS) signal, the standard global tool to monitor ship movements.

The Heriot-Watt team says this lack of visibility poses significant risks to marine life, safety, and sustainable ocean management. The study, which was published in the academic journal Marine Policy, relied on over 1,800 hours of land and sea surveys conducted between 2019 and 2024, covered nine of Scotland's 11 marine regions and showed huge regional and seasonal disparities in AIS visibility.

Dr. Emily Hague from Heriot-Watt's School of Energy, Geoscience, Infrastructure and Society said: "This data challenges the assumption that we can rely on AIS to tell us what's really happening in our coastal seas. In some areas, over 75% of vessel activity goes unrecorded."

Southampton International Boat Show set to offer visitors a bold new vision

The Southampton International Boat Show, the UK's largest celebration of boating and watersports, is returning to Mayflower Park later this year with a new layout and entrance, new attractions, and an expanded line-up of on and off-water experiences. Held from September 19-28, the event will bring together hundreds of leading marine brands, from paddleboards and dinghies to superyachts and the latest tech innovations.

There will also be a fresh new look and feel, including the launch of dedicated feature areas for powerboats (The Powerhub) and fishing enthusiasts (Angler's Alley). The new Boating Academy will feature talks and expert advice for everyone from novices to experienced sailors.

The marina, which offers sea trials, on-water attractions and areas dedicated to different boat types, will return due to overwhelming popularity with both exhibitors and visitors. These curated areas make it easier than ever for guests to explore the boats and brands most relevant to them. The On The Water stage, set within the purpose-built marina, will also return, with a turbo-charged stunt programme, featuring jet ski and other displays soon to be announced.

Tritex NDT Multiple Echo Ultrasonic Thickness Gauges

The Drone Thickness Gauge
Multigauge 6000

The Underwater Thickness Gauge
Multigauge 3000

The ROV Thickness Gauge
Multigauge 4000

The Surveyors Thickness Gauge
Multigauge 5650

Tritex NDT specialize in the manufacture and supply of Multiple Echo Ultrasonic Metal Thickness Gauges, used for verifying corrosion levels and measuring metal thickness from one side only, without removing any protective coatings. The Multigauge 5650 Surveyor Gauge can measure both metal and GRP, in one gauge, and also switch from Multiple Echo to Echo - Echo with the simple press of a button, using the same probe.

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Shipping and Boating by Numbers

In this feature, numbers are used to highlight the key points of the stories. Numbers are often considered more important than words when conveying precise information, as they provide an objective way to represent data, making it easier to compare, analyse, and understand facts quickly. Words can be subjective and open to interpretation.
Here's what we have for you this month.

Greek shipping contributes $14 billion to the domestic economy

A report by McKinsey & Company has highlighted how Greek shipping is **supporting 60,000** jobs in Greece and **employing more than 200,000 seafarers** worldwide.

The report reveals that Greek shipping generates around **$40 billion in annual gross revenues**, with **over 20 Greek shipping companies** listed on foreign capital markets, collectively **valued at more than $9 billion**. Additionally, more than **200,000 foreign seafarers are employed on Greek vessels**, supported by **over 750 ship management companies**, including about 100 managing fleets of more than ten vessels.

McKinsey estimates that the Greek shipping sector contributes roughly **$14 billion to the domestic economy and supports around 150,000 jobs**, both directly (seafarers, ship management) and indirectly (across various shipping-related sectors like hospitality, real estate, and media).

The sector's impact is also reflected in its high-paying jobs and the vibrant shipping cluster in Greece, which includes shipyards, brokerages, law firms, banks, and technology providers.

Sanlorenzo reports full-year 2024 financial results

Sanlorenzo has presented its full-year financial results for the **year ending 31 December 2024**, confirming record revenue and profitability levels. The Italian shipyard released its preliminary consolidated results in February.

The company's board of directors has also outlined the firm's 2025 guidance, which reflects continued growth despite economic and geopolitical uncertainties.

Net revenues from the sale of new yachts **reached €930.4m, an increase of 10.7 per cent** compared to 2023. **EBITDA rose by 12 per cent year-on-year to €176.4m**, with a margin **of 19 per cent on net revenues** from new yachts. EBIT **increased by 10.6 per cent to €139.3m**, maintaining a **15 per cent margin**. Excluding the consolidation impact of Nautor Swan, the EBITDA margin would have increased by **approximately 45 basis points to 19.2 per cent**, while the EBIT margin would have risen by 40 basis points to 15.4 per cent.

Group net profit was **recorded at €103.1m, up 11.1 per cent** compared to 2023, exceeding the upper end of the 2024 **guidance range of €99-101m**. The company has proposed a dividend of €1.00 per share, representing **approximately 34 per cent of group net profit**, consistent with the prior year's dividend policy.

NMMA confirms 9% decline in US new boat sales

National Marine Manufacturers Association

The National Marine Manufacturers Association (NMMA) — a trade association representing boat, marine engine and accessory manufacturers in North America — has released its Monthly Recreational Boating Industry Data Summary report, highlighting a **significant 9.1 per cent decline** in new boat sales in North America.

The report analyses recreational boating powerboat unit sales and key economic indicators through December 2024. While these monthly NMMA reports cover **a rolling 12-month period**, this latest version for December offers a full look at the calendar year 2024, confirming estimates for retail and wholesale sales declines.

Declining retail sales: From January to December 2024, new boat retail sales in North America fell by 9.1 per cent, **totalling 231,576 units**—a significant year-over-year decline influenced by economic pressures and fluctuating consumer confidence.

Softening economic indicators: While demand remained in key areas, broader economic indicators affecting the boating industry remained in the "caution" category, signifying concerns over market stability and continued uncertainty.

From the close of 2024 to the first quarter of 2025, economic volatility has had a noticeable impact on consumer sentiment. The Conference Board Consumer Confidence Index **declined by 7 points in February to 98.3**, marking the largest monthly decline **since August 2021**. This is the third consecutive monthly decline, bringing the index to the bottom of the range that has prevailed since 2022.

As the recreational boating industry manages lower retail sales, Info-Link Technologies recently reported that as of year-end 2024, the median age of current boat **owners in the US is 60**, with more boat owners **in their 70s than in their 40s**. Info-Link's Jack Ellis notes: "Many of the people who owned boats **25 years ago** are the same people who own boats today, but they're **25 years older**."

Fincantieri reports strong growth and €51.2bn backlog for 2024

The board of directors of Fincantieri has approved the draft financial statements for the year ending 31 December 2024, along with the firm's consolidated financial statements.

The Italian shipbuil-ding company, which is based in Trieste, has reported a **net profit of €27m**, compared to a **net loss of €53m in 2023**. Adjusted net profit **amounted to €57m**, an increase from the €7m net loss recorded in 2023.

Revenues **increased by 6.2 per cent year-on-year to €8.13bn**, with EBITDA **reaching €509m**, reflecting **a 28 per cent rise** compared to 2023. The EBITDA margin **improved to 6.3 per cent from 5.2 per cent** in the previous year. The firm's net financial position **stood at a negative €1.28bn, down from €2.27bn in 2023**, with an improved **leverage ratio of 3.3x**, ahead of the company's 2024 guidance.

The company **secured orders worth €15.4bn in 2024**, more than **double the €6.6bn recorded in 2023**, driven largely by the shipbuilding segment. The total **backlog amounted to €51.2bn**, representing **approximately 6.3 times 2024 revenues**. A total of 20 ships were delivered during the year, **with 98 vessels in the order book** scheduled for delivery up to 2036.

Guidance for Fincantieri in 2025 includes **projected revenues of approximately €9bn**, an EBITDA margin **exceeding 7 per cent**, and a leverage ratio in line with 2024 levels.

Brunswick responds to market uncertainties

Brunswick Corp released its 2025 first quarter financial results early Thursday reporting lower year-over-year revenues against what the company describes as the second best Q1 cash flow in more than a decade.

Brunswick chair and CEO David Foulkes

For the quarter ended March 29, 2025, Brunswick reported **net consolidated sales of US$1.22bn**, which **fell 11% below the $1.36bn reported** for the first quarter of 2024.

First quarter sales were below prior year as the impact of continued lower wholesale ordering by dealers and OEMs and prudent pipeline management, was only partially offset by modest annual price increases and benefits from well-received new products.

Brunswick chair and CEO David Foulkes said that the company's first quarter results exceeded its expectations with boat show sales roughly flat to 2024 levels.

Reporting by segment, **propulsion sales of $487.0m fell by 16%** YoY from the **$578.2m earned in the first quarter** of 2024. Engine parts and accessories revenues **dipped by 3% YoY to $255.3m** while Navico Group **revenues of $208.2m were roughly flat to the prior first quarter**. Boat Group reported Q1 **revenues of $372.1m, falling 13% behind the $425.7m** reported for the prior year period.

Sales in the US, representing **67% of Brunswick's total, dropped by 11%** in the first quarter while Canada sales, **representing 5% overall, dipped by 5%** YoY. Sales in Europe, **marking 15% of total revenues, fell by 10% during the quarter** while Asia-Pacific sales, **representing 7% of total revenues, decreased by 8%** YoY. Sales through the rest of the world, **representing 6% of total revenues, came in 15% below Q1 2024 figures**.

Cost of sales for the first quarter was reported as $918m, down from the **$991.4m reported for the prior Q1 by 7%** as a result of aggressive cost control initiatives.

A slight increase in YoY selling general and administrative expenses offset by lower R&D and restructuring expenses **led to Q1 operating earnings of $56.3m, trailing the $110.6m** reported one year ago. Operating earnings were impacted by lower sales, lower absorption from decreased production levels, and the negative impact of changes in foreign currency exchange rates, partially offset by new product momentum, annual price increases, and ongoing cost control measures.

Operating margin for the quarter **dipped by 350 basis points to 4.6%**.

Q1 net income was **reported as $20.2m, which trailed the $68.0m** reported for the first quarter of 2024.

Registrations down but the Balearic Islands still lead the Spanish market

The Balearic Islands lead the national registrations of recreational boats so far this year, but they have seen a **27.5% year-on-year drop**, compared to the **13% decline across Spain**, according to data from ANEN.

The Balearic Islands, historically one of the driving forces of the nautical sector in Spain, had **registered 66 recreational boat registrations** up to February 2025, according to the monthly report prepared by ANEN with data provided by the Directorate General of Merchant Marine.

This figure **represents a 27.5% drop** compared to the same period last year **when 91 boats were registered**, adding to the **20.7% year-on-year decrease** recorded in January.

Nationally, the nautical market began 2025 with a **13% drop in recreational boat registrations**, recording a total of **474 units** compared to **545 in the same period of 2024**.

This downward trend is also reflected in the charter market, which accounts for **26.4% of the total registrations** and has suffered a **national contraction of 27.3%**, with **125 registrations** up to February.

The Balearic Islands continue to lead the Spanish market, accounting for **13.9% of the national registrations**. They are followed by Barcelona, with **a market share of 12.4%**, and **Alicante, with 10.1%**.

The nautical charter segment, which **represents 26.4% of the total registrations**, has been one of the most affected by the market slowdown. Up to February, **125 registrations** for this use were recorded, **compared to 172 last year.**

Groupe Beneteau announces 2024 full year results

"Groupe Beneteau's teams once again showed their outstanding ability to adapt, faced with the significant changes on the boat markets in 2024. The efforts made by all our employees enabled the Group to achieve over one billion euros of sales for the year, as well as the upper range of its full-year profitability forecast. The sale of the Housing business will enable the Group to accelerate its development on the boat markets, while ensuring a fair return for shareholders", confirms Bruno Thivoyon, Groupe Beneteau Chief Executive Officer.

- Income from ordinary operations of **€76m in 2024 (7.3% of revenues)**, higher than forecast
- Very solid financial position
- Exceptional dividend of **€100m (€1.21/share) to be paid on March 27, 2025**, followed by a **current dividend of €18m (€0.22/share).**
- **Revenues of €0.9bn to €1.0bn forecast for 2025**, affected by the continued contraction in the markets and dealer stock in H1'25.
- Acceleration of the product plan: **66 models in three years**, targeting **revenues of €1.5bn in 2028** and an ordinary operating margin of 10%.

The Boat division recorded **revenues of €1,034.4m in 2024, down 29.4%** compared with 2023, a record year that benefited from a**n increase in inventory across the distribution networks by nearly €240m**. As expected, the increase in interest rates, combined with the impacts of inflation, resulted in dealers reducing their stock levels **by nearly €110m over 2024**, contributing around **23% to the decrease** in business between the two years. Sales to end customers **contracted by 7%** over the period. The slowdown in retail demand volumes was particularly marked for the **Sailing business (-€140m, i.e. -24%** versus a high basis for comparison). On the Motor business segments, **the 11% decrease in the volumes** delivered by the distribution **network impacted sales by -€60m**. However, the Boat division was able to benefit from the success of its premiumization strategy, illustrated by this year's value-driven **growth of €110m (+9%).**

REPORT bites

UK battery distributor Ecobat Battery is providing support to Forces Veterans Afloat by supplying batteries for the charity's vessels, which are used to assist veterans.

Transport Canada has signed a reciprocal arrangement with Belgium, allowing Belgian seafarers with valid STCW certificates to apply for Canadian endorsement.

Kawasaki Kisen Kaisha, Ltd (K Line) has announced the delivery of its new LNG-fuelled car carrier, Oceanus Highway.

Failure to scale up suitable quantities of well-priced green fuels has blunted a projected rush to retrofit ships with cleaner engines, a delay that will potentially bring a bottleneck at repair yards further down the line, according to a new study from Lloyd's Register (LR).

Sertec Marine has cemented its position as a global leader in lightning protection technology by becoming the first company to receive certification for its lightning rods from Lloyd's Register.

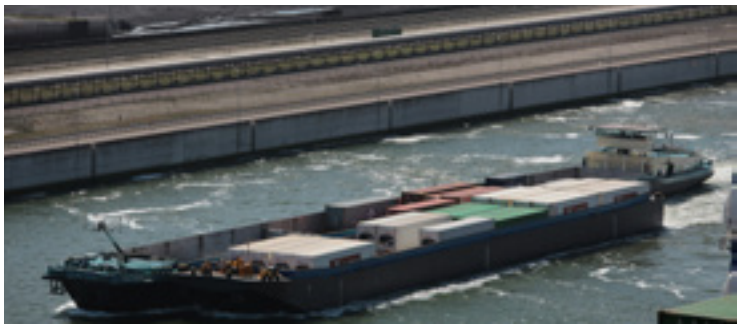
South Korea has set path to establish a public-private training centre aimed at educating 1,000 professionals annually in key areas such as artificial intelligence (AI), environmentally friendly ships and autonomous vessels.

Spanish shipbuilder Navantia has cut the first steel to be used in the construction of a new corvette slated for the Royal Saudi Naval Forces.

One of Stena Line's new ro-pax ferries being built by Jinling Weihai Shipyard in China will feature two 28x4m Norsepower Rotor Sails™, projected to deliver up to nine per cent fuel savings on the planned trade route.

Switzerland-based Viking River Cruises took delivery of a new river cruise ship from German shipbuilder Neptun Werft. She is named after a deity in Scandinavian mythology, Viking Nerthus.

The International Council of Marine Industry Associations (ICOMIA) has named Sovren as a sustaining member. Sovren will be joining the ICOMIA Marinas Group.



Understanding the explosion hazards of shipping coal

A bulk carrier shipping a type of coal called "Bailey High Vol Coking Coal" experienced consecutive explosions in the two forward cargo holds. While still under investigation, the explosions are likely a result of the accumulation of methane gas that created an explosive atmosphere and resulted in significant damage to the two associated cargo holds. It was soon discovered that the other five cargo holds also had highly elevated levels of methane that were approaching the Lower Explosive Limit, presenting an immediate threat to the safety of the mariners and the ship.

Shipment of coal by sea presents a wide range of hazards, including but not limited to methane emission (creating a potentially explosive atmosphere), self-heating, and liquefaction. To mitigate these hazards, coal must be shipped per the standard precautions set out in the International Maritime Solid Bulk Cargo (IMSBC) Code. In addition to these general standards for shipping coal, the IMSBC Code specifies that the ship must also be provided with a cargo-specific shipping declaration that identifies particular hazards and details any supplementary conditions required for safe transport for the specific type of coal.

In this case, the U.S. Coast Guard noted that the cargo-specific shipping declaration did not meet the IMSBC standard to disclose that this type of coal was liable to produce methane. Investigators also noted that the ventilation of the cargo holds, the atmospheric sampling within the cargo holds, and the cargo's trimming after loading did not comply with IMSBC standards.

In light of this recent incident and to mitigate the inherent risks associated with the shipment of coal by sea, the U.S. Coast Guard strongly recommends that vessel owners, operators, mariners, and other maritime personnel:

- Validate that the cargo-specific shipping declaration is complete by thoroughly addressing the properties and potential hazards of the specific type of coal being shipped as well as detailing stipulations for mitigation of these hazards.
- Review and ensure full implementation of conditions of carriage required for shipment of coal by sea as stipulated by IMSBC, the cargo-specific shipping declaration, the vessel's Safety Management System, and industry best practices.
- Communicate openly with the shipper if the cargo's behaviour differs from that specified in the cargo declaration at any time during shipboard transit, at the loading facility, or during transit to the facility.
- Review contingency procedures detailing the detection of and appropriate responses to cargo-related emergencies, both onboard ships and at the loading facility.
- Exercise increased vigilance whenever interacting with coal in any capacity, both onboard ships and at the loading facility, understanding that this is a hazardous cargo that may pose an immediate danger. This includes taking strict precautions to remove or mitigate sources of ignition, including, but not limited to, electrical continuity, hot work protocols, and strict no-smoking zones.

Upcoming deadline for new EU regulation on firefighting suits

Shipowners and operators of EU vessels must take steps to ensure that all new firefighting suits on board comply with changes to European regulations which enter into force from June 2025, according to urgent advice from VIKING Life-Saving Equipment.

The life-saving equipment solutions provider recommends fleet managers undertake a full risk assessment of their firefighting suits to verify compliance with requirements applying under MED regulations (EU) 2024/1975. These are in addition to provisions in effect since August 2024 – that all new firefighting suits must be tested to EN469:2020 standards.

From June, all new firefighting suits bought for EU vessels must feature all three of the enhanced protection capabilities included in 'Level 2' classifications within MED regulations. While 'Level 1' fire suits in-service will remain compliant until they wear out, they must be replaced by Level 2 PPE once they are no longer fit for purpose or worn out.

Developed in response to high-risk firefighting, Level 2 notation covers radiant and convective heat resistance (X2), enhanced water penetration protection (Y2) and breathability (Z2). The inclusion of Y2 responds to growing risks of electrical fires on ships and greater seafarer exposure to close-quarters firefighting in enclosed spaces where water is used in high volumes. Y2 suits feature an extra moisture barrier to protect firefighters against steam burns and chemicals.

NTSB reveals cargo on President Eisenhower lost due incorrect cargo weight data

The U.S. National Transportation Safety Board has published a report after cargo was lost and damaged off containership President Eisenhower.

The input of incorrect container cargo weight data when developing the cargo loading plan led to the shipping containers falling off a cargo ship and others becoming damaged while the vessel was drifting off the coast of California.

Photo credit: Bar Pilot

On 6 February 2024, the U.S. flagged containership President Eisenhower lost 23 shipping containers overboard and another 10 were damaged as the vessel was drifting about 94 miles south of Oakland, California, while awaiting a berthing assignment. None of the lost containers contained hazardous materials. The value of the lost cargo and damage to the containership was estimated at over $735,000.

Longshoreman at the Port of Los Angeles began loading the vessel on January 31 in accordance with a cargo loading plan. The cargo loading plan was developed by the ship planners using the verified gross mass, or VGM, of each container, which was provided by the booking agent. The VGM was determined by combining the empty weight of the container plus the weight of the cargo loaded into it. Before the plan was developed, the booking agent had to manually enter the cargo weight of 40 containers due to an error in the booking system.

During the manual entry, 39 container cargo weights were entered incorrectly and the VGM for those containers was significantly underreported. The actual VGMs for the 39 containers was 18.3 to 22.2 metric tons greater than the VGMs used to develop the cargo loading plan. Because the cargo loading plan included inaccurate VGMs, the container stack weights exceeded the maximum weight limit and the containers were loaded in reverse-stratified stacks, which caused the cargo-securing equipment to fail while the vessel drifted south of Oakland. The booking agent has since modified their procedures and booking system to prevent this type of input error from occurring again.

Download the full report at **https://bit.ly/4ifcyil**.

Liberian Registry issues notice on recall of rocket parachute flares

The Liberia Maritime Authority has published marine advisory 04/2025 on the Voluntary replacement and recall of rocket parachute flares Kokusai Kakoh Co., Ltd / Type: KP-16. Kokusai Kakoh Co., Ltd recalled the flare due to concerns regarding the specified altitude and burning time when fired. The item in question:

Product name/type: Kokusai Kakoh Co., Ltd. Rocket parachute flares Type: KP-16

Date of manufacture: From February 2021 to July 2024. The Liberian Maritime Authority recommends replacing these flares in accordance with information provided by the manufacturer, "Instructions (for outside of Japan)". The instructions also contain steps on how to identify the rocket parachute flares and where to find the nearest Comet distributors for WesCom Signal & Rescue.

REPORT bites

UK Docks has agreed on a long-term lease on two more dry docks on Teesside, a move which will see the former Smith's Docks Company site consolidated under one company.

Incat Tasmania has once again been named one of Australia's Best Managed Companies as part of Deloitte Private's Best Managed Companies program for 2024 for the second consecutive year.

Turkish boatbuilder AvA Yachts has sold the first hull of its Kando85 model, with delivery scheduled for early 2026.

Singapore's Motion Ventures has launched what it claims is the largest-ever maritime tech fund at $100m. Fund II aims to deploy cheques of $250,000 to $10m into at least 25 companies, targeting solutions that digitise and decarbonise the global maritime supply chain.

The World Maritime University (WMU) has contributed to a new study revealing that the biological carbon pump (BCP) sequesters approximately 2.8 billion tons of carbon annually - equivalent to 10 billion tons of CO^2.

The Port of Vancouver recently released its 2024 cargo statistics, setting a new trade record by facilitating the movement of 158 million metric tonnes (MMT) of cargo, a 5% increase from the previous year.

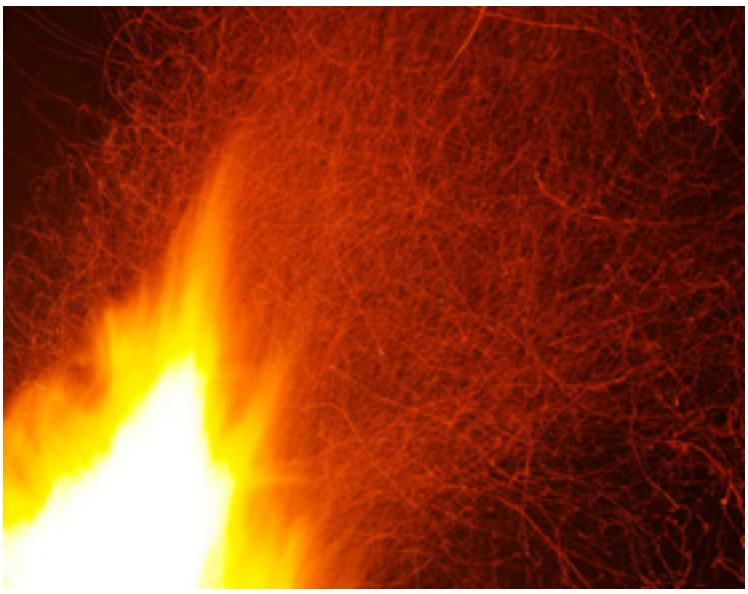
The Panama Canal Authority (PCA) will introduce a transit slot reserved only for vessels with low carbon emissions as part of a strategy to incentivise customers to adopt decarbonisation.

Dutch offshore support specialist Windcat has placed a new windfarm crewboat into service. Hydrocat 60 is the second in a series of catamaran crewboats as well as the first of the series to be powered by hydrogen.

The Port of Gdansk Authority of Poland has entered into an agreement with local engineering company Budimex for reconstruction of one of the quays at the Port of Gdansk.

The International Maritime Organization (IMO) has come up with a work plan to get a maritime digitalisation strategy adopted by the IMO Assembly by the end of 2027.

Incorrect valve starts fatal fire



The U.S. National Transportation Safety Board have released the results of a report after the installation of an incorrect valve in a pipe to a diesel oil tank led to a fatal fire aboard a cargo vessel docked in LaPorte, Texas.

On 8 January 2024, a fire broke out in the engine room aboard the cargo vessel Stride during bunkering, or fueling, operations while docked at the Barbours Cut Marine Terminal. The fire self-extinguished after crewmembers shut down all ventilation to the engine room. Two crewmembers died as a result of the fire, and one was seriously injured.

The vessel was declared a total loss valued at $12 million. Six weeks before the fire, a replacement valve was ordered for the ship's port double bottom diesel oil, or DBDO, tank. After the fire, investigators discovered the installed valve was not the same type of valve specified by the vessel's fuel oil system drawing. Rather than an angle stop valve, a similar looking angle stop check valve, which allows diesel oil to flow in only one direction, even when open, was ordered and installed instead.

As a result of the incorrect valve installation, once diesel oil filled another tank to capacity during bunkering, the diesel oil was directed up the common vent line, rather than the port (or intended) DBDO tank, where it flowed from a small cut out section of the vent pipe that had been sealed at an unknown time. The flexible sealing and tape covering the cut out failed, and diesel oil poured down into the engine room and onto operating machinery, causing a fire.

"Vessel drawings contain piping symbols for equipment such as valve types, sizes, and functions," the report said. "Owners, operators, and crews should carefully note all components of a vessel's drawings and diagrams to ensure that proper spare or replacement parts are ordered to maintain functionality." Contributing to the overfilling of the diesel oil tank was engine crewmembers not monitoring the levels of the tanks being filled aboard the vessel, as required by the bunkering procedure in the operating company's safety management system.

The company's bunkering procedures required a minimum of two engineering officers and two engine ratings to be on duty during bunkering operations. However, at the time of the fire, only three engineering crewmembers (two engineering officers and one engine rating) were involved with bunkering operations. "During bunkering operations, vessel owners, operators, and crews should ensure adequate personnel are available to take frequent soundings, establish fuel tank filling rates, and communicate to the person in charge, so tanks are monitored and do not overflow," the report said.

Key considerations for safety inspections of ships

Safety inspections of ships are a crucial and mandatory part of maritime operations, ensuring compliance with international regulations and safeguarding crew, cargo, vessels and the environment. Understanding how the process of safety inspections of ships is undertaken and maintaining readiness is essential to avoid deficiencies and ensure smooth operations. A well-prepared master plays a vital role in ensuring successful safety inspections. Masters should conduct regular self-inspections to identify and rectify potential deficiencies, maintain an updated checklist covering all inspection areas, and train crew members on emergency procedures and regulatory requirements. They should also communicate with port authorities and classification societies for guidance and keep all records well-organized and readily available for inspection.

Key guidance for safety inspections of ships and what's required:

- Documents, certificates, and publications referred to in the inspection form must be readily available, preferably in a central location, for examination and verification by the inspector.

- Publications obviously not applicable to a vessel need not be produced; e.g., dry cargo vessels need not obtain tanker safety publications, but OBO type ships should obtain them.

- The following should be made ready for the inspector: a) The official Minimum Safe Manning Certificate, b) The original National Certificate of Competence (C.O.C) and Endorsement or Certificate of Receipt of Application for same for each officer, c) For each crewmember: a Seafarers Identification Record Book with appropriate Special Qualification Stickers, d) In the case of passenger ships, the certificates of all survival craft/rescue boat crewmen in particular, and e) A copy of the current crew list and the ships emergency station bill.

- Navigation records, publications, charts, log books, oil record book, cargo record book, ballast water record book, training records (to include fire and abandon ship drills, weekly safety training exercises, and security drills), and all similar material must be available for inspection, preferably in one location, such as the chart room.

- Inspectors have the authority and have been instructed accordingly to make a spot check of lifesaving, fire-fighting, and general safety conditions covered by the SOLAS Certificate. The Master will be instructed to call in the Classification Society for examination and/or verification as may be necessary.

- The Master should have lifeboats uncovered and the vessels firefighting equipment and appliances in their normally stowed positions ready for the inspectors examination. Sufficient crew will ned to be on board and should be prepared to conduct such emergency drills as circumstances may dictate and permit.

- The engine room must be clean and free of oil leaks before any inspection. Additionally, documentation such as the Statement of Compliance for the Consumption of Oil, the SEEMP, BDNs, and records related to the energy efficiency of the ship must be up to date.

- The pilot ladder and associated gear such as gunwale steps, lights, manropes and so on should be accessible and in conformance with the latest requirements in SOLAS Regulation V/23.

- To facilitate the efficient conduct of safety inspections of ships, one of the vessels staff shall be available to accompany the inspector at all times during the process.

- If safe to do so, the inspector will take at least the following photographs of the ship: a) From the shore: bow, quarter, and stern, b) On board: bridge/wheelhouse, weather deck from both the bow and bridge, lifeboats and launching apparatus, and any damage, defect, or areas of concern.

USCG issues alert for defective heat detectors

The U.S. Coast Guard has issued a safety alert regarding the issue of defective heat detectors that were discovered during an engine room fire investigation.

The Coast Guard recently investigated an engine room fire on board an inspected towing vessel which led to the discovery of issues with the maintenance and installation of fire detection systems on board multiple towing vessels. During the investigation, several towing vessels were discovered to have defective heat detectors installed in their engine rooms.

These detectors had been recalled by the manufacturer in 2019 for failure to activate within their listed temperature range. Though the defective heat detectors identified on board these vessels were Edwards branded 280 series 135° F heat detectors, the Coast Guard wants to advise the entire marine industry that the safety recall also includes heat detectors sold under several different brandings.

Download the safety alert at **https://bit.ly/4bNDZ0L**.

REPORT bites

Taiwanese container shipping company Yang Ming Marine Transport Corporation has placed an order for three 8,000 TEU methanol dual-fuel-ready containerships with Shoei Kisen Kaisha as part of a recently revealed fleet expansion strategy.

Moran Yacht & Ship has announced the sale of the 122.5m Lürssen new build, Project Omega, which is due for delivery in 2029. This sale marks the company's 25th Lürssen new construction project.

NCL has revealed its Aqua Slidecoaster, which combines the thrill of a roller coaster with the fun of a water slide at sea.

Continuing its efforts to incorporate new technologies to advance its efforts at reducing emissions, Stena Line is adding two wind rotor sails to one of its two NewMax hybrid vessels and completing the other sister ship "rotor sail ready."

It is estimated that more than 5 million containers are packed with Dangerous Goods (DG) each year - and as global container shipping continues to grow, the number is likely rising.

The USS John F. Kennedy, the US Navy's last non-nuclear powered aircraft carrier is at Brownsville, Texas, to begin a two-year dismantling by International Shipbreaking LLC.

French shipbuilder Chantiers de l'Atlantique handed over a new LNG-fuelled cruise ship to MSC Cruises in a ceremony on Thursday, March 27.

Coalition Capital, owned by French football superstar Kylian Mbappé, is investing in the France SailGP Team. Mbappé's Inspired by KM (IBKM) association will become the French team's official charity partner.

Four Seasons Yachts reports the appointment of Kate McCue as the inaugural Captain of Four Seasons I, the first ultra-luxury yacht in the highly anticipated fleet.

The International Council of Marine Industry Associations (ICOMIA) has named Sovren as a sustaining member. Sovren will be joining the ICOMIA Marinas Group.

MAIB investigation into fatalities on board Berge Mawson

The UK Marine Accident Investigation Branch (MAIB) has published a report into the deaths of three stevedores in a cargo hold access space on board the bulk carrier Berge Mawson. The incident took place at Bunyu Island anchorage, Indonesia on 27 June 2022.

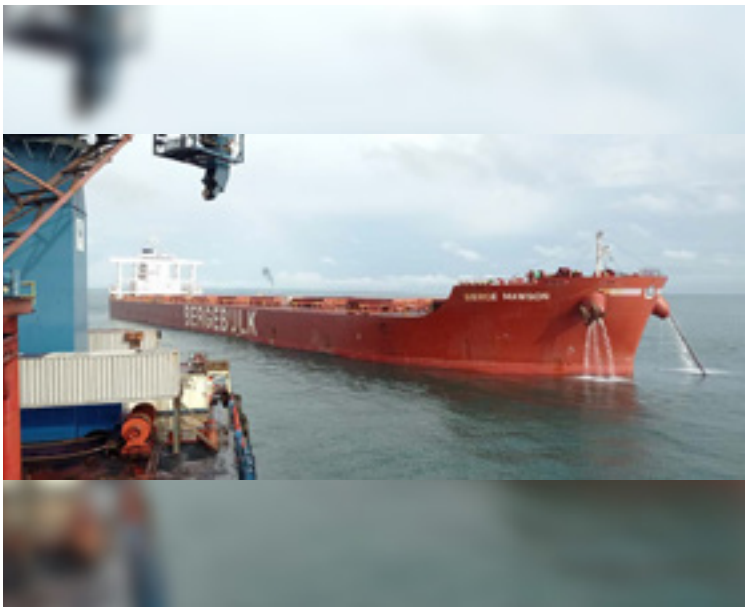
On 27 June 2022, three unconscious stevedores were recovered from a cargo hold access space on board the Isle of Man registered bulk carrier Berge Mawson at Bunyu Island Anchorage, Indonesia. Despite prompt medical attention by ship and port staff, the three men died.

Berge Mawson was loading a bulk cargo of coal from barges using a floating crane. The coal in cargo hold No.7 was being levelled by a bulldozer, when loading was paused and all hatches were closed due to heavy rain. Once the rain had stopped, a stevedore made several attempts to gain access to the bulldozer. Unsupervised, the stevedore mistakenly descended into cargo hold No.8 access space where he collapsed. As Berge Mawsons crew were collecting rescue equipment, two stevedores also collapsed in cargo hold No.8 access space as they attempted to rescue their stricken colleague.

The MAIB investigation concluded that:

- The stevedores died because they entered an enclosed space that had a noxious atmosphere that could not sustain life.
- Atmosphere testing of cargo spaces was not routinely carried out before stevedores entered the compartments.
- The stevedores were not adequately supervised on board Berge Mawson.
- Access ways to cargo spaces were not locked closed when not in use.
- The stevedores were unable to understand safety labels and warnings and cargo space identification.
- The agreed Ship-Shore Safety Checklist had limited validity after the commencement of cargo operations.
- The terminal had not trained the stevedores in line with international guidelines on safe cargo work on board bulk carriers.
- An industry-led initiative that requires bulk terminals to implement safety training and management systems could improve stevedore safety on board vessels.

Read the full PDF report at **https://bit.ly/3FC6IPB**.



Massive container explosion was caused by self-heating chemical cargo

Photo credit: CMSA

The dramatic container explosion aboard the boxship YM Mobility at Ningbo last year was caused by thermal runaway in a cargo of organic peroxides, according to China's Maritime Safety Administration (CMSA). It is the latest in a long string of container accidents involving this class of dangerous chemicals, notorious for self-heating, decomposition, fires and explosions.

The container in question was a reefer box filled with tert-butyl perbenzoate (TBPB), a common activator for making plastics like polyethylene and polyester. It is unstable at high temperatures, and has a thermal tipping point of about 140 degrees Fahrenheit, above which its self-heating tendency accelerates until combustion or explosion. This particular shipment was headed for Jebel Ali, where the terminal requires refrigerated storage for TBPB, so the manufacturer packed it in a reefer box in order that it could be plugged in on arrival.

YM Mobility's operator did not require the box to be plugged in while under way. When the container was loaded aboard YM Mobility in Shanghai on August 6, it was stowed as deck cargo on the starboard bow, packed in a reefer but unplugged and unrefrigerated. Ambient summertime temperatures were about 95 degrees Fahrenheit.

YM Mobility left Shanghai August 7 and transited to Ningbo. On August 9, a crewmember on duty smelled an "irritating odour" while up on the bow. At about 1331, he inspected the container involved and noticed a hissing noise, white smoke and a yellow liquid dripping from the door - characteristic of TPBP decomposition. Over the next six minutes, the smoke increased. The crewmembers up on the bow realized the danger and evacuated the area, and the captain sounded the fire alarm to muster the crew.

By 1338, white smoke obscured most of the starboard bow, and within minutes, it was billowing all over the foredeck. At 1346:30, the reefer box exploded violently, blowing six containers over the side and disintegrating three more. No injuries were reported, and all crewmembers safely evacuated onto the dock a few minutes later.

First responders from shore took over firefighting efforts, and the blaze was under control by the next morning. It took another day to fully put out the last hot spots in adjacent containers.

A post-accident inspection found that the force and heat from the blast were enough to warp the hatch coaming, hatch cover and adjacent structures. More than a dozen containers were burned, blown up or had their contents ruined.

CMSA noted that reefer boxes are airtight and thermally insulated, and any heat from a self-heating substance like TBPB would accumulate inside the container, particularly in hot weather. Under these conditions, the cargo could get hotter and hotter until it went into thermal runaway and exploded.

"No attention was paid to the temperature changes in the box during transportation," CMSA concluded, calling the arrangement negligent. "The transportation plan of transporting TBPB in unplugged refrigerated containers during the hot season is inappropriate. . . . TBPB shippers failed to take into account the thermal insulation and airtightness of unplugged reefers in hot weather."

REPORT bites

Duncan Peacock, resident of Kitimat BC and member of Kitimat Marine Search and Rescue and RCMSAR Unit 63, has been awarded the 12th annual Tim Jones Award for Outstanding Contribution to the Outdoor Community in British Columbia.

Global Marine Business Advisors (GMBA), the international network of marine industry experts, has announced the appointment of Richard Haws as GMBA's new representative in Saudi Arabia.

Marcegaglia's latest acquisition, the LHM 600, marks the 2,000th mobile harbour crane produced and delivered by Liebherr.

Sakigake, the ammonia-powered tug owned by Japanese shipping company Nippon Yusen Kabushiki Kaisha (NYK), has completed a three-month demonstration voyage, and achieved what NYK said are greenhouse gas emissions reductions of up to 95 per cent.

Burnt material and plastic pellets, also known as nurdles, have washed up along the UK's east coast following the collision in the North Sea raising environmental concerns.

A court in Australia sided with its maritime authorities and ordered the owners of a bulker to pay a fine as well as court costs for failing to follow safety directions.

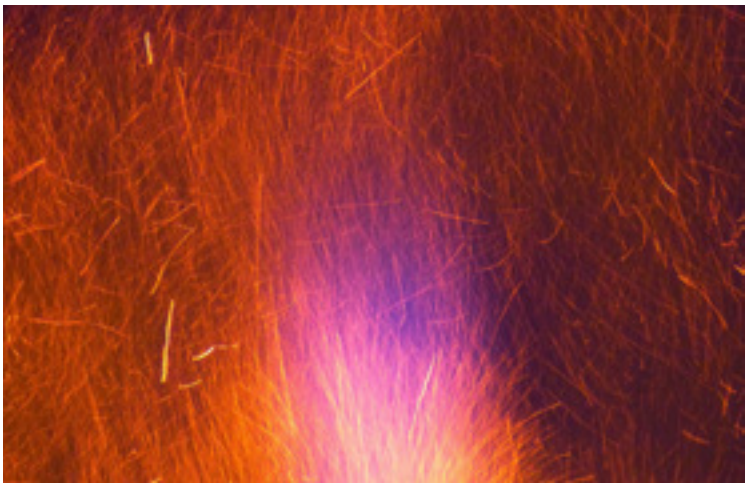
Mitsui O.S.K. Lines Ltd. (MOL) and Fujitsu Limited have announced the start of the operational phase for an AI-powered crew replacement optimization system.

Bureau Veritas Marine & Offshore is participating in the LOWNOISER project, a European Union-funded initiative aimed at reducing underwater radiated noise from ships and protecting marine ecosystems.

The Marina Industries Association (MIA) announced that Ocean Marina Jomtien, in the Gulf of Thailand in Pattaya, is Thailand's first Platinum 5 Gold Anchor Marina.

A Peruvian fisherman who spent 95 days lost in the Pacific Ocean, eating roaches, birds and sea turtles to survive, has returned home to his family.

Panama has taken a bold step in enforcing international regulations by removing 107 ships from its official registry as these ships were sanctioned.



Lessons learned after fire sinks shrimp cutter

Germany's Federal Bureau of Maritime Casualty Investigation (BSU) has published the lessons learned following the fire and subsequent foundering of a shrimp cutter vessel.

The exact cause of the fire could not be determined after the shipwreck was salvaged because of the extensive damage done to the vessel in the incident.

In the early morning, a fire broke out in the engine room of an anchored shrimp cutter during a break in fishing. This was initially not noticed by the sleeping crew.

The main engine was running overnight to cool the fish hold, and the door to the engine room companionway was open for ventilation.

When the captain accidentally discovered the fire, the flames had already spread to the entire engine room and the open companionway, meaning that it was no longer possible for the crew to fight the fire with onboard resources. The crew of two left the burning cutter using a life raft and were rescued unharmed around an hour later. After the fire was later extinguished by external forces flown in, the cutter sank due to the progress of the fire and the entry of extinguishing agent. The water was contaminated by diesel fuel and hydraulic oil.

Why did it happen?

- No anchor or fire watch. Both crew members were asleep and therefore did not notice the dangerous situation;
- Lack of fire alarm system. It was not possible to alert the crew, so that the outbreak of the fire initially remained undetected;
- Open door to the engine room companionway. The fire was probably able to spread more quickly due to a greater supply of oxygen;
- Fire extinguishing system did not fulfil its purpose. Automatic activation of the system was not fitted, manual activation was not (or no longer) possible due to the location of the installation and the type and dimensions of the system were unsuitable for the engine room of the cutter;
- Firefighting and emergency shutdown equipment located within the danger zone. The manual release of the extinguishing system, the fuel shut-off valves and other switches could no longer be reached;
- Lack of emergency preparedness: regular safety drills and/or trainings were not customary. The crew was forced to act spontaneously and could not fall back on previously developed and practised emergency plans.

Read the full report at **https://bit.ly/3QYHfwT**.

The importance of bulk cargo trimming

In one of its recent Risk Watch bulletins, Britannia P&I Club explained that proper trimming of bulk cargo is essential for ensuring ship stability, regulatory compliance, and efficient loading and discharging operations.

The IMSBC Code provides mandatory guidelines for trimming procedures. Section 5 of the code specifies that all bulk cargoes should be trimmed 'reasonably level' to reduce risks such as cargo shifting and instability. For non-cohesive cargoes, trimming standards are determined by the calculated angle of repose. Consideration should also be given to the charter party, as this may stipulate the required method of trimming, especially for cargoes that require specific handling.

Section 5.1.3 of the IMSBC Code states: "The master has the right to require that the cargo be trimmed level, where there is any concern regarding stability based upon the information available, taking into account the characteristics of the ship and the intended voyage."

Trimming is often performed at the end of discharge, but when loading via a chute, spout, or conveyor, it makes sense to avoid the cargo stream constantly pouring onto the same point in the holds. Best practice is for the loading arm to be initially positioned as close to the tank top as safely practicable, depositing a layer of cargo over the entire surface before increasing the loading rate and raising the drop distance. Efforts should then be made to direct the loader for a more even cargo distribution. This reduces or can even eliminate the amount of trimming work needed to flatten the cargo surface at the end of loading.

NTSB investigation into fire on fishing vessel Three Girls

The failure of a component on the hydraulic system for on-deck fishing equipment likely led to a fire aboard a fishing vessel in the Gulf of Maine, according to the U.S. National Transportation Safety Board. On August 11 last year, the fishing vessel Three Girls was fishing in the Gulf of Maine when a fire broke out in the vessel's engine room.

The five crewmembers and a National Marine Fisheries Service observer abandoned the burning vessel and were rescued by the U.S. Coast Guard. No injuries or pollution were reported. Damage to the vessel was estimated at $1.3 million.

The crew of the Three Girls began fishing on August 10 2024, and collected about 20,000 pounds of various groundfish over the next two days. When the fishing net was recovered from the seafloor around 8.50pm local time on August 11, the captain noticed a burning smell that he believed was electrical in nature. He saw thick, black smoke flowing out from the engine room exhaust fan in the port stack and engine room door.

The captain determined the fire was too intense to fight and directed the crew to prepare to abandon ship. The crew launched and entered the liferaft in a quick and orderly fashion less than eight minutes from the time the captain first smelled smoke. During a postfire examination in the engine room, investigators found several exposed surfaces were heavily covered in soot, and there were a few areas of "clean burn" present between the hydraulic return oil filter housing and the winch engine that had been operating at the time of the fire.

This indicated the fire had burned hottest there and that the fire area of origin was likely in the port, forward corner of the engine room between the hydraulic return oil filter housing and the winch engine. Investigators found all hydraulic hoses from the hydraulic return oil filter box were detached from their aluminum filter housing covers, which had been melted away by the fire, indicating the hoses, their fittings, or another component of the box had failed.

The cause of the fire was likely the ignition of pressurized hydraulic oil spraying on components of the running winch engine exhaust system. "After an engine room fire ignites, it is imperative to remove the sources of available fuel and ventilation to the fire to prevent it from spreading," the report said.

"Vessel designers, builders, owners, and operators are encouraged to install, regularly test, and have emergency drills that incorporate remote shut offs for all machinery within these spaces to ensure the machinery can be remotely stopped from outside the space where it is situated. "Additionally, to prevent the reintroduction of oxygen to the space, vessel designers and owners should ensure that the ventilation, both natural and forced draft, can be completely and remotely secured to all engine rooms."

Download the full report PDF at **https://bit.ly/4cebDNp**.

The "E-cars on Board – A Safe Passage" interferry brochure is a vital new resource

The "E-cars on Board – A Safe Passage" interferry brochure addresses common concerns regarding battery electric vehicle (BEV) safety on ro-pax ferries. It provides clear, concise information based on recent research, including findings from projects such as Lash Fire, in which Interferry actively participated.

Interferry members are advised to take a look at the brochure and make it accessible to their customers in a simple way – for more informed decision-making, clarity and safety. Note: You do not have to be an Interferry member to print and distribute this brochure.

The core message is straightforward: BEVs do not present a greater fire risk than traditional vehicles.

BEVs can be stowed safely next to other vehicles on board a ship's vehicle decks, as the fire extinguishing equipment of a ro-pax ferry can handle potential incidents, no matter if it comes from an e-car or a traditional internal combustion engine vehicle (ICEV).

In a clear Q&A format, the brochure informs that BEV fires are statistically less frequent than ICEV fires. It rectifies misconceptions about common fire causes and intensity, extinguishing methods, and fume toxicity. It also clarifies safe storage practices and highlights the safety of on-board charging.

Johan Roos, Director of Regulatory Affairs at Interferry, stresses the brochure's importance. "Informed passengers are essential, especially as we approach the travel season in many parts of the world. Global e-car numbers are rising, and with it the uncertainties as to how this will affect the safety of ferry travels. Ferry operators must provide clear, accurate information, and we believe this brochure is a valuable tool. We want all ferry customers to feel safe and secure."

Read the INTERFERRY brochure at **https://bit.ly/3EEw1Lu**.

MTF report highlights critical safety issues of transporting electric vehicles

The Maritime Technologies Forum (MTF) has published a report titled "Safe Carriage of Electric Vehicles" addressing the critical issue of transporting electric vehicles (EVs) on Pure Car and Truck Carrier (PCTC) vessels.

Currently, there are no international regulations specifically dedicated to the safe carriage of electric vehicles. While some national and regional governmental organizations have issued their own guidelines, the IMO is still in the process of developing mandatory regulations for the transportation of new energy vehicles, including EVs, with a target completion year of 2027.

"This report is a significant step toward safer transportation of electric vehicles. Our goal with this report is to provide the industry with the necessary information to develop effective regulations and safety measures," said Lars Lippuner, Director of UK Customer Maritime Services, UK Maritime and Coastguard Agency (MCA).

The Maritime Technologies Forum (MTF) is a group of flag States and classification societies which aims to bridge the gap between technological progress and regulatory process.

According to the report, crews need to become familiar with electric vehicles and be well-trained to ensure safe transportation of these vehicles. In addition, providing effective information on safe carriage of EVs would be beneficial to stakeholders who are now investigating and considering the additional measures.

Download the report at **https://bit.ly/4bXoWSh**.

UK MAIB releases first safety digest of 2025

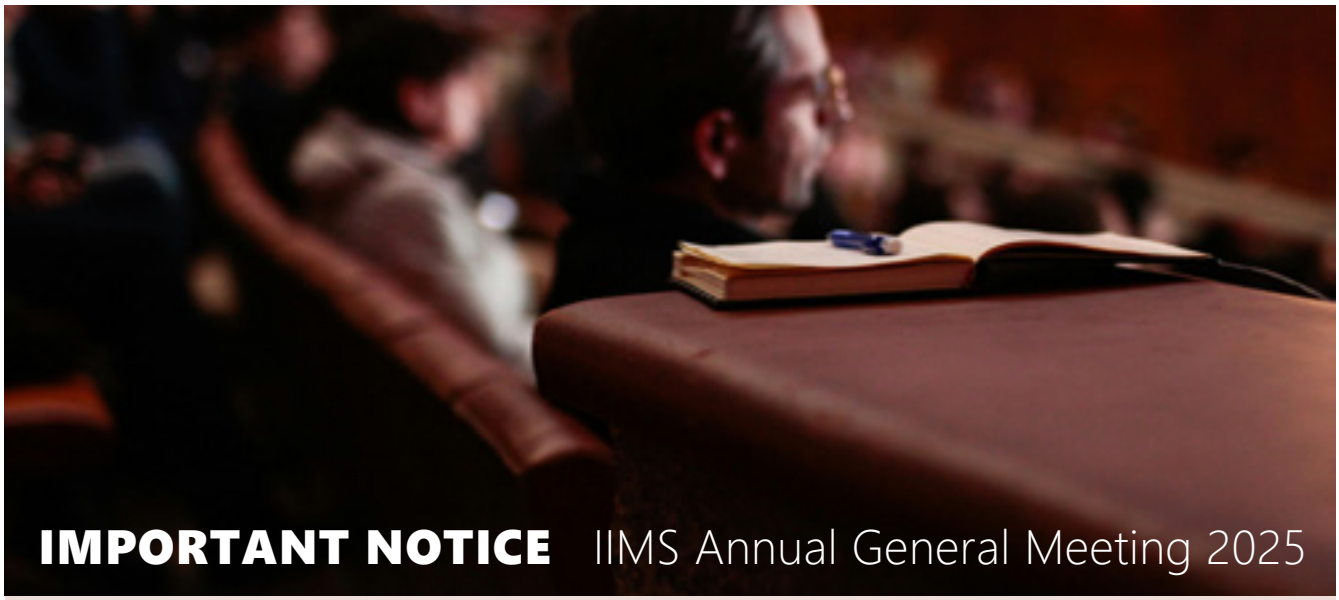
The UK Marine Accident Investigation Branch (MAIB) has published its first safety digest of the year. Safety Digest 1/2025 draws the attention of the marine community to some of the lessons arising from investigations into recent accidents and incidents. This information is published to inform the merchant and fishing industries, the recreational craft community and the public of the general circumstances of marine accidents and to draw out the lessons to be learned.

The sole purpose of the MAIB safety digest is to prevent similar accidents happening again. In his introduction, Chief Inspector of Marine Accidents, Andrew Moll OBE, highlighted to the recent collision between container vessel Solong and tanker Stena Immaculate pointing out it appeared to be yet another collision that should not have happened.

He added that a good lookout as key to preventing collisions (COLREGs Rule 5), and also that stand-alone vessels should ready to take avoiding action when necessary (Rule 17).

The digest also featured introductions by Gary Doyle, Group Harbour Master of Peel Ports Group; Anne Hornigold, Director of Whitby & District Fishing Industry Training School; and Mark Bleecker, Director of MB Marine who contributed their expert insights to this safety digest.

Download the pdf at **https://bit.ly/4jthUaD**.



IMPORTANT NOTICE IIMS Annual General Meeting 2025

The 2025 IIMS AGM takes place on 3rd June at 14.00 (London, UK time). It is being broadcast live via Zoom from the IIMS HQ offices, and all are welcome to join. **The agenda is as follows:**

1. Apologies

2. Minutes of previous AGM held in June 2024

3. President's Report (Capt Ruchin Dayal)

4. Chief Executive Officer's Report

5. Directors' Reports

6. Pre AGM election voting results on the following two items:
- Management Board re-election en-bloc
- Proposed Fee Structure for 2026 Membership

7. Fellowship & Honorary Membership awards

8. Any Other Business

The AGM is open to all. If you would like to join the meeting, the Zoom room details are:

IIMS Annual General Meeting 2025
3 June 2025 at 14:00 (London, UK time)

Go to **https://bit.ly/3ZayMer**.

Meeting ID: **834 9031 0829**

Passcode: **690085**

Recent new IIMS members, upgrades and graduates

Full members

Justin Grubb	*MIIMS*	USA
Rafael Matos	*MIIMS*	Colombia
Keith Morgans	*MIIMS*	UK
Ataur Rahman	*MIIMS*	Bangladesh

Associate members

Brian Ahern	*AssocIIMS*	Turkey
Carlo Demicheli	*AssocIIMS*	Italy
Manuel Gonzalez	*AssocIIMS*	Spain
Alex Lloyd	*AssocIIMS*	UK
Keiran Russell	*AssocIIMS*	Australia
Md Hafiz Ullah	*AssocIIMS*	Canada

Graduate members

Mohammad Adil Hashmi	*GradIIMS*	Saudi Arabia
Leo Fahey	*GradIIMS*	Spain
Shane O'Donovan	*GradIIMS*	Ireland
Thomas Chubb	*GradIIMS*	UK

Affiliate members

St. Aubyn Browne	*AffilIIMS*	Antigua
Arnaldo Bugari	*AffilIIMS*	Italy
Emre Cetinel	*AffilIIMS*	Turkey
Bertrand Hermange	*AffilIIMS*	France
Greg Lawen	*AffilIIMS*	Seychelles
Eli Parkes	*AffilIIMS*	Hong Kong
Soykan Sezer	*AffilIIMS*	Turkey
Andrew Tate	*AffilIIMS*	UK

IIMS congratulates Leo Fahey, Shane O'Donovan and Thomas Chubb *for completing their studies in the IIMS Professional Qualification in Yacht and Small Craft Marine Surveying.*

IIMS congratulates Mohammad Adil Hashmi *for completing his studies in the IIMS Professional Qualification in Cargo & Commercial Ship Marine Surveying.*

Round up of the IIMS training seminars held over the past three months

It has been a hectic period and IIMS has delivered a wide range of training events in recent weeks meeting dozens of members and non-members at various locations.

In early March, Mike Schwarz attended the IMCA Regional North America meeting at Newport, Rhode Island to deliver a presentation to a large audience of offshore specialists. He met a number of eCMID accredited vessel inspectors as well others immersed in this industry sector.

Later that month, a group of surveyors gathered at Chilworth Manor Hotel near Southampton for a one day hybrid training session. Of particular interest were the two presentations dedicated to lithium-ion battery chemistry and installations. David O'Neill, based in Palma, displayed his extensive knowledge of the chemistry whilst Marcus Jones analysed some of the key challenges this new technologies is presenting the marine industry. The presentation by Phil Duffy on valuing large and superyachts was also hugely valuable.

The train rolled on to Baltimore. This annual event, held at the MITAGS facility on the edge of Baltimore, has remained popular over the years, and this proved to be the case again. Thanks to James 'Randy' Renn, who had once again delivered two days of high quality content covering the widest range of marine surveying topics imaginable.

A dozen yacht and small craft surveyors attended a two day event in April held at the well appointed Howth Yacht Club near Dublin. Once again, the subject of lithium-ion batteries dominated the two day agenda.

Pictured below right, James Renn

The annual Western Mediterranean Yacht & Small Craft seminar is held with the ever growing Palma International Boat Show as its backdrop. One of the highlights of this year's show was the appearance of Jeff Bezos' 127 metre three masted superyacht – a remarkable sight.

The range of topics covered across the two days was extensive. Roland Perry gave a fascinating presentation on the process of marine surveying involving a strong AI element in it. Tim Rowe demonstrated his extensive knowledge when he talked about surveying classic wooden boats. On the second morning, 2 May, METALNOX delivered an in depth Technical Seminar at its facilities on the repair of shaft lines and/or their elements: propellers, shafts, P brackets and rudders at their groundbreaking facility.

The workshop mixed technical aspects with practical examples, and those present saw at first-hand the initial analysis of a propeller using a 3D scanner, through to laser alignment, repair by welding, straightening and dynamic balancing.

Special thanks are extended to Karen Brain, Matrix Insurance, who popped up at several of these events to talk about the insurance market and the importance of terms and conditions in a surveyor's report.

The new MCA Workboat Code Edition 3 was introduced last year, and this was the first opportunity IIMS has had to share the significant changes it contains having studied the documentation in detail. An online audience of nearly 50 surveyors and vessel owners/operators joined the technical training seminar under the expert tutelage of Fraser Noble (Chairman of the IIMS Certifying Authority) and Steve Moffatt (Certifying Authority committee member).



METALNOX delivered an in depth Technical Seminar at its facilities. Above images by METALNOX

Report on the IIMS Yacht & Small Craft gathering in Cornwall *by Nick Healey MIIMS*

The Institute is grateful to member, Nick Healey, for arranging an evening event for yacht and small craft surveyors based in the UK southwest recently.

Nick writes: There were nine attendees at Falmouth Boat Construction, who kindly hosted the event under the working title 'Marine engineering'. Johnathon (The chief and yard owner) headed up the talk, firstly giving us an insight into their services. He was followed by Steve (head engineer) who gave and showed some great examples of engine scenarios including, installations, exhausts, corrosion in coolant systems, propellers and fuel management. He also took us through his extensive collection of photographs that he has meticulously collected over an engineering career spanning many decades. In addition, we walked through the yard looking at propellers and shafts where problems had been observed by Steve to understand the issues.

I think I can speak for all present that this was a most useful exercise. I'm sure everyone would have learnt something and probably, most importantly, it gives a little reminder of the detail needed in order to provide a meaningful survey report.

Surveying can be a lonely world sometimes. Time spent networking and building a relationship between other surveyors/brokers and contractors has been invaluable during my career. Sometimes a quick call to a contractor, or a fellow surveyor to discuss a topic on something you are currently looking at, can make your day run a lot smoother. Asking for help when knowledge or experience may be at a deficient should be actively encouraged.

Singled out by royalty at installation dinner

IIMS stalwart and executive director, Capt Allen Brink HonFIIMS, got an unexpected but welcome surprise when he attended the Hon. Company of Master Mariners installation dinner of the new Master, with Prince Edward in attendance. The dinner took place on 25 April 2025 at Mansion House, London.

During dinner, when Prince Edward expressed his gratitude to the guests for attending, he singled Allen Brink out, extending particular thanks to him for making the long journey from South Africa to be there. That's quite an accolade Allen, who is pictured (left) with Prince Edward at the event.

IIMS London Conference report

Marine Surveyors, P&I Clubs, and Loss Prevention: Collaboration for Safer Seas

IIMS held a successful one day event in central London on Tuesday 13 May 2025, the first such conference of its kind for commercial ship surveyors to take place in the UK capital since before Covid.

Many thanks are due to Stuart Edmonston and his team at UK P&I Club for hosting the event in the Thomas Miller offices and for their generous hospitality on the day, including an excellent working buffet lunch.

The event was kindly co-sponsored by AR Brink & Associates and eDOT Solutions.

Commenting on the event, IIMS CEO, Mike Schwarz, said, "I am delighted at the quality of content that was delivered by a stellar line up of experiences and talented speakers

The event was opened by a short welcome from IIMS President, Capt Ruchin Dayal, who sadly could not be at the event in person. John Stawpert (Principal Director Marine, International Chamber of Shipping) followed as he delivered a keynote address to which Mike Schwarz replied. John's keynote address is published in full later.

Stuart Edmonston, UK P&I Club, delivered a powerful presentation entitled "Partnering for Safety: The Role of P&I Clubs, Marine Surveyors, and Risk Management in Loss Prevention".

John Lloyd, CEO Nautical Institute, is a name that will be known to many and IIMS was delighted he as able to take time out from his busy schedule to present "Marine Surveyors, Safety, and Sustainability: The Nautical Institute's Vision for Safer Seas". In his presentation, John spoke of the role that the human element plays in incidents and accidents.

Someone else well known to IIMS members is Capt Nick Sloane. Some years ago he delivered a masterclass on the work he and his team undertook to raise the ill-fated Costa Concordia. Nick did not disappoint as he delivered a fascinating presentation entitled, "Recovery of the bark EUROPA off the Cape Town synchrolift".

After lunch, it fell to Jeremy Russell KC to fill what he called the graveyard slot. In his talk, he spoke expertly about "LOF today: The art of assessment from the perspective of a Lloyd's arbitrator".

It was surely inevitable that the subject of lithium-ion batteries and fires at sea (and on land) caused by this technology would fully engage the audience, and so it proved. Karley Smith and Yvonne Tung from Brookes Bell gave a hard hitting presentation called "Navigating the Risks: Lithium-ion Batteries, Electric Vehicles, and Fire Safety in the Maritime Industry".

Geraldine Koon and Amelia Dunn, both from ITIC, brought the day's proceedings to a close. Their topic - "Risk management for marine surveyors" - assessed how a surveyor should set up a survey, including the importance of making terms and conditions clearly available, what to include in their report and other vital aspects of trying to avoid litigation!

Stuart Edmonston (above left) with Mike Schwarz (right) and Capt. Allen Brink (bottom left).
AR Brink & Associates and eDOT Solutions co-sponsored the event

KEYNOTE ADDRESS:
Evolving Safety Standards in a Changing Maritime Landscape

By John Stawpert, (Principal Director Marine, International Chamber of Shipping).

Good morning, distinguished guests, colleagues, and representatives from across the maritime sector.

I would like to thank the International Institute of Marine Surveying for the invitation to speak here today, and the opportunity to discuss such important industry developments and their impact on safety for the broader maritime community.

Shipping, as we are all aware, is undergoing a period of significant and, in many respects, unprecedented change. The global imperatives of decarbonisation, digitalisation, and sustainability are reshaping not only how we design and operate vessels but also how we think about safety and about the roles and responsibilities of the key actors involved in upholding it.

Let me begin by addressing a development that may well have a profound and lasting impact on the maritime sector: the recent outcome of MEPC 83. After several years of complex and often challenging negotiations, Member States at the International Maritime Organization have agreed upon a new regulatory framework for the reduction of greenhouse gas emissions from international shipping.

This agreement is a significant milestone. If adopted at MEPC's extraordinary session in October, it would reflect a serious commitment by governments to align international shipping with broader climate objectives, and it sends a strong signal to markets, investors, and the public that the maritime industry is prepared to make its contribution to the global energy transition. The International Chamber of Shipping welcomes this development and commends the efforts of the IMO and its Member States in reaching this consensus under difficult political circumstances.

However, the work does not end with the announcement of an agreement. The framework must now be implemented, and that implementation must be both effective and realistic. For shipowners and energy producers, the immediate priority is the establishment of a regulatory structure that is not only ambitious but also practical. We need a structure that provides clarity, predictability, and the necessary incentives to support investment in new fuels, propulsion systems, and technologies.

The scale of the task ahead is substantial. Billions of dollars are already being invested in alternative fuel-capable vessels, fuel infrastructure, and research into GHG-reducing technologies. But progress on this front cannot be sustained without regulatory certainty. Producers of new fuels, for example, must be confident that their investments will have long-term viability. The same applies to ports, operators, and insurers. The IMO framework must now catalyse the broader transition and provide the assurance that international shipping requires in order to move forward at the pace that is necessary.

John Stawpert (Principal Director Marine, International Chamber of Shipping) with Mike

In parallel with the regulatory and technical aspects of decarbonisation, we must also give due attention to the implications for safety.

The fuels and technologies now under development or deployment bring entirely new risk profiles and, consequently, new requirements for training and onboard procedures. Fuels such as ammonia and hydrogen are fundamentally different from traditional marine fuels in terms of their physical properties, storage requirements, and operational risks. Ammonia, for instance, is toxic and presents serious risks if not handled properly. Hydrogen is highly flammable and presents unique challenges in containment. Even methanol, already used on some vessels, requires substantial modifications to existing safety systems and crew procedures.

Abatement technologies, such as onboard carbon capture and storage systems, also introduce a new layer of complexity. These systems must be integrated into vessel design, monitored carefully, and maintained with precision. Failures in these systems could have serious consequences not only for vessel performance, but for the safety of crew and the marine environment.

As shipowners we recognise marine surveyors will play a critical role in this evolving landscape. Their responsibilities will expand as new systems are introduced, and they will be called upon to assess unfamiliar risks, to validate compliance with emerging standards, and to support the safe integration of new technologies into ships and ship operations. This will require ongoing training, updated protocols, and new forms of cooperation with class societies, regulatory bodies, and shipowners.

Likewise, P&I Clubs may face new questions of liability, coverage, and claims management. As risk profiles shift, so too must the analytical models and assumptions that underpin underwriting decisions. Claims involving novel fuels or untested technologies may present scenarios for which there is little precedent. The industry must be ready to adapt.

It is also essential that this transition be fair and inclusive, not only in economic terms, but also in terms of its impact on the workforce. The seafarers who will operate these new systems and handle these alternative fuels must receive adequate training, certification, and support. The same applies to surveyors, inspectors, and auditors. A just transition must consider the full range of personnel

involved in decarbonisation and ensure that safety standards are not compromised in the rush to innovate.

We must also consider the implications of emerging technologies such as Maritime Autonomous Surface Ships, or MASS. Although we are still in the early stages of regulatory development, the presence of remotely operated or fully autonomous vessels is no longer a theoretical prospect. Trials are already underway in various parts of the world, and the IMO is engaged in the complex task of developing a comprehensive framework to address these technologies.

Autonomous vessels raise fundamental questions about safety, responsibility, and accountability. Without a human crew onboard, how do we ensure appropriate responses to emergencies? How do we inspect or survey such vessels to ensure equivalence? How do these vessels fit into the complex world of maritime contracts and insurance? There are many outstanding questions that need to be resolved. The surveyor's role will evolve here as well, potentially involving real-time monitoring systems, digital twin simulations, or remote inspection technologies.

At the same time, several items on the current IMO agenda may also have a bearing on safety in the near term. The proposed targeted review of the ISM Code and related instruments, the scope of which will be discussed at MSC 110, could potentially have far-reaching impacts.

Consequently, ICS has organised a working group on the revision of the ISM Code, an instrument which has been instrumental in embedding a safety culture throughout the industry. It is our hope that careful consideration will be given to the need to review this document and its guidance, maintaining the intrinsic flexibility that has made it so effective, even as shipping becomes more technologically advanced and operationally complex.

Similarly, proposals to regulate biofouling practices may introduce new maintenance requirements that affect both vessel performance and survey regimes. More frequent hull cleaning, inspection scheduling, and anti-fouling measures could have knock-on effects for safety and resource allocation.

On 26 June this year, The Hong Kong Convention on Ship Recycling will enter into force, crowning two decades of progress. Whilst industry is in a strong place to comply with the Convention's requirements, challenges will arise, recognised by IMO's commitment to a two year experience building phase. The task of surveying ships to ensure compliance prior to recycling will be a new phenomenon in many jurisdictions, whilst the ongoing legal uncertainty between the application of the Hong Kong and Basel Conventions may present hitherto unrecognised stumbling blocks for the sector.

In the longer term, international agreements such as the Biodiversity Beyond National Jurisdiction (BBNJ) treaty will affect shipping operations. Measures that may in future be agreed by the IMO to protect sensitive marine areas identified by the treaty could involve rerouting, speed reductions, or restrictions on anchoring. While environmentally necessary, these measures must also be assessed for their operational and safety implications, including increased voyage times, crew fatigue, and search and rescue and logistical challenges in more remote areas.

There is also significant geopolitical context: the global regulatory landscape is increasingly shaped by regional or unilateral actions, sanctions regimes, local emissions requirements, and trade controls. While often well-intentioned, these measures can have unintended consequences. They may create inconsistencies in compliance requirements, expose operators to conflicting obligations, or result in commercial pressures that incentivise unsafe practices.

Fragmentation of regulatory oversight undermines enforcement. When rules differ from one jurisdiction to another, or when enforcement is uneven, challenges to compliance impede the smooth flow of trade, whether intentional or otherwise. This, too, has safety implications.

This is why the International Chamber of Shipping continues to advocate strongly for global regulation through the IMO. Shipping is, by its nature, a global industry. Its efficiency, reliability, and safety depend on common standards applied consistently across jurisdictions. Fragmentation introduces risks that are ultimately borne by the very people and organisations working to keep ships safe, seaworthy, and compliant.

As we navigate a future shaped by decarbonisation, technological disruption, regulatory reform, and geopolitical uncertainty, these roles of seafarers, surveyors and the insurance markets will become even more crucial. The industry must invest in their development, support their independence, and integrate their perspectives into policymaking at every level.

We find ourselves at a moment of transition. The decisions we make now, and the way we implement them, will have long-lasting consequences for our industry. But if we remain committed to collaboration, to technical excellence, and to global standards, there is no reason why safety should be compromised. On the contrary, we have an opportunity, and an obligation, to ensure that it continues to improve.

Thank you
John Stawpert

eCMID AVI 10th anniversary report

The elegant West-Indish Huis in central Amsterdam was the venue for the 10th anniversary gala buffet dinner on 19 May 2025.

The Festival of Knowledge X, took place at the Radisson Blu Hotel Amsterdam Airport on Tuesday 20 May 2025, celebrating a decade since the launch of the scheme.

Over the last decade, more than 1,000 applications for accreditation have been received.

Key highlights noted:

- AVIs were engaged at all times and spoke passionately about the scheme
- AVIs are in support of the future generation of marine professionals coming into the eCMID AVI scheme
- AVIs talked about how we can support them going forward and asked, "How are we going to grow the scheme?"
- IMCA (for whom we manage the scheme) were fully supportive and took onboard comments from the audience and answered all questions from in-person AVIs and those online
- It is clear that IMCA need to take action on how the scheme can grow and develop to attract new candidates as we (IIMS/MSA) only administer the scheme and are very limited with what we can do

The West-Indisch Huis is the former headquarters of the Dutch West India Company in Amsterdam. In this building, the Dutch West India Company's governors in 1625 ordered the construction of a fort on the island of Manhattan, laying the foundations for New York City.

Mike, Sharon and Elly from IIMS head office hosted and facilitated the events

New vessels review

Invictus GT280 Carbon Look, a game-changer

The new Invictus GT280 Carbon Look was showcased at boot Düsseldorf earlier this year. Featuring exclusive carbon fibre construction using 'pre-preg' technology, this model marks a significant technological leap that will influence the development of future Invictus models.

When it comes to carbon fibre, there's always some precaution. In the automotive and boating industries, it is frequently seen as a mere visual effect—often reproduced with films that mimic the signature weave of the material. Moreover, the processing of this material, which is remarkable for its mechanical properties but challenging to work with, is sometimes carried out with insufficient precision.

Singapore's largest electric harbour craft launched

The Coastal Sustainability Alliance (CSA), an industry collaboration led by Singapore's Kuok Maritime Group (KMG), launched its first fully electric supply boat this week, as part of the country's goal for all new harbour craft to be fully electric or compatible with net-zero fuels by 2030. The supply boat is capable of cruising at eight knots under zero-emission operations while maintaining operational reliability and was designed to improve economic viability by delivering higher cargo volumes and extending operations.

"Coupled with an efficient hull design and operationally efficient marine logistics, the vessel can achieve 60 per cent energy savings over a conventional lighter making multiple trips, providing significant costs and carbon emissions reduction for the industry," said PaxOcean, part of the Kuok Marine Group.

Kingfisher Boats launches the 23 and 25 XAC Models

Canadian based Kingfisher Boats has announced the release of two new models: the 23 XAC and 25 XAC. Designed for families, anglers, and small groups, these heavy-gauge aluminium boats offer a hybrid solution for both fishing and cruising. They are well-suited for both fishing trips and casual outings across the Pacific Northwest and Great Lakes.

The 23 XAC measures 23'1" in length with a 250 HP engine, while the 25 XAC is slightly larger at 25'1" with a 300 HP engine. Both models have a 16° variable deadrise, making them stable in various water conditions. The 23 XAC offers a fuel capacity of 322 L (85 USG), and the 25 XAC has the same fuel capacity with an option for a larger 125 USG tank. Cabin headroom on both models is 6'3", providing ample space for extended time on the water.

Mylius begins construction of new super-fast cruiser

Italian boatbuilder Mylius Yachts has commenced construction of the first M72 fast cruising sailing yacht, the second largest model in its sailboat range. Due for completion next year, the 22.2m (72ft) vessel is a joint project in association with the Palma-based Carkeek Design studio, blending high performance with comfort and elegance.

The Mylius M72 is intended for owners who love to race but still want to enjoy comfortable cruising, offering future buyers ample customisation options. A craft in the high-performance 21m (70ft) range, it is designed as a pure racer offering aesthetics and competitiveness in regattas. Developed in perfect synergy with the hull, the sail plan is that of a pure racer designed to win, as evidenced by the presence of running backstays, dual backstays and a 29.9m (91ft) high-modulus carbon mast from Hall Spars, along with a carbon boom and bowsprit. The racing sail inventory includes a top square mainsail, J2 jib, Code 0, and A3, but the future owner can, of course, opt for smaller sails for cruising.

UK's Haventus christens newest energy facility support workboat

A naming ceremony was recently held for Harris, a new multi-purpose workboat ordered by UK-based energy transition facilities company Haventus. Classed by Bureau Veritas, the workboat has an LOA of 24 metres, a moulded beam of 9.4 metres, a maximum draught of two metres, a depth of 2.8 metres, a gross tonnage of 158, and air-conditioned accommodation for four crewmembers. Two Volvo D16 1,250kW main engines deliver a bollard pull of 20 tonnes and a service speed of 10 knots.

Key features include a large open deck with a Heila knuckle boom crane, anchor handling winches, towing winches, towing pins, and a Mampaey towing hook. The sides are fitted with tyre fenders while pushbow fenders are incorporated fore and aft.

Saffier Yachts launches SL 46 MED

Saffier Yachts of the Netherlands has launched the new Saffier SL 46 MED, a 46ft sailing yacht that redefines the concept of luxury sailing yachts, blending high performance with exceptional comfort and craftsmanship.

Designed for sailors who seek both speed and elegance, the Saffier SL 46 MED features a sleek, modern hull optimised for performance, reaching speeds of 18kt. The interior boasts high-end materials and finishes offering a comfortable space to relax. The expansive cockpit provides ample room for outdoor living and socialising, while the open aft design creates a seamless connection to the water.

New vessels review

Port of Tyne set to take delivery of UK's first fully electric foiling pilot vessel

The Port of Tyne has purchased the UK's first fully electric foiling pilot boat, described as a significant milestone for the Port and the UK's maritime sector. The vessel will be used to transfer pilots onto the ships, delivering essential goods and cargo to the northeast of England. This investment by the Port of Tyne aims to further enhance both the safety and efficiency of the Port's operations. It is also another major step towards the delivery of a fully net-zero pilotage service as part of the Port's continuing drive to reduce emissions and decarbonize.

Designed and built by Artemis Technologies in Belfast, the Artemis EF-12 Pilot is powered by Artemis' patented eFoiler technology, producing zero operational emissions and offering a cleaner alternative to traditional diesel-powered vessels. Integrating advanced hydrofoil and electric propulsion technologies ensures a smooth, quiet, safe journey.

TJ Boats launches new pilot house RIB

Poland's TJ Boats has launched the SRB 60 Pilot House and is looking to further expand its range next year. In 2025 the company will focus on securing new markets outside Poland, according to a senior company representative.

The producer builds boats from high density polyethylene (HDPE) at a yard operated by local company Splastic in Studzienice, in south-western Silesia.

TJ Boats claims to be the only player from the Polish boating industry that builds motorboats and RIBs with the use of HDPE welding and butt welding. This allows the company to provide customers with custom-made, but also durable and high-quality craft whose manufacturing process is also environmentally friendly, as the HDPE the company uses is 100% recyclable.

Crestliner Unveils the 2050 Fish Hawk

Crestliner Boats, a leading aluminum boat builder with a legacy for performance and durability, has announced the launch of the 2050 Fish Hawk. As the newest, largest, and most advanced model in Crestliner's Fish Hawk series, the 2050 combines exceptional performance, cutting-edge fishing features, and family-oriented versatility to redefine the boating experience.

The 2050 Fish Hawk is platformed on Crestliner's exclusive AP-X Hull technology, elevating the entire Fish Hawk lineup with unprecedented performance, stability, and durability on the water. Whether you're an elite angler chasing the perfect catch or a family looking for adventure, the 2050 Fish Hawk promises to deliver the ultimate on-water experience.

Versatile mooring boats to serve Indonesia's Benete Port

Photo credit: Robert Allan Ltd

Indonesia-based copper and gold mining company Amman Mineral Nusa Tenggara (AMNT) recently took delivery of two new mooring boats in a series built locally by Dumas Tanjung Perak Shipyards.

The new AMNT mooring boats each have an LOA of 13.86 metres (45.47 feet), a moulded beam of 5.5 metres (18 feet), a moulded depth of 2.2 metres (7.2 feet), a maximum draught of 1.72 metres (5.64 feet), space for two crewmembers, and two Caterpillar C7 diesel engines each rated 209 kW (280 hp) at 2,300 rpm.

The engines drive Kort 900mm Kaplan propellers to deliver a service speed of just over 10 knots and a bollard pull of 6.39 tonnes. RAL said that, during sea trials, the vessels easily exceeded the required performance standards.

Princecraft Boats awarded the prestigious NMMA Innovation Award in the "Pontoon" category

Princecraft Boats was awarded the prestigious NMMA Innovation Award in the "Pontoon" category at the 2025 Minneapolis Boat Show. This recognition was given for the company's ground-breaking new model, the Vogue 25 RL, which made its highly anticipated debut at the show.

The Vogue 25 RL, part of the luxury-focused Vogue series, raises the bar in pontoon design, combining modern aesthetics with cutting-edge features that set a new standard for luxury, innovation, and accessibility in the boating industry.

"We are incredibly honoured to receive Princecraft's first-ever Innovation Award," said Rodier Grondin, President of Princecraft Boats. "The Vogue 25 RL brings a fresh, modern style to the water, blending advanced technology, superior craftsmanship, and exceptional value. This boat is unlike anything we've ever brought to market, and we are proud of our team's hard work and dedication. This award is a testament to their effort, and we look forward to welcoming more boaters to the Princecraft family through the Vogue series."

Shallow-draught maintenance workboat to support UK marine construction and renewables projects

UK-based Briggs Marine and Environmental Services has taken delivery of a new maintenance support vessel built by Freire Shipyard of Spain.

The Lloyd's Register-classed Forth Constructor has been developed to support Briggs Marine's contracts with the UK Government, as well as offshore wind farms and commercial ports and harbours.

With a DP2 system and diesel-electric propulsion, the vessel will primarily be used for inspection, maintenance and replacement of aids to navigation (AtoN) and heavy inshore moorings, both in the UK and overseas. It will also carry out seabed inspection and survey, diving, and ROV operations, as well as offshore project and maintenance support operations. Inshore cable laying operations will be possible thanks to the vessel's operational draught of only 2.5 metres (8.2 feet).

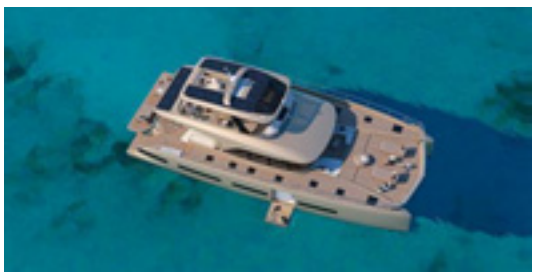
Forth Constructor has a length of 39.99 metres (131.2 feet), a beam of 12.4 metres (40.7 feet), a displacement of 875 tonnes, and a gross tonnage of 636. Four Scania D16 480kW generators drive two Hydromaster 640kW azimuthing thrusters to deliver a maximum speed of 11 knots and a bollard pull of 22 tonnes.

Lagoon presents new models

Groupe Beneteau's Lagoon catamaran brand presented more details of its largest powercat to date – the Lagoon Eighty 3 – at its French shipyard in Bordeaux. The company also held the world premiere of its entry level Lagoon 38, the smallest boat in the sail catamaran range.

The Lagoon Eighty 3 is the result of a collaboration between the Bordeaux shipyard and VPLP naval architects, Patrick le Quément for the exterior design, and Nauta Design for the interior. This new powercat is the bigger sister to the Lagoon Eighty 2 sail catamaran. The Eighty 3 is described by le Quément as being "designed for bold, adventurous spirits."

The new model is 24.4m (80ft) but it is certified as under 24m. The Eighty 3 provides over 300m^2 of living space and can be configured to have between four and six cabins for eight to 16 people. The four-cabin version has a lower deck galley and a skipper's cabin. She is powered by two John Deere N13 580hp engines and can carry enough fuel for a range of up to 3,500Nm.



IMO is set to develop a maritime digitalization global strategy

The International Maritime Organization (IMO) is taking action to create a comprehensive strategy that harnesses emerging technologies to turbo-charge efficiency, safety and sustainability in the shipping industry.

During its 49th session in London from 10 to 14 March, IMO's Facilitation Committee (FAL) outlined a work plan for developing the IMO Strategy on Maritime Digitalization, which is set to be adopted by the Organization's highest governing body – the IMO Assembly – by the end of 2027.

The cross-cutting strategy will span different areas of IMO's work, fostering a fully interconnected, harmonized and automated global maritime sector. To guide this process, the Facilitation Committee established a Correspondence Group to define the strategy's scope, key objectives and implementation framework. The Group will work over the coming year to identify existing and emerging technologies, standards and methodologies that can support maritime digitalization, while ensuring alignment across IMO's various committees.

The Facilitation Committee invited the Marine Environment Protection Committee (MEPC) and Maritime Safety Committee (MSC) to encourage Member States and international organizations to join the Correspondence Group, to ensure the early involvement of all stakeholders in shaping the IMO digitalization strategy. The Correspondence Group will table a report to the next session of the Facilitation Committee (FAL 50) in 2026, before a final submission is made to the Assembly session scheduled for the end of 2027.

IMO Secretary-General Arsenio Dominguez emphasized the transformative potential of cutting-edge technologies such as AI and autonomous navigation, while recognizing related challenges, including cybersecurity risks and the global digital divide.

He stated, "The IMO Maritime Digitalization Strategy is a game-changing effort to make smooth, seamless, smart shipping a reality. It will help integrate vessels and ports, improve logistics and optimize routes, while reducing greenhouse gas emissions. We must work together to ensure the strategy serves all."

The strategy builds on previous milestones, including the introduction of mandatory Maritime Single Window (MSW) regulations last year, which require ships and ports to use a single digital platform to exchange information and streamline port call procedures.

IMDG code update strengthens ammonium nitrate safety

ICHCA International has welcomed a key amendment to the International Maritime Dangerous Goods (IMDG) Code by the International Maritime Organization (IMO), which strengthens safety requirements for shipping ammonium nitrate.

Key provisions of the amendment
The revised clause 7.6.2.8.4 clarifies that under-deck carriage of ammonium nitrate and related fertilizers is permissible only if all hatches, including tween deck hatches, can be readily opened in an emergency. This ensures effective firefighting measures, such as maximum ventilation and boundary cooling, can be implemented promptly.

"Ammonium nitrate fires can escalate out of control very rapidly. To help prevent consequential loss of life and damage, the new provisions laid out in the IMDG Code, in particular clause 7.6.2.8.4, should be complied with at all times," explained Brian Devaraj, a member of ICHCA's Technical Panel.

Ammonium Nitrate (NH_4NO_3), a white to grey odourless chemical has a melting point of 169 degrees C and decomposes at 210 degrees C. While it does not burn by itself, it will significantly accelerate burning of combustible material.

The revision aims to eliminate ambiguities regarding stowage requirements, particularly in multi-layered compartments of conventional reefer vessels, where compliance with emergency access provisions has been challenging.

Implications for stakeholders

- Voluntary early adoption: While the amendment becomes mandatory in 2026, the IMO encourages voluntary compliance from January 2025.
- Operational adjustments: Shipping companies may need to assess and modify vessel designs to ensure hatch accessibility aligns with the new requirements. This could involve retrofitting existing ships or adjusting cargo stowage practices.
- Regulatory alignment: Countries with significant ammonium nitrate handling, such as Australia, South Africa, and Chile, have already implemented specific regulations addressing these risks. The IMO's amendment seeks to standardize safety measures across international maritime operations.

"Although not mandatory until 1st January 2026 it can be applied on a voluntary basis from January 2025. ICHCA is urging all those involved in the maritime transport of ammonium nitrate to abide by the new regulation immediately," said ICHCA CEO, Richard Steele.

Marine Order 504: simplified safety management system

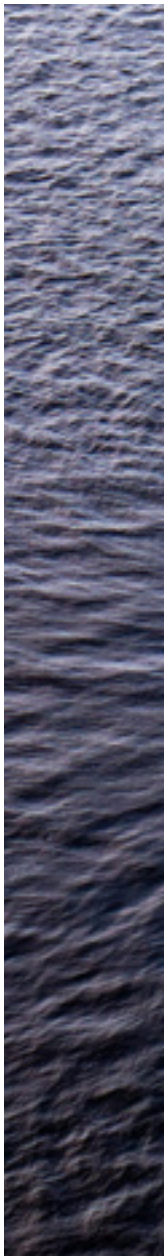
The Australian Maritime Safety Authority (AMSA) has announced that from 1 June 2025, a simplified safety management system (SMS) will be available for smaller, less complex domestic commercial vessels that meet the eligibility criteria.

Simplified SMS makes it easier for eligible operators to comply with Marine Order 504 by making the mandatory requirements more practical for smaller vessel operations particularly for operational procedures, risk assessments, and emergency planning while maintaining safety standards.

Use AMSA's SMS toolkit to build your simplified SMS. The step-by-step instructions will guide you through the process with ease.

Download the Class 2 and Class 3 simplified SMS toolkit at **https://bit.ly/439NViA**.

Download the Class 4 (hire and drive) simplified SMS toolkit at **https://bit.ly/4krBcgX**.



Updated Port Marine Safety Code extends reach to UK Marinas

In a significant move to strengthen maritime safety across the UK, the Department for Transport has issued an updated version of the Port Marine Safety Code (PMSC) with clear expectations that marinas and other non-statutory marine facilities bring their safety practices in line with the national framework.

Originally introduced in 2000, the PMSC has long applied to statutory harbour authorities. However, the latest revision now explicitly includes all marine facilities, including privately operated marinas, piers, jetties, and terminals, even when located outside of traditional harbour jurisdictions.

While compliance with the Code remains voluntary, it is regarded as industry best practice, and failure to follow it may be considered evidence of negligence in the event of a marine incident. The PMSC is supported by the Guide to Good Practice on Port and Marine Operations (GTGP), offering practical guidance to help marine facility operators implement effective safety and environmental management systems.

This updated Code marks a crucial step toward consistency in marine safety across all UK waters, said a spokesperson for the Department for Transport. Marinas are now expected to meet the same high standards as harbour authorities when it comes to managing marine operations safely and responsibly.

What does it mean for marinas?

Under the revised Code, marina operators are expected to:

- Appoint a Duty Holder at a senior level who is accountable for marine safety performance;
- Assign an independent Designated Person to audit marine safety systems annually;
- Operate a formal Marine Safety Management System (MSMS) based on comprehensive risk assessments;
- Publish a Marine Safety Plan at least every three years and report performance against it;
- Maintain facilities in a safe, fit-for-purpose condition under their Conservancy Duty;
- Ensure all personnel involved in marine operations are competent, trained, and regularly assessed.

In addition, marinas are urged to separate commercial and safety functions, invest in ongoing staff development, and document all audits, inspections, and training. Although not a statutory requirement, the PMSC carries considerable weight in legal contexts. In the event of an incident, failure to adhere to the Code and GTGP could be used to demonstrate a lack of due diligence. Marina operators and harbours are encouraged to review the updated Code and accompanying guidance in full, and to evaluate their current practices against the revised expectations.

Download the updated Port Marine Safety Code at **https://bit.ly/3Yz9Ywt**.

NEW marine reports and guides

ABS Port State Control 2024 Q4 Report

ABS has released its latest Quarterly Port State Control (PSC) Report which provides information about deficiencies identified on ABS vessels during inspections carried out by the various PSC regimes globally during the last quarter of 2024.

There were 465 total detained vessels in the fourth quarter per Paris MoU, Tokyo MoU and USCG. Of those detained, only 22 vessels were ABS classed vessels. For period 1 October to 31 December 2024, the top categories for Port State Control (PSC) detentions on ABS vessels in the Paris Memorandum of Understanding (MoU), Tokyo MoU and the United States Coast Guard (USCG) database are as follows:

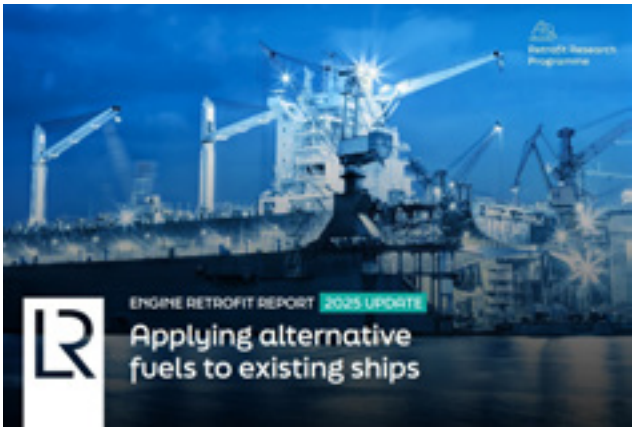
15150 ISM
07103 Division – decks, bulkheads and penetrations
15109 Maintenance of the ship and equipment
14104 Oil filtering equipment
07105 Fire doors/openings in fire-resisting divisions
07106 Fire detection and alarm system
07109 Fixed fire extinguishing installation
13199 Other (machinery)
04107 Emergency towing arrangements and procedures
04121 Crew familiarization with Emergency Systems
07108 Ready availability of firefighting equipment
07115 Fire-dampers
07125 Evaluation of crew performance (fire drills)
13101 Propulsion main engine
13103 Gauges, thermometers, etc

Paris MoU Inspections for Fourth Quarter 2024
The Paris MoU inspections during the period 1 October to 31 December 2024 have increased compared to the fourth quarter in 2023. The number of inspections has decreased compared to 2022 and 2021 for the same period. The Paris MoU had 172 detentions for this period. Only six of those detentions were on ABS classed vessels.

Tokyo MoU Inspections for Fourth Quarter 2024
The Tokyo MoU inspections during the period 1 October to 31 December 2024 have remained the same compared to the fourth quarter 2023. The number of inspections has increased compared to 2022 and 2021 for the same period. The Tokyo MoU had 281 detentions for this period. Of these detentions, 14 were on ABS classed vessels.

Total Worldwide USCG Detentions for Fourth Quarter 2024
The USCG had 12 detentions for the period 1 October to 31 December 2024. Only two detentions were on an ABS classed vessels during this period.

Download the report in full at **https://bit.ly/3EBBsKD**.



Lack of green fuels questions engine retrofits says new study

Lloyd's Register (LR) has issued an update to its Retrofit Research Programme, with the latest report focusing on the developments in Engine Retrofitting for alternative fuels.

While the maritime industry has seen positive developments, such as increased methanol fuel conversions and shipyard retrofitting capabilities since 2023, the adoption of alternative fuels faces a significant hurdle.

Regulatory pressures, such as the EU's FuelEU Maritime and Emissions Trading System (ETS), are in place, yet the lack of robust incentives for fuel producers is slowing down the demand and overall transition. This disparity is creating a gap between regulatory push and market pull.

The latest report leverages our in-depth data collected over the past year, highlighting the advancements, emerging trends, and current status of this rapidly evolving technology, which the shipping industry is actively exploring to decarbonise the existing fleet.

Request a copy of the report at **https://bit.ly/3FEMTll**.

NEW marine reports and guides

New report data highlights urgency of maritime industry in tackling growing cyber threats

Only 1 in 6 shipowners fully understand what a cyber-secure vessel should look like upon delivery, highlighting a critical gap in the industry's approach to maritime cybersecurity. The report, jointly published by Thetius, CyberOwl, a DNV company and HFW, explores key stakeholder challenges and approaches to managing cybersecurity across the lifecycle of a vessel.

The Lifecycle Dilemma: Navigating Cybersecurity Risks Across Designing, Constructing and Operating a Vessel delves into the shifting risks and disconnected approaches in cybersecurity across each stage from initial design through to its operation and maintenance. It outlines the roles, responsibilities, challenges and misconceptions of various stakeholders at each stage of the vessel lifecycle.

The report launches at a time of growing cyber risks for the shipping industry. Increasingly sophisticated cyber criminals and new system vulnerabilities are arising as a result of a more connected world. Designing a vessel with cybersecurity in mind is not just optional but a necessity.

The Lifecycle Dilemma emphasises the need to embed cybersecurity into every stage of a vessel's lifecycle, starting with a secure-by-design approach.

This report consolidates the opinions of more than 150 stakeholders, including shipowners, charterers, OEMs, seafarers, insurers, shipyards, and other cybersecurity experts. It provides a detailed assessment of the current and anticipated cybersecurity challenges. It evaluates the industry's responsiveness to evolving regulatory demands and technological progress, emphasising the critical need for integrated cybersecurity practices throughout the vessel lifecycle, from initial design to ongoing maintenance.

In light of the growing cyber threats facing the maritime industry, The Lifecycle Dilemma is set to be an indispensable resource in navigating these challenges, driving critical discussions and actions needed to enhance cybersecurity protocols and protect global maritime operations.

Click to apply to download the free report at **https://bit.ly/4iAijHL**.

Climate Adaptation Report published by the UK Canal & River Trust

Recently published, a new report produced by the Canal & River Trust aims to show how vital the UK's waterway network can be as the Government tries to tackle climate change. The 30-page Climate Adaptation Report spells out how important canals and waterways are and how they can be part of action against problems such as storms, flooding and drought, which have badly affected areas of the UK.

It highlights how the 2000 miles of canals and waterways, and 84 reservoirs, across England and Wales have adapted from their original roles and can now become a vital infrastructure as the country deals with climate change threats. The Climate Adaptation Report also claims the charity will need an extra £15 million a year to combat global warming.

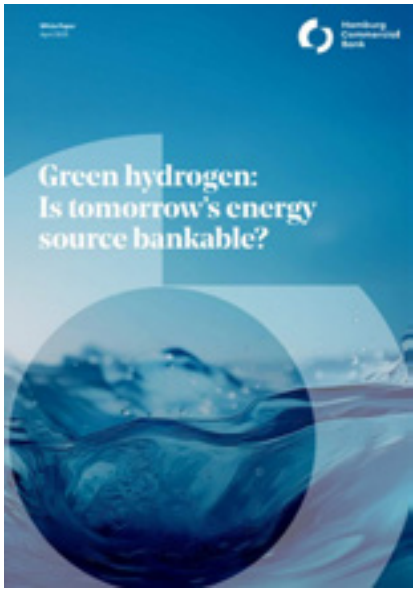
Richard Parry, chief executive of Canal & River Trust, said: "Our historic canal network fulfils a range of uses far beyond what was anticipated when the canals were first dug by hand. Many people don't realise that these man-made waterways carry out so many important functions and need constant care and maintenance to keep them open and available to all. Linking towns and cities across the country and on the doorstep of millions of people, it is important for canals to be part of the Government's national climate change reporting framework."

The Climate Adaptation Report, which has been submitted to the Government, states that the canal network was the most important infrastructure project of its day, making the Industrial Revolution possible. It says: "A legacy of that pioneering engineering, today's navigable canals continue to be repurposed and are at the heart of many communities, providing a range of economic, social and environmental benefits on the doorstep of around 10 million people.

"The places around canals have also changed beyond recognition and continue to be a focus for development and regeneration, making the canal network an enabler for growth. Meanwhile, the canals themselves are vital conduits for critical national infrastructure including pipes and cables for the UK's energy, telecommunications and water supply networks."

The Climate Adaptation Report provides evidence into how climate change affects the canal network and its associated structures and habitats, now and in the future. It shares the top 12 biggest risks, including flooding, drought, subsidence, structural damage and ecological degradation, and describes how the Canal & River Trust manages them, illustrated by case studies.

Download the report in full at **https://bit.ly/3FcFVo0**.



HCOB white paper: Green hydrogen – Is tomorrow's energy source bankable?

In its recently published white paper, Hamburg Commercial Bank (HCOB) explores "Green Hydrogen: Is tomorrow's energy source bankable?" and considers the prospects for green hydrogen and the conditions that need to be met to make hydrogen projects bankable. "Green hydrogen will play an important role in the transition to a low-carbon economy. It provides CO2-neutral energy and is particularly attractive for industries that have high energy requirements and are difficult to decarbonize," says Hans Lötzer, Head of Project Finance Analysis at HCOB and co-author of the white paper.

The European Union (EU) has set itself the target of producing ten million tons of renewable hydrogen by 2030, as well as importing the same amount. According to the latest data from the International Energy Agency (IEA), the EU is currently lagging far behind in achieving its energy targets. There are also bottlenecks in the green hydrogen value chain. "Uncertainties such as access to large amounts of renewable energy for green hydrogen production, as well as offtake and transportation are slowing down investment in green hydrogen projects," explains Hans Lötzer.

"If green hydrogen is to make a significant contribution to the decarbonization of industry, it must be produced cost-effectively and in large quantities," says Marco Schweer, Executive Director Project Finance at HCOB and co-author of the white paper. "This goal requires enormous investments from both the public and private sectors. To overcome these challenges, investors need a clear regulatory framework and long-term purchase agreements with users and feedstock suppliers. These contracts are crucial to minimize investment and financing risks and ensure sustainable demand."

Download the whitepaper at **https://bit.ly/4cxrtTG**.

Industry Associations issue consolidated BMP Maritime Security publication

BMP Maritime Security has been published by a series of industry Associations, including BIMCO, ICS, IMCA, INTERCARGO, INTERTANKO & OCIMF supported by over forty maritime stakeholders. It is a consolidated and enhanced publication Best Management Practices (BMP) for Maritime Security (MS).

NEW marine reports and guides

The BMP Maritime Security consolidates previously published regional publications into a single, comprehensive publication with actionable insights and advice. It focuses on providing a threat and risk management process and, recognising the dynamic nature of regional security situations, provides signposts to direct users to the most up-to-date security intelligence and risk assessment information. BMP MS is now available to view on the industry website here.

The guide provides comprehensive information on maritime security, covering a range of essential topics. It begins with an overview of maritime security threats, followed by detailed instructions on conducting threat and risk assessments. The guide also offers guidance on effective planning, mitigation measures to protect against risks, and incident response procedures. Post-incident protocols are included to ensure proper follow-up actions.

Additionally, the guide features annexes on reporting and information centres, seafarer welfare support, and a maritime lexicon with abbreviations for easy reference.

The fundamental requirements of BMP Maritime Security
To counter the threat, existing BMP guidance has greatly improved the industry's ability to understand, detect, and deter maritime security threats in recent years, but the advice needs to keep pace with the rapidly evolving threat environment. In BMP Maritime Security, users can navigate easily to different sections and link directly to external sources.

1. Understanding the Threat
- Dynamic nature: Maritime threats are constantly evolving.
- Current information: Obtaining up-to-date information is crucial for effective threat and risk assessment and decision-making.

2. Conducting Risk Assessments
- Assessment: Companies must conduct thorough threat and risk assessments.
- Ship mitigations: Identify and implement measures to protect the crew and ship.
- Crew training: Ensure the crew is well-briefed and trained.
- Situational awareness: Know your operating environment.
- Guidance: Comply with Flag State requirements, industry guidance, and implement military recommendations where appropriate.

3. Reporting
- Voluntary registration and reporting: Register and report to regional centres as appropriate.
- Incident reporting: Report incidents and suspicious activities to recognised reporting centres and the Flag State Administration.
- Distress signals: Send distress signals when under attack.

4. Cooperation
- Shipping and military forces: Cooperate with other ships and military forces as necessary.
- Law enforcement: Work with relevant law enforcement and authorities to preserve evidence.
- Welfare providers: Collaborate with welfare providers to provide psychological and/or logistical support.

Additionally, the publication includes various diagrams that provide valuable learning opportunities. The publication includes a significant section detailing global authorities and, importantly, appropriate contacts and tools for seafarer welfare support.

Civil Nuclear Report - Advanced Maritime Nuclear

A new paper proposes framework to support UK development of advanced, safe, small nuclear reactors as a reliable and scalable zero-emission maritime power source.

The UK is well positioned to lead the safe development and deployment of new nuclear power systems for commercial ships and Floating Nuclear Power Plants (FNPPs), according to a new report from CORE POWER, NorthStandard and Lloyd's Register (LR).

Technology company CORE POWER, global marine insurer NorthStandard and maritime professional services provider LR have jointly published Advanced Maritime Nuclear: A unique opportunity for the UK. The new paper sets out a policy framework for the UK Government to support the deployment of advanced small nuclear reactors on commercial ships and FNPPs.

The Department for Transport should include nuclear-powered shipping and FNPPs in an updated Clean Maritime Plan (CMP) and long-term nuclear strategy, the report argues.

Global shipping currently depends on fossil fuels for close to 99% of its energy consumption, but the International Maritime Organization (IMO) is aiming for its greenhouse gas (GHG) emissions to

reach net zero by around 2050. However, alternative fuels options (including biodiesel, methanol, hydrogen and ammonia) face major cost, production, transportation and use challenges.

In the foreword to the paper, Lord Mountevans comments: "The UK has the skills, expertise, and history of innovation to lead the development of nuclear-powered shipping. By leveraging our decades of experience with small reactors for the Royal Navy, we can decarbonise maritime transport, create jobs, and strengthen Britain's position as a clean energy world power."

The UK pledged to triple nuclear energy generation capacity at COP 28. The Civil Nuclear Roadmap to 2050, published by the last government, envisaged nuclear technologies, from Advanced Small Modular Reactors (A-SMRs) to large-scale nuclear plants as part of the UK's energy mix. These new, safe and advanced nuclear technologies in modular designs, which allow for straightforward manufacturing and regulatory approval processes that enable dramatic energy efficiency gains for global shipping. NorthStandard's participation in the new paper reflects the role commercial insurability will play in future nuclear operations in the civil maritime space, particularly to cover shipowners' liability.

Download the report at **https://bit.ly/41ymNsE**.

Plugging AI skills gaps critical for future of shipbuilding industry

Addressing anticipated skills shortages in artificial intelligence (AI), robotics, and automation is essential to the future of the shipbuilding sector, according to a new report by the National Manufacturing Institute Scotland (NMIS), operated by the University of Strathclyde and based at the Advanced Manufacturing Innovation District Scotland (AMIDS) in Renfrewshire.

Developed with industry partners and Innovate UK's Workforce Foresighting Hub, the report highlights the need to equip the workforce with the skills required as the industry evolves and adopts new technology. It looks ahead to the next five years and beyond, emphasising the importance of adapting both traditional roles and emerging ones.

While automation and robotics are already used in a variety of tasks by shipbuilding companies, the team behind the foresighting work found that demand for technology to assist with welding, joining, and inspections in confined or hazardous spaces is only likely to increase.

For example, the roles of some welders will evolve to combine traditional skills with expertise in new technologies and materials, as advanced technologies such as robotics and additive manufacturing are integrated into operations. This transition underscores the need for a collaborative approach between industry and training providers to design programmes that prepare workers for these hybrid roles.

To ensure that employees are ready to work with technology of this kind, updated training modules, short courses and continuous professional development (CPD) programmes are among the recommended actions to bridge gaps in current knowledge and skills within the workforce.

The report includes several future occupational profiles or job descriptions – from quality and compliance roles to engineering and systems design – which can be used by manufacturers to evaluate any gaps between existing roles and future requirements, allowing training and apprenticeship standards to be adjusted accordingly.

Greg Cranstoun, industry and skills engagement lead at NMIS, said: "Scotland has a deep-rooted history of shipbuilding, particularly on the Clyde, next to where NMIS is based, but the challenges of a skills shortage apply to the whole of the UK.

"Technology is only going to become more prevalent as the adoption of AI and robotics increases in all sectors, and there are significant gains that could come from using advanced equipment to improve both health and safety and productivity in shipyards."

In addition to the focus on shipbuilding, findings from the report may be relevant to employers in other sectors where similar technology can be applied, including offshore wind, oil and gas, construction, and transport.

Read the full report at **https://bit.ly/4i13PB2**.

EU assesses potential inclusion of small ships under EU MRV

The European Commission has published a report assessing the potential inclusion of small ships between 400 and 5000 gross tonnage under the scope of the EU regulation for the Monitoring, Reporting and Verification (MRV) of maritime greenhouse gas (GHG) emissions. The analysis identifies that over 5300 smaller vessels, which are emitting around 11 million tonnes of CO2 every year, are currently not covered by the legislation.

In line with the Commission's commitment to avoid disproportionate administrative burden, the analysis examined the administrative cost of MRV procedures. Recurring annual MRV-related administrative costs for smaller vessels are projected to be similar, if not slightly higher, than for larger vessels. Consequently, the balance between administrative costs and additional monitored GHG emissions is less favourable for smaller ships. In turn, the report notes that the net present value of additional administrative costs for companies and competent authorities is higher than the monetary potential of GHG emission savings attributable to the MRV maritime Regulation alone.

Yet, the analysis suggests that these findings could shift if the GHG emission savings from the possible integration of smaller vessels in other GHG mitigation policies, such as the EU ETS and FuelEU, were considered. Additionally, an assessment of these potential additional benefits will be considered in the context of the 2026 review of the EU ETS Directive.

EU assesses potential inclusion of small ships under EU MRVThe GHG emissions associated with:

1. The most emitting vessel categories represent a 4.2% increase (i.e. 5.61 MtCO2) compared to what is included in the revised MRV scope (i.e. including emissions from general cargo and offshore vessels between 400 and 4,999 GT to be added from 2025).

2. Including all vessel categories except the ones exempted by MRV would lead to a marginally higher emissions coverage compared to scenario 1, with an increase of 4.6% (i.e. 6.19 MtCO2) compared to the MRV revised scope.

3. The option to expand also to other categories Including all vessel categories (including categories currently excluded from MRV) would lead to a more significant expansion in the emissions coverage with an 8.4% increase (i.e. 11.32 MtCO2).

Direct energy and GHG emissions savings

Even though the MRV maritime Regulation does not impose direct limits on emissions or mandate emission reducing practices, an expansion of the MRV scope would be expected to lead to direct energy and GHG emissions reductions due to the potential of MRV data to help overcome some of the existing market barriers, which can unlock the adoption of technical and operational energy efficiency improvements.

A conservative 0.7% cumulative reduction rate was assumed to apply to baseline GHG emissions from smaller vessels included in the MRV scope within the period 2025-2050. This would lead to relatively small cumulative GHG emission savings.

Download the report at **https://bit.ly/4hv7upF**.

Engine room fires are still a major concern

Written by Gard experts Siddharth Mahajan, Kim Watle and Svend Leo Larsen

Gard saw five fires originating in the main and auxiliary engines in the first month of 2025 alone. Tragically, some of these fires resulted in fatalities and serious injuries to seafarers. While it is too early to draw any conclusions about how the rest of the year will go, it may be helpful to review experiences from recent years. Although the main cause of these fires may not be identical, there are certain similarities in the underlying patterns of the fires.

Introduction

Every year fires on board ships lead to loss of lives and severe damage to the vessels themselves. Most fires on board ships originate in the engine room where the three ingredients for a fire, namely fuel, oxygen and a source of ignition, exist in abundance. These do not only start the fire but also feed and intensify it further. Fire safety is not only about detecting and fighting a fire, but also about preventing it from igniting in the first place.

In this article we will focus on how these fires can be prevented. We will touch upon some of the main causes of engine room fires and explore insights from our claims data to understand the frequency of such fires before setting out some recommendations on how to mitigate the risks of these fires occurring.

How do most engine room fires start?

A review of Gard's hull and machinery (H&M) claims for the years 2017-2024 related to fires and explosions on vessels, shows that nearly 60% of all such fires originated in the engine room. Nearly two thirds of these engine room fires occurred on the main and auxiliary engines or their associated components such as turbochargers. The majority of these incidents were caused by a failure in a flammable oil system, most often in the low-pressure fuel oil piping, allowing spray of oil onto an unprotected hot surface.

Following is an example from our claims portfolio.

Case study

A copper pipe that was part of the fuel oil pressure gauge supply pipework for one of the auxiliary engines fractured. Due to a missing metal spray shield the fuel sprayed onto the unprotected hot surfaces of the nearby turbocharger and the exhaust system which had temperatures of more than 400 °C. The fuel ignited causing extensive damage to auxiliary engines and power distribution cables. The vessel was out of service for 40 days to carry out repair works.

Investigation by experts showed that the copper pipe that fractured did not match the original design and had a lower wall thickness. There was no record of any previous repairs carried out to the fuel system pipework. The pipe assembly on the other three auxiliary engines appeared to be of original installation comprising of a steel pipe. The spray shield was removed during maintenance and not re-installed. Insulation was also suspected to be inadequate since exposed sections around the exhaust manifold and turbocharger were noticed on other three auxiliary engines. The investigators concluded that the heat shielding arrangements on the fire damaged auxiliary engine did not meet the relevant SOLAS regulations, II-2/2.2.6.1.

Fire damaged area of auxiliary engine

Fractured copper pipe

In this case, there are two main aspects which need to be highlighted.

- *First* is the leakage of flammable oil; and
- *Second* is the inadequate protection to prevent highly flammable fuel from coming in contact with a source of ignition.

Leakage or spray of fuel due to a failure in the oil system

Below we list some of the most commonly occurring causes of fuel spraying from low pressure piping systems. The list is by no means exhaustive, but a review of past Gard cases has shown that below listed failures occur frequently.

- Piping, piping connections and other associated components, such as o-rings, were not original parts or of a type recommended by the manufacturer. In some cases, modifications had been done by the crew under existing management, whilst in others the crew were not aware of such modifications as they had been done under previous ownership or management.
- Piping connection had not been tightened to the required torque and with time it loosened due to, for example, vibrations. Another reason may be incorrect assembly after maintenance.
- Bolts for flanges or filters breaking due to fatigue caused by overtightening over a period of time. In some cases, securing bolts were also found loose or missing altogether.
- Fatigue fracture of pipes. Such pipes are typically not well supported along their entire length, which causes excessive stress due to vibrations. Lack of support may be attributed to the design or failure to reinstall the holding brackets after maintenance.
- Fuel oil filter covers coming loose and displacement of the spindle from the top cover for various reasons.
- Rupture of rubberized hoses due to degradation caused by the heat generated from nearby machinery, or use of non-original spare part.
- Engine manufacturers' design improvement recommendations not implemented

Oil coming in contact with hot surfaces

- Shielding can either be by insulating hot spots with thermal insulation or anti-splashing tapes, and/or by using physical barriers such as spray shields.
- The potential risks associated with the proximity of fuel oil/ lubricating oil piping installations to hot surfaces may not be comprehensively addressed during the newbuild stage by the shipyard or the vessel's classification society.

Some typical issues with insulation which we have seen in our claims portfolio are:

- the quality may differ from yard to yard, it can deteriorate with age;
- it may not have been fixed back properly after maintenance, and
- it can become soaked with oil over a period of time due to minor leakages.

As for physical barriers:

- they may not have been part of the original design and therefore not fitted, or
- where fitted, they may not have been installed back in place after maintenance has been carried out on the oil system, as in our case study, and as time passes may even be misplaced.

Older vessels need more attention

One of the factors which must be considered when assessing fire risks in engine rooms is the age of vessels. The risk of leakages from machinery may increase as ships grow older. We discuss this further below but highlight here some of the main issues that can increase the risk of fire in the engine room on older vessels.

- Protection of hot surfaces may degrade, thereby increasing the probability of ignition and risk of fires.
- Older vessels can face cuts to their maintenance and safety budgets as they near the end of their service life.
- A vessel may have changed ownership and management a number of times during its life, and this can have a direct impact on the consistency of maintenance in the engine room.
- Older vessels may lack the advanced fire detection and suppression systems found on newer ships.
- Sourcing spare parts for older machinery can be difficult and expensive, potentially leading to delays in repairs and the use of less reliable temporary fixes

Typical hotspots in the engine room

Based on previous fire incidents handled by Gard, we have found that the below listed areas acted as a source of ignition in most cases. The temperature of these areas can easily exceed 500 °C which may be well above the oil's auto ignition temperature.

- Exhaust manifold, pipes and associated flanges
- Exposed areas of boilers
- Turbochargers
- Indicator valves on cylinders
- Heater for purifier units
- Electrical wires/components and switchboards. Melting or smouldering of cables can also contribute to the transmission of heat

Data insights – do the numbers tell their own story?

In Gard, when analyzing trends, we, just like Cefor (The Nordic Association of Marine Insurers), follow closely the frequency trends of incidents over a given time period. This way we are also able to account for the growth in our portfolio from one year to the next. From 2017 to 2024, main engine fire frequency has shown a slight downward trend, while auxiliary engine fires have remained steady.

Between 2017 and 2024, main engine fires occurred on an average of 0.07% of vessels annually. This translates to approximately 7 fires per 10,000 vessels each year. While this percentage may seem low, the consequences of such fires are severe, impacting human life, the environment, and causing substantial financial losses. Auxiliary engine fires were slightly less frequent at 0.04%.

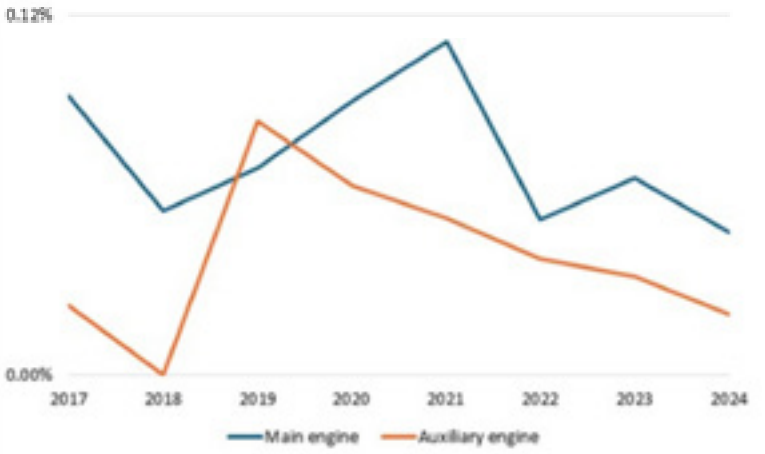
Vessel Segment: Do specific vessel types present a greater risk of machinery fires?

Passenger ships experience the highest combined frequency of main and auxiliary engine fires, and among cargo vessels, car carriers and container vessels experience a higher frequency of such fires, possibly due to a higher number of auxiliary engines on all these ships compared to other vessel types. Bulk carriers, on the other hand, generally demonstrate better performance in this area. When examining the various size segments within cargo ships, the mid-size vehicle carrier segment (10k – 20k dwt) and Container Intermediate 2 segment (6,000-8,000 teu) had the highest main engine fire frequency. Whereas, for auxiliary engine fires, it is the container feeder segment (<3,000 teu).

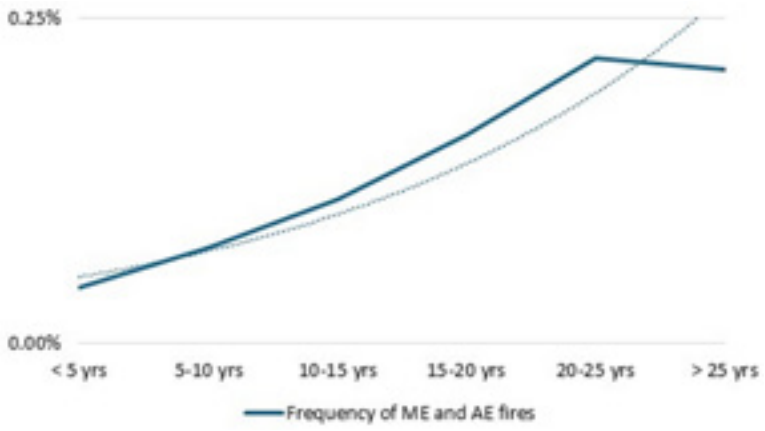
Age as a factor

As previously discussed, vessel age is a significant factor in fire risk assessment. Our data reveals a higher incidence of engine room fires in older vessels, as shown in the graph.

Interestingly, concentrated inspection campaigns (CIC) by Port State Control MoUs on 'Fire Safety' carried out in 2023 concluded that the rate of detention for vessels failing certain CIC items seemed to increase as ships get older. See the Paris MoU report and Tokyo MoU report.



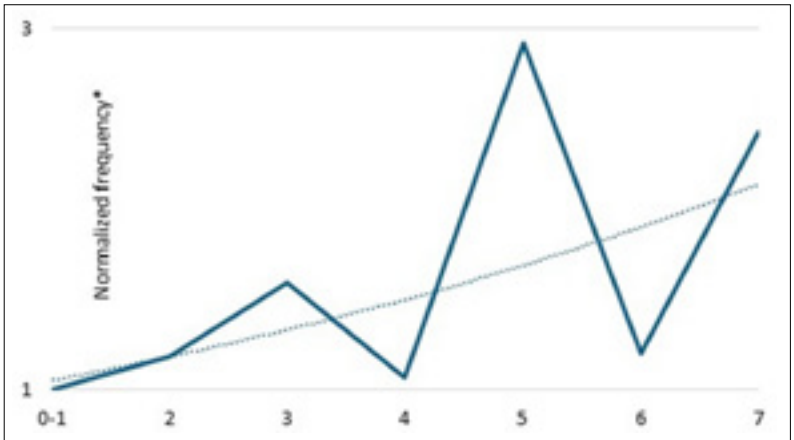
Frequency of engine fires (GARD H&M data)



Frequency of engine fires by age of vessels (GARD H&M data)

Poor port state inspection performance linked to increased fire risk

Ships accumulating more deficiencies per inspection over the three years preceding an incident face a heightened risk of fire in their main or auxiliary engine. This risk increases with the number of deficiencies. Numerous deficiencies might be indicative of a broader problem with maintenance on board and safety culture within the organization. It's important to note that beyond seven deficiencies per inspection, the available data becomes too limited.



Number of deficiencies per PSC inspection

Note: Normalized frequency shows the relative risk of an engine fire for vessels with different numbers of deficiencies per inspection, using vessels with '0-1 deficiencies per inspection' as the baseline. For example, vessels with 5 deficiencies per inspection have nearly 3 times the risk.

Recommendations

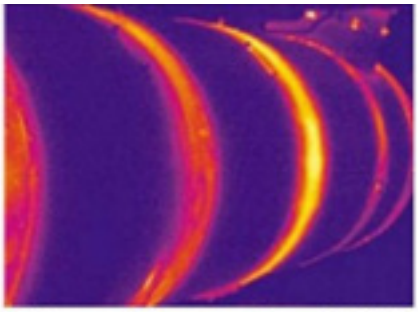
Failure in an oil system followed by deposit of oil onto a high temperature surface is the leading cause of engine room fires. We have the following three key recommendations which can help owners, managers and their crew reduce the risk of such fires occurring.

1. Identifying sources of leakages

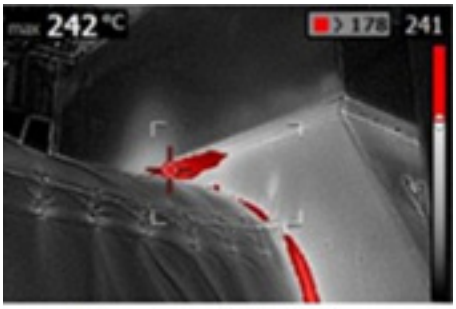
Checking fuel and lube oil pipes for loose fittings, missing bolts on flanges, non-metallic hoses in areas where the temperatures can exceed the oil's ignition point etc., from where oil can spray onto hot surfaces should be part of the vessel's planned maintenance system. It is recommended that the assessment to identify potential sources of leakages be done on a regular basis. Also look out for whether the components of the oil piping system are original and meet the manufacturer's specifications. This is particularly important when taking over a second hand ship either under management or ownership.

2. Mapping hot surfaces using thermography

Owners/managers should incorporate the use of thermography onboard for detection of hot surfaces and for checking insulation during normal operations. Owners should consider including thermographic examinations in new building specifications and have such tests carried out during sea trials. A thermographic examination of the engine room and the vessel's electrical installation should be carried out periodically with engines and electrical equipment running. It is important to note that spot thermometers have limited effectiveness, as they only measure the temperature at a single point.



Thermo of the exhaust manifold of the main engine shows a max. temperature of 250°C.



Exhaust manifold showing a max. tempetuare of 242°C.

The UK Marine Accident Investigation Branch (MAIB) has recommended that the UK Maritime & Coastguard Agency (MCA) submit a proposal to the International Maritime Organization (IMO) requiring the use of thermographic equipment to identify exposed high-temperature surfaces. Additionally, classification societies offer voluntary notations for fire protection in machinery spaces that require the use of thermal cameras for hotspot detection. This raises the question within the industry of whether current statutory regulations and Class rules adequately address the regular identification of machinery space hotspots.

3. Shielding hotspots

Insulation: As materials used to insulate high temperature surfaces may degrade over time or become oil-soaked, regular checks should be carried out. Even if the insulation of an exhaust pipe / system appears to be in good order, there may be hidden inadequately insulated areas and smaller open hot spots which could start a fire if in contact with oil.

Spray shields: The position and condition of spray shields for both high- and low-pressure flammable oil lines should be checked regularly, as should the drainage arrangements for jacketed fuel oil pipes. Where spray shields are not included in the original design and the area has been identified as a potential 'source of oil leakage', then the installation of spray shields should be considered. Particular attention should also be given to the immediate and proper refitting of spray shields and insulation materials upon completion of maintenance.

Spray shield around the pressure damper on auxiliary engine

Shielding to protect the turbocharger

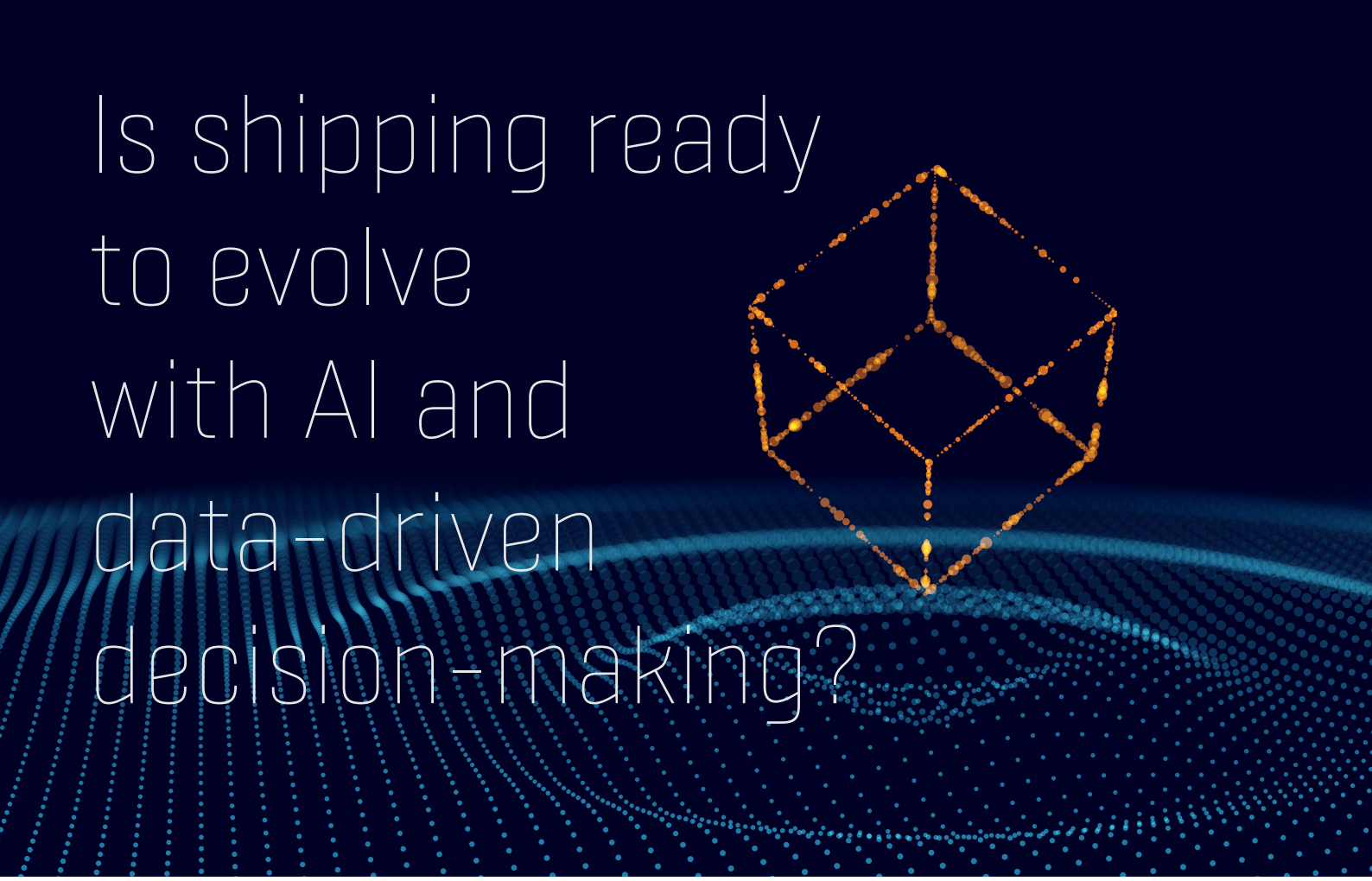
Guard fabricated to cover fuel system buffer (damping) tank

Referring to our initial case study above, making sure that the piping met the original specs, reinstalling the spray shield after maintenance, and using thermography to identify the exposed sections in the insulation around the turbocharger and exhaust manifold of the auxiliary engine would have prevented the fire from occurring.

The engagement of external assistance to conduct these reviews may, from time to time, be considered to provide an independent assessment of potential fire safety hazards within the engine room.

First published 13 February 2025 https://gard.no/insights/

Is shipping ready to evolve with AI and data-driven decision-making?



Decades after other industries embraced digital transformation, shipping still relies on email chains, phone calls, and gut feel. But AI and data-driven decision-making are starting to challenge the status quo, forcing companies to rethink how they operate.

Some shipowners and operators see AI as a buzzword. Others see it as an existential threat. The reality? AI is neither magic nor a job killer. It's a tool that can finally bring logic, transparency, and efficiency to an industry that's been built on relationships and intuition rather than data.

The problem: decisions based on instinct, not intelligence

Shipping has never been a data-led industry. Chartering managers, bunker buyers, and fleet operators make multi-million dollar decisions daily, often without real-time data or historical benchmarking.

A bunker procurement manager, for example, might buy fuel based on a few WhatsApp quotes, comparing offers in their head rather than through a structured system. An operator might adjust a ship's speed based on personal experience rather than predictive analytics. A charterer might pick a fixture based on the strength of their broker relationship rather than hard market data.

These aren't necessarily bad decisions, these are the best decisions people can make with the information they have. But that's exactly the problem. Too many critical decisions are still being made with incomplete, outdated, or biased information.

AI is already proving itself

AI isn't some futuristic concept, it's already proving its value in shipping. Some of the most forward-thinking companies are using AI-driven routing models to cut fuel consumption, optimize speed, and avoid congestion. Others are applying machine learning to detect vessel performance anomalies before they turn into costly breakdowns.

Take predictive maintenance. By analyzing engine performance and historical failure patterns, AI can tell shipowners when a part is likely to fail, long before it becomes a problem. This isn't hypothetical. Maersk, for example, has been using AI to reduce unplanned maintenance and improve vessel uptime.

Another clear use case is AI in chartering. Today, a human broker or charterer has access to a fraction of the data that AI can process in seconds. AI tools can scan thousands of past fixtures, market conditions, and vessel positions, flagging optimal deals that might have been missed in a manual search.

Why adoption is slow

If AI is so effective, why isn't every shipping company using it? The biggest barrier isn't the technology, it's the mindset. Many decision-makers are skeptical, seeing AI as a black box rather than a reliable tool. Others don't want to change a system that has worked for them for years.

Then there's the data problem. AI is only as good as the data it's trained on, and too many shipping companies still rely on fragmented, inconsistent, or outright inaccurate data. A 2022 survey by Splash247 found that 68% of shipping executives rated their internal data management as 'poor' or 'very poor'. Without clean, structured data, AI can't deliver reliable insights.

And let's be honest, there's also resistance because AI threatens the way things have always been done. A charterer who's built their career on instinct doesn't want to be told that a machine can do their job better. A bunker trader who thrives on personal relationships doesn't want full price transparency to erode their margins.

Article written by Xmar. For more information about Xmar go to **https://www.xmar.com**.

The companies that embrace AI will win

Despite the resistance, AI adoption isn't a question of if, it's a question of when. The companies that embrace AI now will gain a competitive edge, reducing costs, improving efficiency, and making smarter decisions.

The best examples of AI adoption in shipping aren't replacing humans—they're empowering them. AI doesn't remove the need for experienced operators or traders, but it gives them better tools to make better decisions. The smartest companies aren't asking, 'Will AI replace my team?' They're asking, 'How can my team use AI to be 10 times more effective?'

As regulations tighten, margins shrink, and competition increases, the companies that embrace data-driven decision-making will outperform those that rely on outdated methods. AI isn't here to replace people, it's here to replace inefficiency. The only question is whether the industry is ready to accept it.

Platforms like XMAR are already proving that AI and data-driven decision-making can transform bunker buying. By providing full price transparency, structured negotiations, and real-time insights, XMAR is helping shipping companies move away from outdated processes and toward smarter, more strategic fuel purchasing.

Ensuring the safety of autonomous shipping

As autonomous shipping technologies have rapidly advanced, maintaining the highest safety standards is essential. DNV experts explain how this progress has led to the development of the Autonomous and Remotely Operated Ships (AROS) notations.

In December 2024, DNV announced the release of the Autonomous and Remotely Operated Ships (AROS) notations. The objective of the notations, which took effect from 1 January 2025, is to provide a framework for how autoremote vessels can achieve equivalent or higher safety compared to conventional vessels.

Multi-structured AROS notations

The AROS notations are broad and comprehensive. The scope of the rules is to define systematics and functional and procedural requirements for autoremote vessels and systems used on board and off-ship. This extends to the remote operating centre and the connectivity needed for autoremote vessel operations.

Autonomous and Remotely Operated Ships (AROS) family of class notations

Class Notations	MOO Qualifiers	LOC Qualifiers
4 Categories of Functions	4 Modes of Operation - MOO	3 Locations of Control - LOC
NAV - Navigation	**RC** - Remote Control	**OB** - Onboard Control
ENG - Engineering	**DS** - Decision Support	**OS** - Off-ship Control
SAFE - Safety	**SA** - Supervised Autonomy	**HC** - Hybrid Control
OPS - Operations	**FA** - Full Autonomy	

Source: DNV

Autonomous and Remotely Operated Ships (AROS) family of class notations

Autonomous shipping can be defined by three dimensions: location of control, [degree of] human involvement and degree of system independence. DNV divides each of these dimensions into four broad categories – remote control, decision support, supervised autonomy and full autonomy - which can be controlled from various locations. These categories can be applied to different functional areas: navigation, engineering, safety and operations.

The functions compositing AROS family of class notations

Defining autonomous shipping in different ways

These dimensions and categories define the concept of autonomy in different ways. Remote control refers to vessels where operations are carried out at locations other than the vessel, while decision support refers to on-board systems which act like a "co-pilot", analysing information and generating advice which is fed to an operator, who can then decide whether to act on this advice or not.

While remote control and decision support will always have human beings at the centre of the decision-making process, this begins to deviate significantly with the other categories. Supervised autonomy has similarities to decision support, but the system can act and make decisions without waiting for acknowledgement from a human. Nonetheless, a human operator is informed about the system's intentions in real time and can stop or override when necessary, something which only happens in exceptional circumstances in the case of full autonomy.

"The AROS notations acknowledge these different modes of operation, and these are central to their structure," says Mariah Kurtinaitis Joukes, Autonomous Shipping Senior Engineer at DNV.

Advancing autonomous shipping

While some features of autonomy have been present in shipping for the past decade, their implementation has rapidly advanced in recent years. Several pilot schemes have been tested for unmanned, fully autonomous vessels, while decision support systems are increasingly prevalent on conventional vessels. While the trend is undoubtedly moving towards more autonomy, the motivation and benefits vary depending on what kind of system is in place.

"Unmanned vessels provide a lot of freedom," says Are Jørgensen, Senior Principal Engineer, Digital Ship Systems at DNV. "You can take a vessel that is 80 metres long and reduce this to 20 metres by removing accommodation space and everything else associated with the crew. This reduces risk and enables leaner designs, so this has a lot of appeal for shipowners.

"At the other end of the scale, decision support systems are already helping to reduce the workload and stress levels of on-board crew and helping them to make better and safer decisions."

Environmental benefits of autonomous shipping

Increased autonomy can also lead to environmental benefits, a crucial consideration in a maritime industry exploring all possible routes to decarbonization. Decision support systems are already helping ship operators with route and speed optimization, maximizing the efficiency of vessels. Vessels with supervised autonomy and full autonomy can take this even further.

"Autonomous vessels and systems enable you to take many more parameters into account when plotting a route," says Jørgensen. "For example, this can help you achieve just-in-time arrival at port. If a ship operator knows that port entry will be delayed, they can take a longer route where, for example, there is more of a tailwind. This can also work for optimization of fuelling, and many other things, like considering the impact of the weather upon arrival time. The sky is the limit."

Safety at the heart of the AROS notations

At the heart of the AROS notations is the need to verify autonomous vessels as being as safe or safer than conventional vessels. "While humans are often the cause of incidents on conventional vessels, they

can also prevent smaller incidents becoming catastrophes," says Jørgensen. "So, in order to improve safety, we need the autonomous systems to be very robust and resilient.

"This is where we are trying to get to, and it is central to the framework that we have established with the AROS notations."

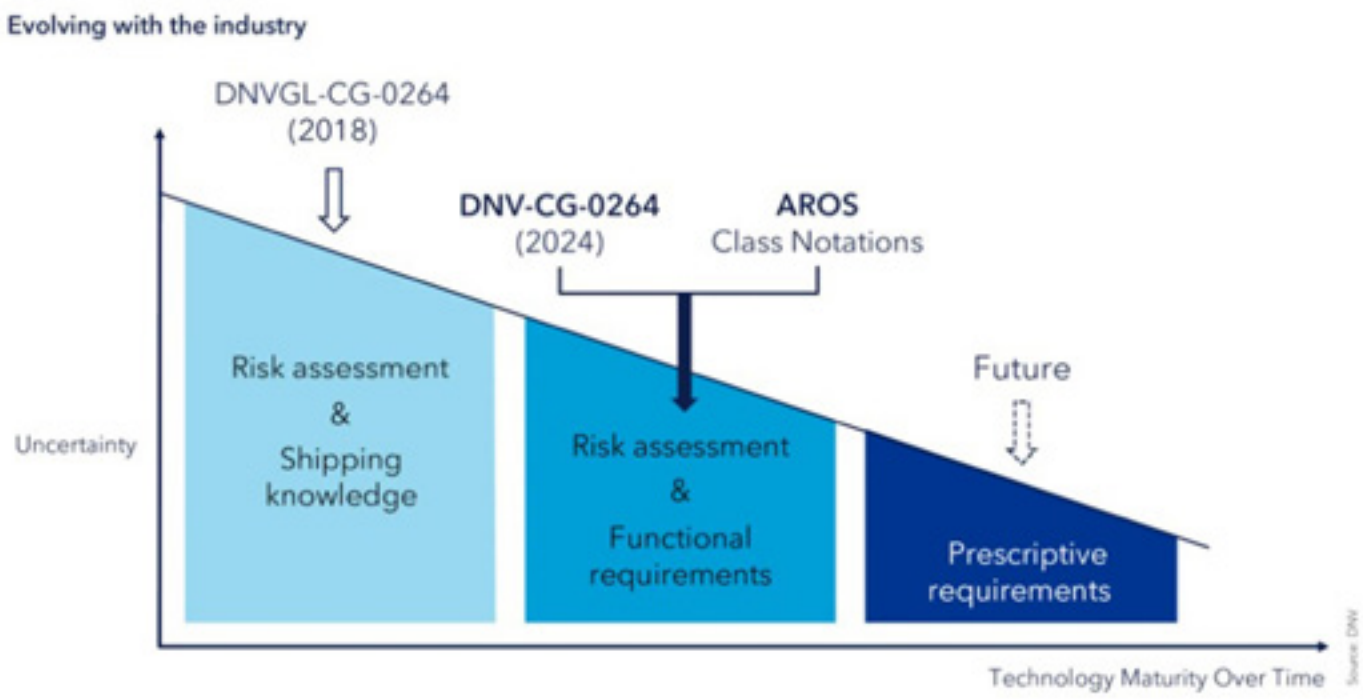
Lightly regulated autonomous shipping

Autonomous shipping is still a lightly regulated space. IMO is currently addressing this by developing a code for Maritime Autonomous Surface Ships (MASS) – a definition which aligns with DNV's definition of "autonomous and remotely operated vessels". MASS is expected to be voluntarily applicable from 2025, but not mandatory until 2032. Without regulation, the development of autonomous vessels has up to now been based on a broader, more abstract risk-based approach, applying guidelines from IMO Resolution 1455.

"This basically means that if there are no existing rules to follow, you then need to describe what you want to do, identify the associated risk and then take actions to de-risk," says Joukes. "At DNV, we have been acting as a third-party verifier on a number of autonomy projects, based on this risk-based approach, and this has given us important knowledge which we have used to structure the AROS notations."

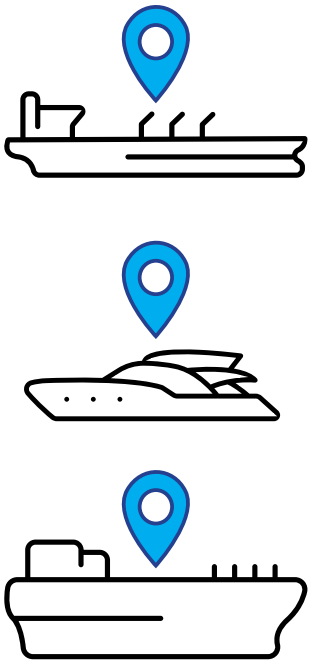
Building on the DNV guidelines

"There are two parts to the notations," says Joukes. "One part is that it recommends clients to follow a risked-based process, which has already been described in DNV guidelines for autonomous shipping, and the second is based on functional requirements."



For this risked-based element, the AROS notations build on the process-orientated DNV guideline (DNV-CG-0264) for autonomous shipping, which has been in place since 2018. Importantly, this contains process descriptions for both concept qualification and system qualification. Both are systematic, risk-based assessments used in the development of novel technologies that ensure these technologies are safe, reliable and ready for market.

According to Jørgensen, going through these processes is a central part of the journey for developers of autonomous vessels wishing to be awarded the AROS notations. "While the notations apply some specific requirements, the nature of autonomous ships means there are many novel concepts which cannot be fully covered by requirements, particularly as we expect many innovations and technological developments in the future. This is why the risk-based approach is such a key part of the notations. It is not prescriptive in nature and is deliberately broad."



Using previous experience to build the AROS notations

Based on previous experience in applying the risk-based approach, three things have been fundamental in creating the AROS notations.

Firstly, some patterns have emerged regarding functionality, and this has been very important in gaining a better understanding of how autonomous ships operate.

Experience has also taught the project team to carry out a better and more structured risk analysis. This led to more focus on the follow-up of identified risks to ensure that these are mitigated in a good and traceable way.

As a thought leader in autonomous shipping, DNV has been involved in pioneering research projects such as the ReVolt concept, which have provided key insights leading to the development of the AROS class notations.

Identifying the need for a flexible approach has also been crucial. This creates the option for DNV to carry out a safety evaluation of pilot test phases in the overall process. "In some cases, the concept owner or system supplier doesn't really know what they're going to do until they have tried and failed a bit. This allows them to try and fail in a safe way," says Jørgensen.

Development of key functional requirements for autonomous systems

Taking the knowledge and experience of working on autonomous projects, and identifying key patterns, DNV has developed some key functional requirements for autonomous ships, the second main pillar in the AROS notations. These complement the risk-based approach by drawing some lines in the sand with some fundamental rules.

"These functional requirements vary, depending on each system and which kind of notation is being sought," says Joukes. "Generally though, this includes the expectation that vessels holding the AROS notations will be able to respond to abnormal events, and the requirement that vessels can monitor and respond to incidents which can result in harm to people, the environment or the vessel itself."

Like the risk-based approach, these rules are expected to evolve in step with developments in the autonomous shipping space.

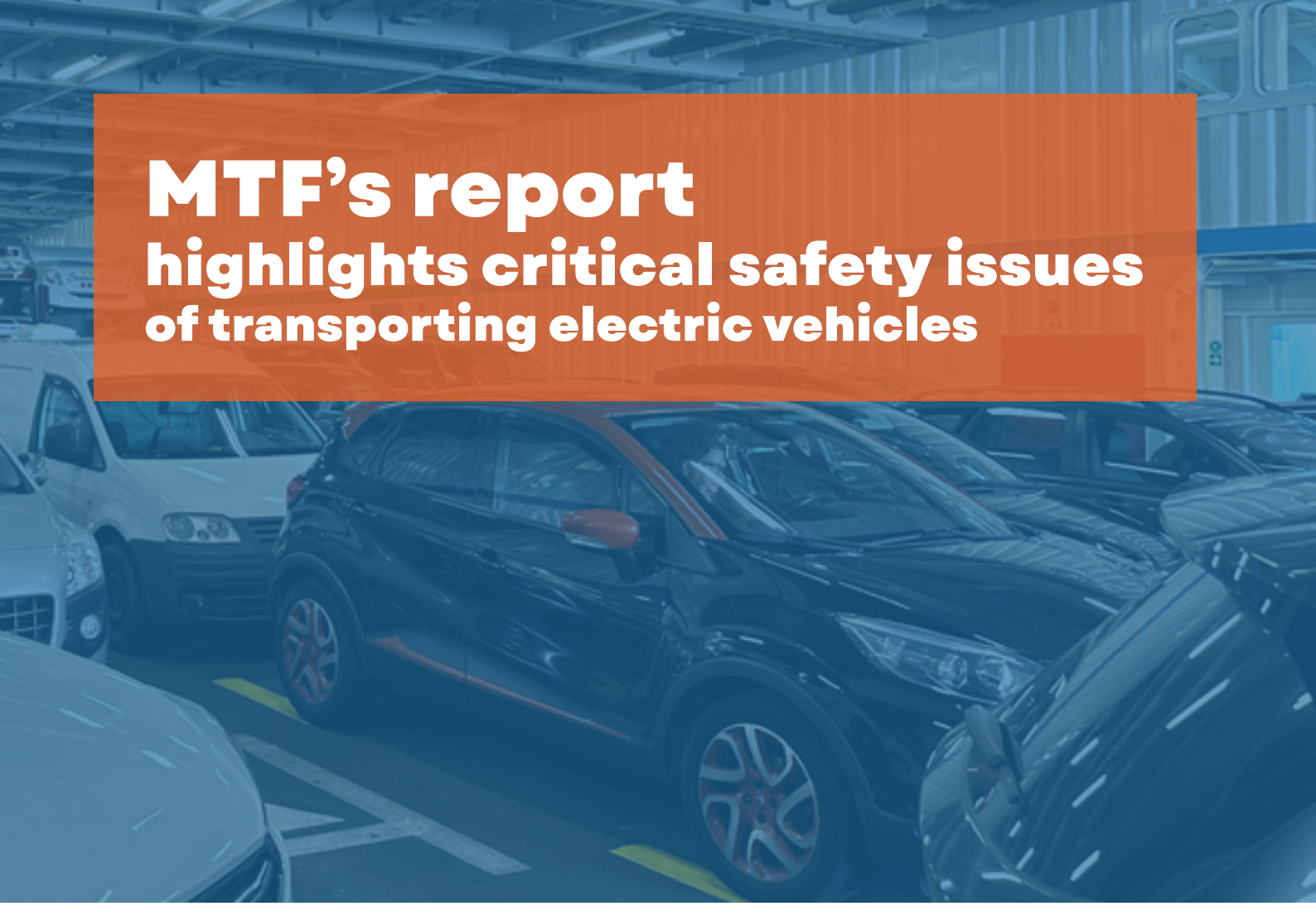
Safety at the heart of DNV's outlook on autonomous shipping

DNV has been a pioneer in autonomous shipping for a number of years, with key involvement in flagship projects like Yara Birkeland, Reach Remote and Ocean Infinity. Like everything, DNV's continuing involvement in the space is primarily driven by the goal that the maritime industry continues to evolve and innovate in a way that is safe and secure.

"As a class society we have no desire to push autonomy for the sake of autonomy," says Joukes. "But if our customers are going in that direction, we should be able to help them and make sure that this is done in a safe way.

"That is our mission in class."

"As a class society...
...we should be able to
help them and make sure
that this is done in a safe way."



MTF's report highlights critical safety issues of transporting electric vehicles

Greenhouse gas (GHG) emissions are an environmental issue experienced globally, affecting countries and industries. As one of the measures to decarbonise road transportation by reducing GHG emissions from automobiles, car manufacturers have been developing EVs that are powered by lithium-ion batteries (LiB) instead of conventional fuels.

Transportation of EVs by PCTC vessels has also begun, and the share of EVs amongst all vehicles being transported has been increasing. Among potential problems, is that if an abnormality occurs in the LiBs used to power an EV, or a fire breaks out from the battery, special response methods must be applied.

The characteristics of LiBs include high energy density, high voltage and the ability to be recharged. It is also known that extinguishing a fire from a LiB can take a considerable amount of time. Moreover, vehicles, whether conventional vehicles or EVs, transported by PCTC vessels are loaded in vehicle spaces (car decks) with minimal distance between each other, which causes a fire rapidly spreading to other adjacent vehicles and difficulty in approaching burning vehicles to conduct firefighting operations. Therefore, special measures must be implemented given the unique environment in the vehicle space, and this further combined with the characteristics of EVs leads to the necessity of implementing firefighting measures specific to EV transportation.

There are no regulations for safe carriage of EVs at the moment, in spite of increasing number of EVs transported by vessels. In April 2022, the Maritime Safety Committee (MSC) of the IMO decided to develop mandatory regulations for transportation of new energy vehicles including EV, with a target completion year of 2027. In March 2024, a discussion was initiated as an "evaluation of adequacy of fire protection, detection and extinction arrangements in vehicle, special category and roll-on roll-off (RORO) spaces in order to reduce the fire risk of ships carrying new energy vehicles" at the 10th session of the Ship Systems and Equipment Sub-committee (SSE 10) under the MSC.

Some national and regional governmental organizations and other maritime related organizations have undertaken investigations and published their own guidelines for the transportation of EVs, and multiple projects have also undertaken investigations and reported results at the IMO. Furthermore, front-runner shipowners and management companies are now

taking measures for safe carriage of EVs, as it will take a long time to develop mandatory requirements for carriage of EVs at the IMO.

Crews need to become familiar with EVs and be well-trained to ensure safe transportation of these vehicles. In addition, providing effective information on safe carriage of EVs would be beneficial to stakeholders who are now investigating and considering the additional measures.

The Maritime Technologies Forum (MTF) has published a report titled "Safe Carriage of Electric Vehicles" addressing the critical issue of transporting electric vehicles (EVs) on Pure Car and Truck Carrier (PCTC) vessels.

Currently, there are no international regulations specifically dedicated to the safe carriage of EVs. While some national and regional governmental organizations have issued their own guidelines, the IMO is still in the process of developing mandatory regulations for the transportation of new energy vehicles, including EVs, with a target completion year of 2027.

"This report is a significant step toward safer transportation of electric vehicles. Our goal with this report is to provide the industry with the necessary information to develop effective regulations and safety measures," said Lars Lippuner, Director of UK Customer Maritime Services, UK Maritime and Coastguard Agency (MCA).

The Maritime Technologies Forum (MTF) is a group of flag States and classification societies which aims to bridge the gap between technological progress and regulatory process.

According to the report, crews need to become familiar with EVs and be well-trained to ensure safe transportation of these vehicles. In addition, providing effective information on safe carriage of EVs would be beneficial to stakeholders who are now investigating and considering the additional measures.

Key highlights of the report:

Early Detection: The importance of detecting heated EV batteries (EVBs) early, potentially through a Battery Management System (BMS) on each vehicle that can release alarms and send alerts to the ship's systems. Prevention of Explosion: Addressing the release of flammable gases during thermal runaway and the need for explosion-proof electrical equipment on the upper deck. Fire Protection and Prevention of Fire Spread: Emphasizing the isolation of fires, cooling of EVs, and the need for enhanced structural fire protection to ensure safe evacuation of the crew.

Manual Firefighting: Portable firefighting equipment should be deployed in the early stages of a fire and removing excess water during operations will be important to maintain vessel stability.

Fixed Firefighting Systems: The comparative review of the characteristics of fixed fire extinguishing systems in vehicle space, as required by SOLAS II-2/ Reg.20, was made in an impartial manner, as they each have various advantages and disadvantages.

Safety of Crew During Firefighting: Highlighting the importance of understanding fire characteristics and car deck obstructions to proceed with manual firefighting and ensure crew safety during firefighting operations.

Safety Management System – Training and Drill: The Safety Management System (SMS) for PCTCs carrying EVs should be strengthened to address characteristics of EVs and EV fires.

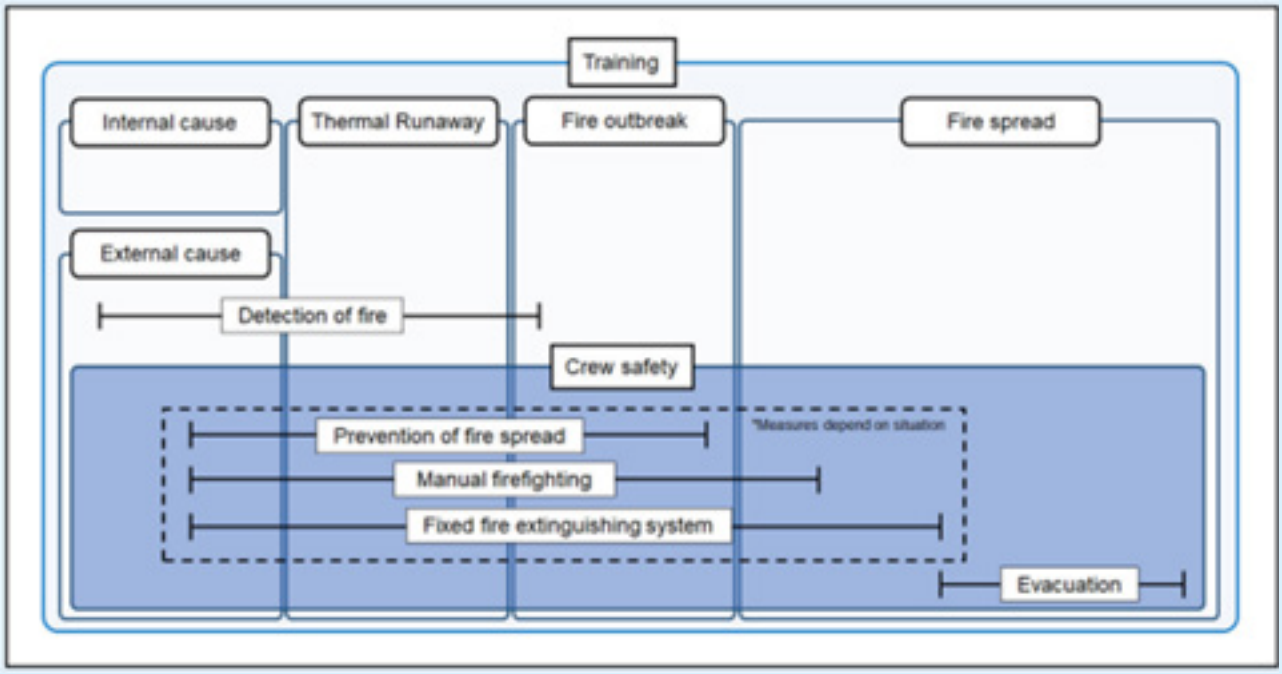


Image credit: MTF

Detection

Vehicles, whether conventional vehicles or EVs, are carried tightly in vehicle spaces of PCTCs, which could lead to fast fire spread to adjacent vehicles. Such a fire would be uncontrollable and existing fixed fire-extinguishing systems would probably not be effective, putting the lives of the crew at severe risk, and risking both the cargo and the vessel.

Therefore, early detection is a key to ensure that fires do not develop to an extent where the fixed firefighting systems are no longer effective and to initiate any firefighting such as isolation, cooling, and fire suppression, before thermal runaway of EVBs occurs and a major fire develops. If thermal runaway occurs, the key objective should be the prevention of fire spread to adjacent vehicles.

Through the discussion about early detection, the following measures with general comments were identified.

- Closed-Circuit Television (CCTV) with Artificial Intelligence (AI) or Video Analytics Function
- Infrared (IR) Cameras
- Gas Detection System
- Additional Detectors
- Alert from EV Itself

Safety of Crew During Firefighting

In general, manual firefighting is important to extinguish fires at an early stage and prevent the fire spread but should only be used in case of a possible effective fire response or prevention. It is important to understand the characteristics of fire and the kind of ship to proceed with manual firefighting and ensure the safety of the crew during the firefighting. If the situation or operational aspect allows manual firefighting, the crew should be safe during firefighting. There are the following characteristics of EV fire and PCTCs to be considered during manual firefighting by crews.

The tight spacing of vehicles during full loading may restrict the crew from locating a fire, accessing its seat, and preventing access to equipment for firefighting. Lashing belts prevent the crew from approaching the vehicle, leading to injuries. Furthermore, the effects of smoke typically create situations where visibility is poor. It is important to ensure firefighter safety and make it as easy as possible for them to identify the source of fire. The nominal air-change rate of the ventilation system is important, but this also brings in a high volume of oxygen sustaining the fire.

Lighting may not be available or sufficient. Usage time for the self-contained breathing apparatus (SCBA) provided to firefighters needs to be considered due to the amount of time typically required for EVB cooling operations. The onboard usage time of such SCBA generally tends to be limited to between 20 and 30 minutes.

EVBs during thermal runaway emit toxic HF gas that is harmful to the crew. Immediately Dangerous to Life or Health (IDLH) of HF gas is 30ppm, as provided by NIOSH. Then, at the early stage of a fire, ship's crews may fight the fire with portable fire extinguishers without wearing proper firefighting personal protective equipment (PPE)/SCBA. As a result, there are chances for the ship's crew to inhale the toxic gases. On the other hand, it should be noted that HF is highly reactive, and its concentration will reduce very fast.

Crews' physical and mental states should be considered to ensure crew safety during firefighting. It should be noted some crew may panic whilst firefighting.

Safety Management System Training and Drills

Proper training should be conducted, and procedures/guidance manuals should be available on board to assist the crew in taking appropriate actions in case of a fire. It is also important to establish firefighting plans and implement daily fire drills for effective firefighting operations expected to take long periods of time.

Everything on board the vessel is bound by the company safety management system. The training and drills could be linked to ISM code Element 8 (emergency preparedness).

"By addressing the unique challenges posed by EV fires, we aim to enhance the safety of maritime operations and protect crews, ships and cargoes. This report serves as a starting point for the development of safe carriage practices for EVs and aims to provide valuable information to regulators and industry stakeholders for further development," said Hiroaki Sakashita, President & CEO, ClassNK.

Download the report at **https://bit.ly/3XLi1pp**.

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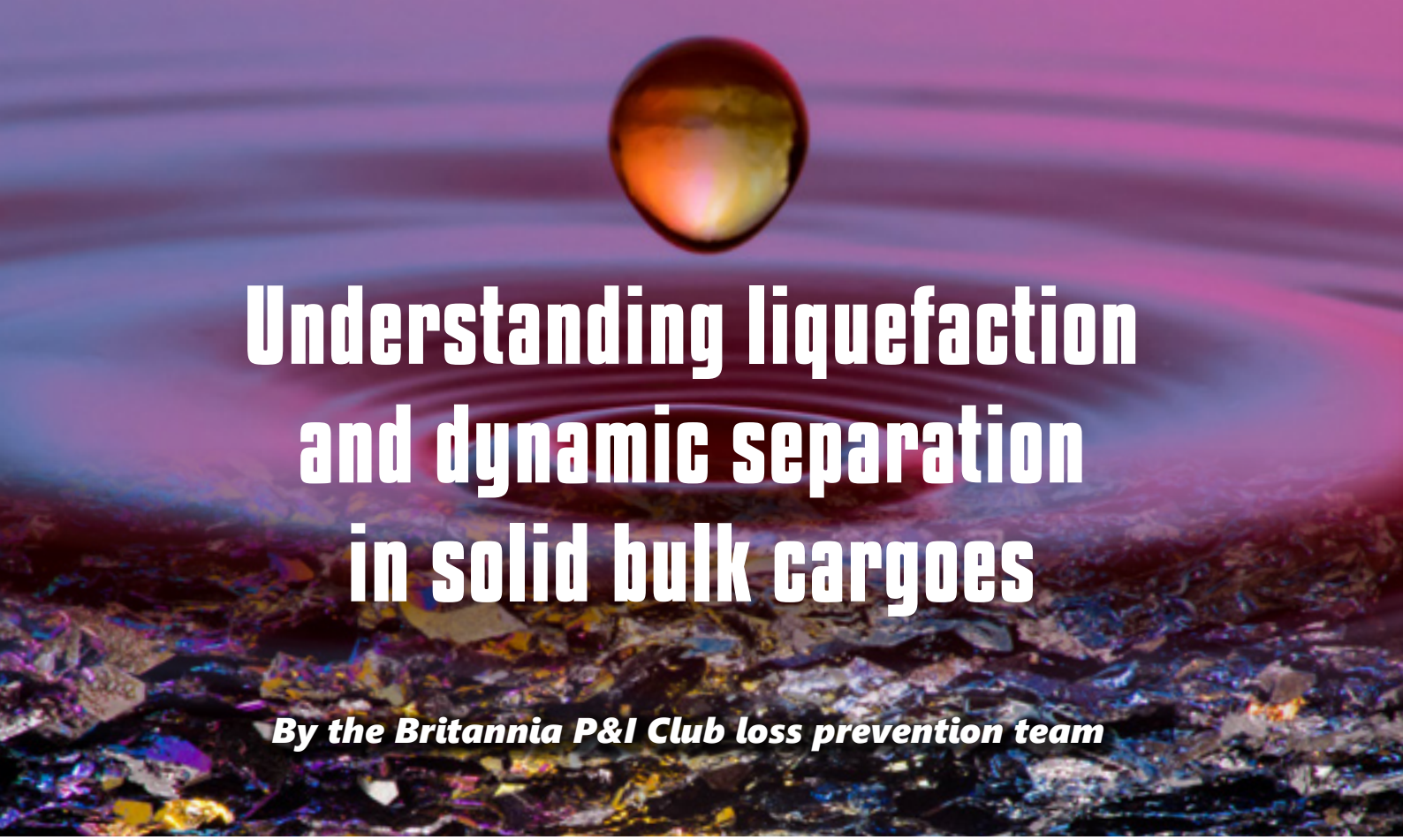


Understanding liquefaction and dynamic separation in solid bulk cargoes

By the Britannia P&I Club loss prevention team

A recent INTERCARGO report highlighted cargo liquefaction as the greatest contributor to loss of life at sea in the preceding decade. Despite improved safety, cargo liquefaction incidents continued to occur. Although ship losses due to cargo liquefaction accounted for less than 20% of all vessel casualties during that period, they resulted in the loss of 70 lives, representing over 60% of the total fatalities. In other words, if cargo liquefaction occurs on a bulk carrier, it is more likely to result in loss of life than any other type of incident.

Cargo liquefaction is so dangerous because in certain cases it occurs without warning leading to a rapid loss of stability, hampering the crew's ability to evacuate and survive.

Safe carriage of cargoes is at the very foundation of ship safety. Stakeholders in the cargo distribution chain are required to know the cargo hazards, but also correctly declare the cargo and comply at all times with the requirements of the International Maritime Solid Bulk Cargoes (IMSBC) Code.

Stakeholder compliance with regulatory requirements may be affected by a lack of appreciation of the risks involved. Investigations into high-profile incidents have shown that many non-compliant cargoes had been shipped before an incident ultimately occurred. Potentially creating a false sense of safety between the involved parties.

The understanding of moisture-related bulk cargo failures and the necessary risk mitigation practices is continually evolving. Amendments 06-21 of the IMSBC Code, effective from 1 December 2023, introduced the term "dynamic separation" as a new mechanism that can lead to moisture-related bulk cargo failure. While it is similar to cargo liquefaction, it differs in its specific physical process and impact on ship safety.

Group A cargoes according to the IMSBC Code

The IMSBC Code now describes two mechanisms which may result in cargo instability due to moisture content, classified as Group A cargoes. These are liquefaction or dynamic separation. To understand the difference between them, it is necessary to consider the physical properties of solid bulk cargoes.

Many mineral cargoes offered for shipment contain a significant amount of moisture due to production processes and exposure to rain during storage.

Solid bulk cargoes comprise of individual particles in contact with each other. The contact forces between these particles allow the cargo to retain shape and remain stable. Most cargoes are shipped partially saturated, meaning the voids between solid particles contain both air and moisture. When the cargo is subject to vibration and movement of the ship, it compacts and consolidates. Consolidation of the cargo ultimately results in reduction of the volume of the void spaces between the solid particles.

If the cargo predominantly consists of lumps (larger particles), the moisture may freely drain to the bottom of the cargo hold and be pumped out via the bilge system.

In this case, cargo particles remain in contact with each other, and the cargo retains its strength.

In cargoes containing more fine particles, there may be insufficient drainage channels for excess moisture to escape. As the volume of the voids decreases due to consolidation/compaction, the water which cannot escape from the void spaces will ultimately push the solid particles apart. When the solid particles lose contact with each other, the cargo will lose strength and will behave as a liquid, affecting the ship's stability. This phenomenon is called liquefaction.

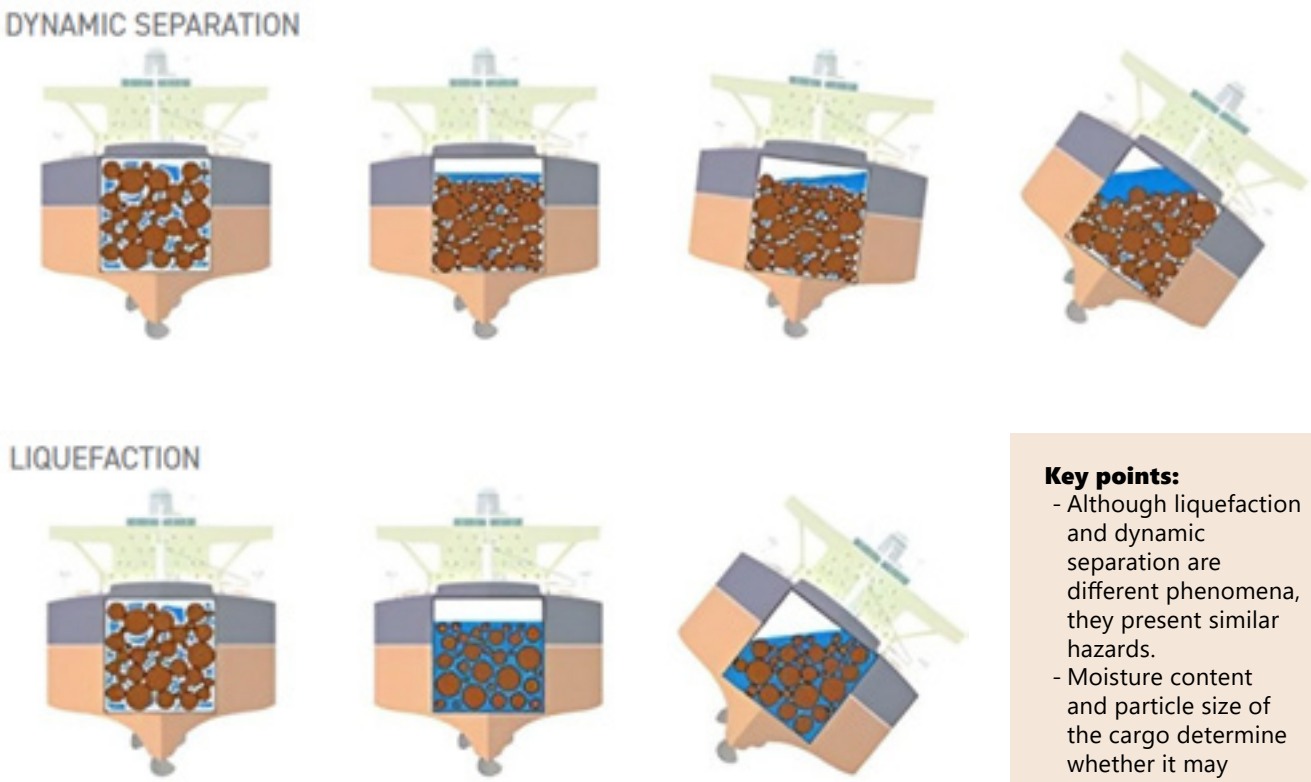


Image credits: Australian Maritime Safety Authority (AMSA)

If the water can escape from some of the void spaces but cannot drain completely, it may migrate upwards from the area of high pressure to the area of low pressure, ultimately collecting on the surface of the cargo forming a liquid slurry (consisting of water and fine solids). This slurry, moving with the motion of the vessel, can impair the ship's stability. This phenomenon is called dynamic separation.

The following comparison published by AMSA highlights the differences between liquefaction and dynamic separation:

Key points:
- Although liquefaction and dynamic separation are different phenomena, they present similar hazards.
- Moisture content and particle size of the cargo determine whether it may become unstable and liquefy/undergo dynamic separation.
- In dynamic separation, the bottom part of the cargo may remain stable whilst the top is covered with the liquid slurry.

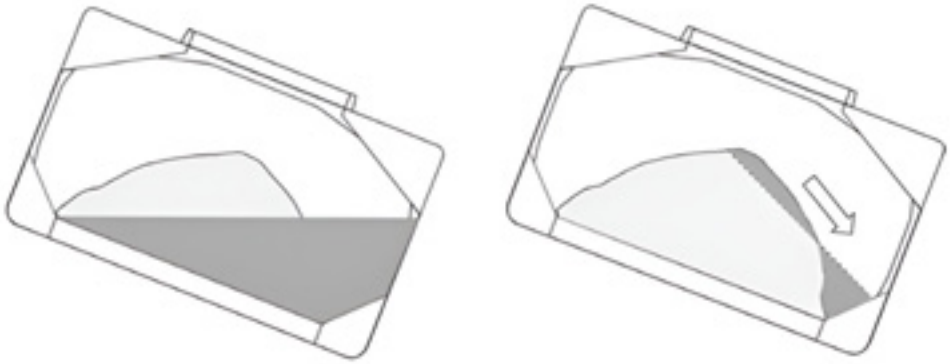
Hazard associated with liquefaction and dynamic separation of cargoes

For a ship experiencing liquefaction or dynamic separation, the main hazard is the uncontrollable shifting of cargo. Cargo shifting may result in listing, capsizing and/or structural damage to the ship. When cargo behaves like a dense fluid, the free surface effect can further impair the ship's stability.

Cargo shifting: Most mineral cargoes are relatively heavy; therefore, cargo holds are likely to be only part filled, leaving space for cargo movement. If the cargo liquefies or undergoes dynamic separation, the cargo can flow across the hold whilst the ship is rolling. However, the liquefied cargo (or dynamically separated slurry) has certain inertia and after flowing to one side, it may not return when the ship rolls back. Consequently, the ship may develop a new equilibrium with a large, permanent list. This list may worsen as the liquefied cargo shifts more toward the heeling side than the opposite side.

The free surface effect of the liquefied cargo (or dynamically separated cargo slurry) reduces the ship's dynamic stability, decreasing its ability to absorb energy from external heeling forces and increasing the risk of capsizing.

Cargo sliding is a phenomenon related to, but different from, liquefaction or dynamic separation. Normally, a cohesive, untrimmed bulk cargo will maintain its shape during ship rolling due to cohesion forces, or the cargo particles "locking" against each other. However, the cohesion in many mineral cargoes depends on moisture content. If it is too low or too high, the cargo may be prone to sliding. Therefore, moisture migration within the cargo may prompt cargo sliding. This highlights the IMSBC Code requirements related to cargo trimming (7.1.2 and section 5).



Difference between cargo liquefaction (left) and sliding (right). Image credit: DNV

Key points
- Cargo liquefaction or dynamic separation may lead to ship listing heavily and capsizing or sinking.
- Cargo shifting combined with free surface effect may result in a rapid loss of stability.
- The risk of cargo becoming unstable increases when the ship is rolling heavily.

Cargo moisture content and liquefaction/dynamic separation

The IMSBC Code assigns Group A to cargoes which may "possess a hazard due to moisture that may result in liquefaction or dynamic separation" if shipped at a moisture content exceeding their transportable moisture limit. Of note, some cargoes like coal may be assigned Group A and B (as they may liquefy/undergo dynamic separation and possess a chemical hazard).

Be aware that cargoes may seem dry and granular during loading, but they can still contain enough moisture to become fluid or unstable when subjected to compaction and vibration during the voyage.

Liquefaction or dynamic separation may occur in cargo when two conditions are met:

- The cargo has particle size distribution (PSD) which does not enable free draining and in result makes it prone to liquefaction or dynamic separation.
- There is enough moisture in the cargo to enable liquefaction/dynamic separation.

Moisture content (MC) is defined as the portion of a representative sample of cargo consisting of water, ice or other liquid, expressed as a percentage of the total wet mass of that sample.

Transportable moisture limit (TML) of a Group A cargo means the maximum MC of the cargo which is considered safe for carriage in ships (unless they are specially constructed/fitted). TML is determined by test procedures, approved by a competent authority, such as those specified in Appendix 2 of the IMSBC Code, paragraph 1.

Key points
- For a Group A cargo to be compliant with IMSBC Code and acceptable for carriage, the MC must be below the TML.
- Cargo declaration, testing and certification must fulfil the requirements of IMSBC Code (Section 4, also 7, 8).
- For cargoes like bauxite or coal, the PSD will determine whether they are liable to liquefy/ dynamically separate and should be carried under Group A requirements.

Which cargoes are subject to liquefaction/dynamic separation?

Most Group A cargoes are mineral concentrates; these are refined ores that have been enriched by removing most of the waste material. Refining the cargo may impact the PSD, potentially increasing the risk of liquefaction/dynamic separation.

Attention should be paid to the IMSBC Code general schedule for MINERAL CONCENTRATES, which, as stated in the schedule and in the IMSBC Code Appendix 4 (Index), should be read in conjunction with some of the specific cargo schedules (e.g. MANGANESE CONCENTRATE).

Group A includes several unprocessed or partly processed ore cargoes, such as NICKEL ORE, BAUXITE FINES or IRON ORE FINES. Liquefaction or dynamic separation of these cargoes has been attributed to several tragic incidents, in particular nickel ore and bauxite/bauxite fines.

Finally, Group A includes several cargoes of other types where the hazard of liquefaction/dynamic separation has been identified – such as COAL (Britannia Guidance on the Carriage of Coal Cargo may provide further reference).

The list of Group A cargoes is regularly updated, with new cargoes and new schedules. To establish whether a cargo offered for shipment is classed as Group A, the primary reference should always be the current edition of the IMSBC Code, Appendices 4 (Index) and 1 (individual schedules). In case of any doubt, it is recommended to seek guidance from the Flag State or Class and contact the Club.

It's important to recognise that the actual properties of the cargo offered for shipment may differ from those listed in the IMSBC schedule. Several IMSBC cargo schedules were developed only after tragic incidents involving cargoes that were not initially classified as Group A. Clay is an example of cargo which currently has a Group C schedule but has been known to present Group A hazards.

The IMSBC Code warns that "schedules for individual cargoes are not exhaustive, and the properties attributed

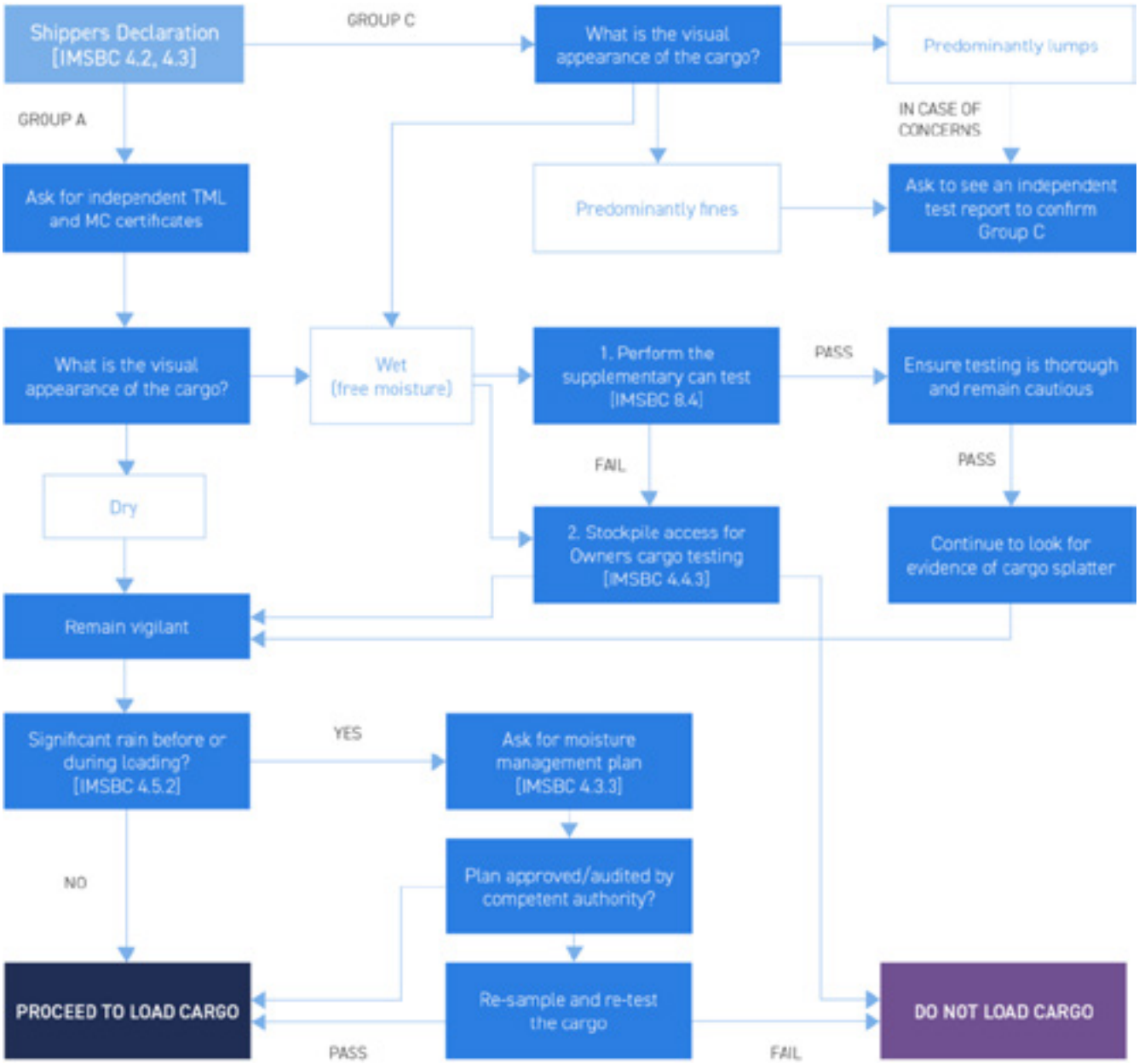
to the cargoes are given only for guidance. Consequently, before loading, it is essential to obtain current valid information from the shipper on the physical and chemical properties of the cargoes presented for shipment" (section 1.2.1 of the Code).

Furthermore, Group A classification is not definitive, and some cargoes may still present such hazard: "Many fine-particled cargoes if possessing a sufficiently high moisture content are liable to flow. Thus any damp or wet cargo containing a proportion of fine particles should be tested for flow characteristics prior to loading". (Appendix 3, section 2.1 of the Code).

Special attention is required when cargoes not listed in the IMSBC Code are offered for shipment. These unlisted cargoes can be particularly dangerous, as their potential hazards when loaded in bulk remain uncertain until they undergo the proper procedures outlined in Section 1.3 of the Code.

Key points

- All solid bulk cargoes must be shipped under their correct Bulk Cargo Shipping Name (BCSN), which identifies the schedule and the relevant requirements of the IMSBC Code.
- The cargo declaration must be complete and fulfil the IMSBC Code requirements.
- Actual properties of a cargo may differ from those in its IMSBC schedule, and it may require sampling/testing (for example, to confirm it is not liable to liquefy).
- Unlisted cargoes are only acceptable for shipment if they fulfil the requirements of IMSBC Code section 1.3. This applies also to cargoes where there is no complete BCSN match with an existing cargo schedule.



Precautions for loading and carriage of Group A cargoes

Britannia's article on "Liquefaction – Caution Remains the Watchword" provides the basic operational guidance for loading Group A cargoes, summarising the process and documentary requirements to be followed.

It should be noted that mandatory P&I Club notification requirements remain in place for nickel ore cargoes from ports in Indonesia and the Philippines.

The previous flowchart offers guidance on actions the crew may need to take upon loading if there are concerns about the accuracy of the cargo declaration or the actual condition of the cargo.

Key points

- The shipper is responsible for correct declaration, certification and testing of the cargo. Masters and officers should be conversant with the IMSBC Code requirements in this regard and immediately report any discrepancies
- The crew should be vigilant for any signs indicating excessive moisture content, such as cargo splatter
- Can tests are supplementary – they are not formal evidence that the cargo is compliant but may provide a warning
- It is recommended to seek support if there is any suspicion that the cargo has been incorrectly declared or certified, or that it is in an unsuitable condition for transport.

Actions if liquefaction or dynamic separation is detected during the voyage

The Safety Management System (SMS) on ships carrying solid bulk cargoes should include procedures for managing cargo liquefaction and dynamic separation. These issues can develop rapidly, particularly in adverse weather conditions. The SMS procedures, as well as the training provided to officers and crew should consider the following points:

- When a ship is loaded with cargo presenting the risk of liquefaction or dynamic separation, rolling should be kept to a minimum as far as possible.
- The ship's rolling period in its current loading condition should be known, recorded, and monitored. Resonance with the sea or swell frequency can promote liquefaction and should be avoided whenever possible.
- In cases of dynamic separation, the sloshing of slurry on top of the cargo may result in an uncharacteristic motion, disrupting the regular rolling rhythm due to different wave periods of the slurry in each hold. Any irregular rolling should be investigated.
- Any indication of the ship developing a list should be noted, reported and recorded together with details of the rolling period and its characteristics (irregular, asymmetric, etc.)
- Route planning and weather avoidance should be executed to avoid heavy weather and excessive rolling
- If safe and permitted by weather, the cargo surface should be regularly examined for change, such as accumulation of water, collapse, or shifting. Keeping a photographic record will assist in detecting changes between examinations
- Where abnormalities or indications of liquefaction/dynamic separation are detected, the appropriate crisis response should be triggered and assistance from shore-based experts sought.

If liquefaction/dynamic separation of the cargo is occurring:

- The master/shipowner should immediately follow the emergency notification procedure.
- The crew should prepare for immediate evacuation and remain in readiness until the situation is under control.
- The SMS should assist the master in evaluating whether it is safe to remain on board.
- Speed and course should be adjusted to minimise the ship's rolling movement as far as possible.
- If possible, the ship should proceed to a sheltered area or a port of refuge.

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THE IMPORTANCE OF TRIMMING FOR DRY BULK CARGOES

In one of its recent Risk Watch bulletins, Britannia P&I Club explained that proper trimming of bulk cargo is essential for ensuring ship stability, regulatory compliance, and efficient loading and discharging operations.

The IMSBC Code provides mandatory guidelines for trimming procedures. Section 5 of the code specifies that all bulk cargoes should be trimmed 'reasonably level' to reduce risks such as cargo shifting and instability. For non-cohesive cargoes, trimming standards are determined by the calculated angle of repose. Consideration should also be given to the charter party, as this may stipulate the required method of trimming, especially for cargoes that require specific handling.

Section 5.1.3 of the IMSBC Code states: "The master has the right to require that the cargo be trimmed level, where there is any concern regarding stability based upon the information available, taking into account the characteristics of the ship and the intended voyage."

Trimming is often performed at the end of discharge, but when loading via a chute, spout, or conveyor, it makes sense to avoid the cargo stream constantly pouring onto the same point in the holds. Best practice is for the loading arm to be initially positioned as close to the tank top as safely practicable, depositing a layer of cargo over the entire surface before increasing the loading rate and raising the drop distance. Efforts should then be made to direct the loader for a more even cargo distribution. This reduces or can even eliminate the amount of trimming work needed to flatten the cargo surface at the end of loading.

The process of trimming is important for several reasons:

- **Ship stability:** At sea, the ship and cargo will be subject to longitudinal and lateral forces. If cargo piles collapse to one side, this can affect the vessel's overall stability due to the shift in weight and could endanger it.

- **Minimizing air in the cargo:** Effective trimming minimizes the volume of air entering the cargo. The more air present, the greater the likelihood of self-heating, which is particularly relevant for various Group B cargoes.

- **Weight distribution:** Ensures an even weight distribution across the tank top concerning weight limitations. In practice, this means spreading the cargo as widely as practicable within the cargo space to prevent excessive loading on the tank top (or tween deck, if applicable).

- **Regulatory compliance:** Trimming may be required by regulations such as the International Maritime Solid Bulk Cargoes (IMSBC) Code or the Grain Code.

- **Efficiency in discharging:** A properly trimmed cargo allows for more efficient unloading operations and reduces the likelihood of uncontrolled shifting during discharge.

According to Britannia, maximizing the equal distribution of cargo requires good communication with the shore loader. To anticipate this requirement, it is recommended to raise it as a point at the ship-shore meeting with the terminal representative and clarify how communication will take place during loading operations.

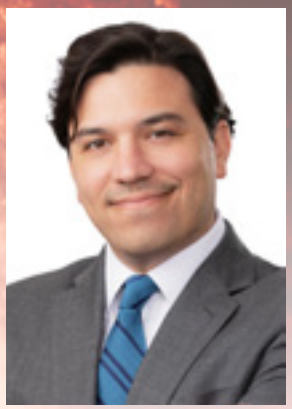
This also highlights the importance of maintaining supervision of loading operations by ship's staff, rather than relying solely on a cargo surveyor. It remains the ship master's responsibility to ensure that the cargo is safely prepared for transport before departure.

BOOM!

A SYSTEMATIC APPROACH TO MARITIME RISKS

By Luis Llamas and Thomas "Buddy" Bardenwerper, Jones Walker LLP Maritime Practice Group

The bilge alarm is sounding. Smoke is billowing. Oil is spreading. A lot needs to happen in these critical, heart-pounding moments; coming up with an emergency response plan shouldn't be one of them.



Buddy Bardenwerper (left) and Luis Llamas (right). Photo credit: Jones Walker

Operating a maritime business is inherently risky. This is so for inland commerce, open ocean navigation, and everything in between. Not only are maritime professionals subject to the whims of Mother Nature, but much of the work itself is dynamic, involving massive vessels, heavy machinery, and hazardous materials. Accordingly, anyone engaged in the maritime industry - from deckhands, machinery operators, and engineers to captains, shoreside support staff, and corporate officers - must be ready to respond to a crisis at a moment's notice. Because an ounce of preparation is worth a pound of cure, leaders of maritime businesses should expect that crises will occur and train their workforce for the inevitable.

That said, developing a maritime emergency response plan can seem daunting. Again, a lot can go wrong, and many people need to do different things at different times. This can be overcome, however, by breaking down a nascent plan into its logical parts. One way of doing this is to organize the plan hierarchically - i.e., with some aspects geared toward operators and other aspects designed for managers - and temporally - i.e., left of boom, at boom, and right of boom. By making the planning today easier, the response to the crisis tomorrow will be more effective.

Operators, managers and maritime risks

Roughly speaking, operators are those employees who carry out the business's day-to-day operations. For example, they would be the men and women working aboard the company's vessels or rigs. Managers, on the other hand, are those individuals who are one step removed. These include the executive leadership team, in-house counsel, or human resources professionals. Because operators and managers will face different kinds of problems during the same crisis, the emergency response plans dictating what they should do and when they should be appropriately tailored.

Left of boom, at boom, and right of boom

To organize a response plan temporally, imagine a hypothetical "boom" event such as an explosion, hurricane, collision/allision, blowout, or spill. And then figure out what the managers and operators need to do left of boom, at boom, and right of boom. In other words, what should be done to prevent a specific emergency from happening? What should be done right now when an emergency does happen? And what should be done to navigate the lingering fallout from a crisis to best protect the business and the community and restore operations? These are the "preparation," "immediate response," and "recovery" stages.

Now let's see how these pieces fit together in terms of maritime risks.

Preparation

The preparation, left-of-boom stage requires both managers and operators to brainstorm what kinds of emergencies are most likely to occur in their business. Some risks will be obvious, such as a blowout for the offshore oil and gas industry. Others will be less so, like a pandemic causing port closures while a container ship is underway. Once the various risks have been identified, different teams can begin drafting specific response plans for each. In doing so, they should consider the federal and state regulations related to these risks. What do the Occupational Safety and Health Administration, the Coast Guard, or the Environmental Protection Agency have to say about this kind of hazard? And what capabilities does the company already have on hand, such as firefighting equipment, life rafts, and personal protective equipment? And will it need resources like aircraft, rescue personnel, tugs, or divers from the government or private-sector partners?

As these general plans come together, they should be fine-tuned and eventually spawn easy-to-follow checklists for operators and managers. Scheduled and unscheduled drills will also be critical, as working through these checklists from top to bottom is the only way to reveal shortcomings. Feedback - whether from the most senior, well-coiffed executive to the most junior, grease-splattered wrench-turner - should be solicited and considered, as the response plan is, after all, a living document.

Immediate response

Boom! When least expected, the catastrophe strikes. In this phase, the onus is on the operators who are on scene (and potentially in great danger) to make the critical decisions that will dictate the trajectory of the crisis. The goals here will likely be the same regardless of the business: protection of lives, protection of the environment, and protection of property. For operators, this means immediately reporting the incident, seeking assistance, and initiating the emergency response procedures that have hopefully become second nature. Managers will need to rush personnel and assets to the scene - to the extent it is possible - and coordinate with local, state, and federal responders.

Recovery

Once the initial crisis has been contained - i.e., anyone in immediate danger has been evacuated, fires have been controlled, hazardous materials are no longer being discharged, etc. - access the risks to minimize negative repercussions and begin recovery as quickly as possible. Again, the tasks confronting operators will differ from those confronting managers. For operators, the focus will be on cleanup, salvage, and restoration of infrastructure. For managers, the emphasis will be on public relations, dealing with civil or criminal investigations or lawsuits, or navigating insurance and indemnification claims. It is only when both the operators and managers are successful that their business will truly be up and running once again - and hopefully more resilient to risks moving forward.

Accidents happen, but effective responses are planned and tested in advance. A maritime emergency response plan should be considered a living document with periodic reviews and audits. Operators and managers. Left of boom, at boom, and right of boom. A maritime emergency response plan organized in this way will be easier to draft, easier to drill, and easier to execute - give it a try before the next crisis strikes.

About the authors

Luis Llamas is a partner in Jones Walker LLP's Maritime Practice Group and is the head of the firm's Miami office. In his maritime practice, Luis has led multiple casualty investigations and resulting litigation and routinely handles cases involving marine casualties, collision, personal injury, complex maritime products liability, commercial litigation, contract disputes, and a wide range of transactional matters.

Thomas "Buddy" Bardenwerper is an associate in Jones Walker LLP's Maritime Practice Group based in the Miami office. He is a former U.S. Coast Guard officer and has handled critical incident communications involving pollution, search and rescue, and law enforcement cases.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Cargo tank cleaning and preparation onboard tankers: Best practices and guidelines

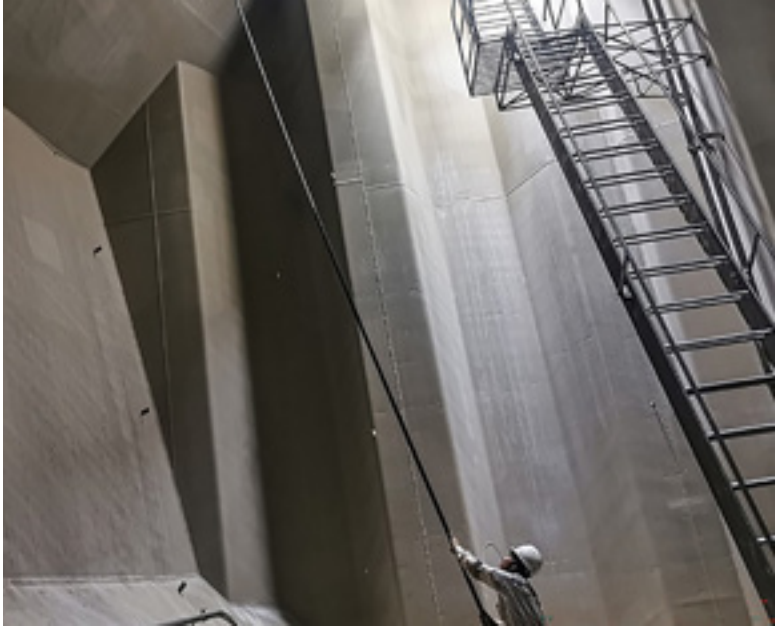


Photo credit: West P&I Club

West P&I Club has issued a loss prevention bulletin in which they describe best practices and give guidelines on cargo tank cleaning and preparation onboard tankers. the Club highlights that product and chemical tankers carry a variety of commodities, often necessitating frequent tank cleaning to prevent a cross-subsequent, off-spec claim. Detailed planning of the tank cleaning is crucial, and the ship's crew must be informed of the schedule.

Why is tank cleaning necessary?

Tank cleaning is essential in the following circumstances:

- Preparing for the next cargo
- Dry dock
- Regulatory Compliance: adhering to MARPOL and other IMO Conventions/Codes
- Preventing build-up of residues e.g. in Residue Oil Tank (ROT) / Slop Tanks
- Facilitating gas freeing for tank inspection / mopping / maintenance / repairs
- Complying with the charter party agreement
- In extreme circumstances to prepare for carrying clean ballast

Tank preparation encompasses various stages, with tank cleaning being the most common. The preparation steps vary depending on the type of vessel and cargoes.

These steps include:

Planning

Effective tank cleaning requires careful planning, considering cargo details, environmental factors, and system components. The plan should address cleaning methods, risks, and safety measures. Regular risk assessments are needed, especially for new or infrequent cargos. Fire and explosion risks are minimized by washing tanks in an inert atmosphere.

Bottom flush

A line and bottom flush is the first cleaning step required for all non-inert tanks as per ISGOTT.

Tank cleaning

Tank washing mediums include cold seawater wash, hot seawater wash, freshwater wash, freshwater rinse, deionised wash/rinse, treated water wash/rinse (e.g., reduce hardness), and chemical or detergent wash. Tank washing methods include butterworthing, injecting, re-circulating, rinsing, steaming, purging, inerting, gas freeing, local cleaning, stripping and mopping and drying.

The extent of cleaning required depends on the properties of the previous cargo, the tank coating, the next cargo's preloading specifications and the shipper's requirements.

Verifying results

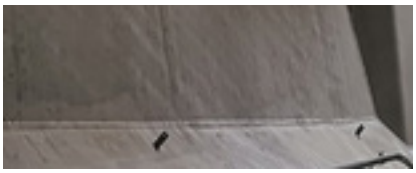
Verification of the tanks' level of cleanliness is more often required before the charterer's permission to load the next cargo. This can be done through enclosed space entry for a visual inspection and coating assessment, which may include wall wash testing, or by wash water analysis, eliminating the need for enclosed space entry.

Pre-wash after discharge

Prewash must be carried out for chemical tankers as per MARPOL Annex II.

Decanting and discharging ashore

Slop tanks must be decanted as per the relevant MARPOL Annex. The ROT must be discharged ashore in a timely manner.



There are a number of safety concerns to be considered:

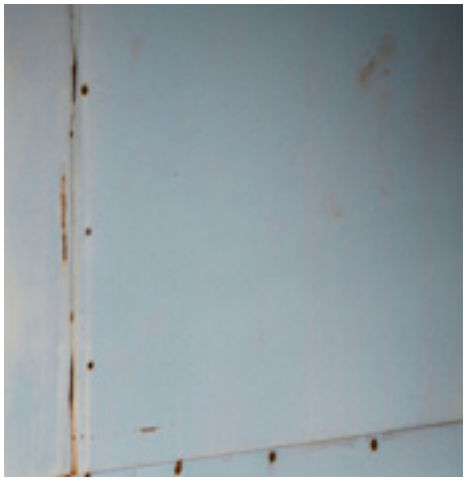
- Entry into enclosed space
- Exposure limits
- Cargo safety data sheets (SDS)
- Static accumulation
- Reactivity

Common tank cleaning problems

Common tank cleaning problems
The most common issues encountered with tank cleaning are failed inspections and cargo contamination due to inadequate tank cleaning, often influenced by tank coatings. When tanks are considered not clean enough by charterers, further cleaning is costly and time-consuming affair.

Key questions to ask in such cases:

- Were the Charterer's tank cleaning instructions followed effectively?
- Was a third-party tank cleaning expert consulted, such as Milbros or MIRACLE?
- Did the Chief Officer and crew have sufficient experience with these cargoes?
- Did the vessel fail a Wall Wash Test (WWT) or was Wash Water Analysis (WWA) used for verification?
- Was the previous cargo compatible with the tank coating?
- Have previous cargo residues been absorbed into an epoxy coating?



If a vessel fails a tank inspection and the charterer requests additional cleaning, the Club should be contacted to clarify further details before commencing extra cleaning. If the tanks do require further cleaning and the cleaning instructions have been followed accurately, third party expert guidance should be sought.

In cases where the tanks were not cleaned sufficiently and a cargo contamination claim arises, the Club should be contacted and an investigation conducted. Findings from the investigation should be shared across the company's fleet to raise awareness and reduce the risk of reoccurrence.

If the charterer's tank cleaning instructions were not followed effectively and the tanks are considered not clean enough, follow additional charterer's instructions and consult the latest tank cleaning recommendations from expert companies.

Failure in a WWT, does not always indicate inadequate tank cleaning for a vessel to load the next nominated cargo once dilution factors are considered. As this is known to be a subjective test, vessel's owners can request a repeat test from another surveyor and retain samples for secondary analysis.

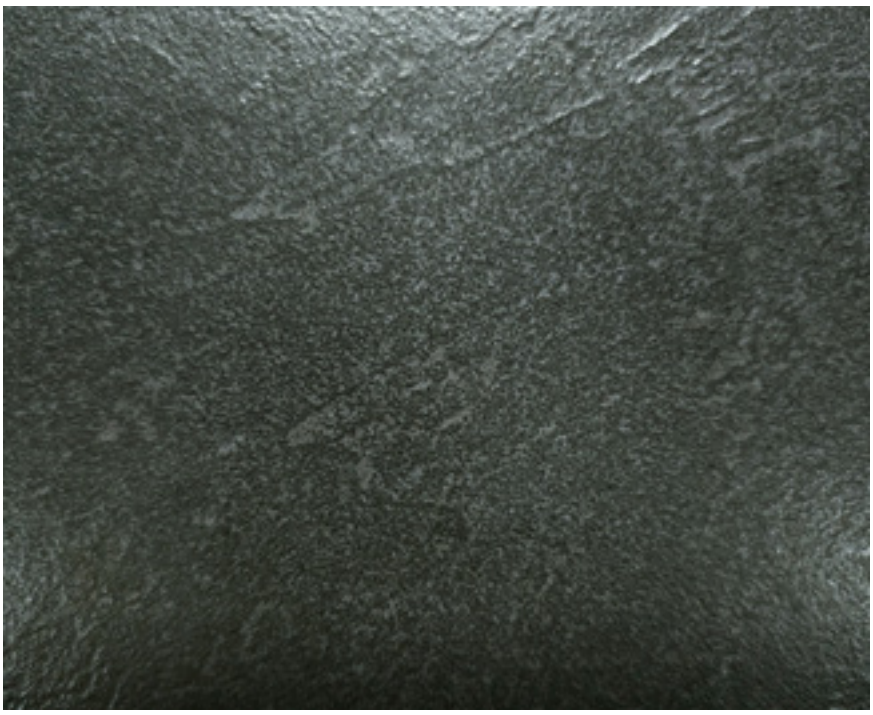
WWA can eliminate the need to gas-freeing and tank entry for WWT. This method has been shown to be more effective than WWTs for verification and tank cleaning. Please see out LP Bulletin on Cargo Tank Cleaning Verification Methods.

Incompatible cargoes with tank coatings, such as a high FFA content edible oil with zinc, are hard to clean and will more often require further cleaning.

Aggressive cargoes carried in epoxy-coated tanks will leave cargo residues within the tank coating. Cleaning will not help desorb the residues, periodic ventilation at an elevated temperature is needed. Please see out LP Bulletin on Cargo Tank Coatings for more information.

In summary, if a vessel fails a tank inspection and the charterer requests additional cleaning, P&I should be contacted to clarify further details before commencing extra cleaning. If the tanks do require further cleaning and the cleaning instructions have been followed accurately, third party expert guidance should be sought. In cases where the tanks were not cleaned sufficiently and a cargo contamination claim arises, P&I should be contacted and an investigation conducted. Findings from the investigation should be shared across the company's fleet to raise awareness and reduce the risk of reoccurrence.

Download the guidelines at https://bit.ly/4b7cKhy.



Cultivating trust in ammonia as a marine fuel

Lloyd's Register's Maritime Decarbonisation Hub (The Decarb Hub) and Mærsk Mc-Kinney Møller Centre for Zero Carbon Shipping (MMMCZCS) have releases new reports to help meet the upskilling needs of an estimated future 800,000 seafarers as the industry transitions to alternative fuels.

With the maritime industry under pressure to reduce carbon emissions, ammonia is gaining popularity as a promising alternative fuel, as evidenced by LR's Fuel For Thought Ammonia report. However, many are unaware of the unique hazards associated with ammonia, including toxicity, flammability, and material incompatibility, and how to handle it safely, efficiently, and in an environmentally responsible manner.

While current frameworks outlined in the International Maritime Organization's (IMO) STCW for seafarer training provide a foundation, they fall short of addressing the unique challenges posed by ammonia. The MMMCZCS and The Decarb Hub, a joint initiative between the Lloyd's Register Group and Lloyd's Register Foundation, have released a new set of reports under the "Ammonia as Fuel – Competencies and Training" project, emphasising the need to address design and human factor challenges associated with ammonia.

The reports outline a roadmap for the industry to prepare seafarers for ammonia-fuelled ship operations, detailing minimum regulatory requirements, basic and advanced competencies for seafarers, and role-specific training for onboard and shore-based personnel.

In particular, the proposed framework is consistent with STCW specifications for basic and advanced standards. Required standards, expressed as competency statements, are broken down into three areas: knowledge, understanding and proficiencies (KUPs).

Seafarers need knowledge of:

- the key characteristics of ammonia, such as toxicity, flammability, explosivity, corrosion and material incompatibility
- a ship's ammonia-related systems and equipment, including storage
- ammonia's physical and chemical properties
- hazards and hazard controls of ammonia
- occupational health and safety precautions and measures
- how to respond to emergencies, such as leaks, spills, fires and explosions
- pollution prevention mechanisms

Seafarers will need understanding of:

- the specific operational and maintenance regimes required by ammonia
- fuel changeover procedures
- how approaches to emergency response differ on board ammonia-fuelled vessels
- how processes change with increased automation
- the legislative requirements with which they must comply

Seafarers will need new skills and proficiencies in:

- operation and maintenance of ammonia related equipment, including increased use of automation to enable remote operations
- handling of ammonia storage, transfer and handling systems applicable to pressurized and refrigerated ammonia or a combination of both
- use of new materials
- use of new types of instrumentation and control systems
- use of new types of detection and monitoring equipment
- use of different personal protective equipment (PPE)

While the initiative was underway, the MMMCZCS conducted an industry acceptance survey, which revealed a great degree of willingness to work on ammonia-fuelled vessels, and moreover that this level of heightened acceptance is contingent on comprehensive training programmes.

The three reports from the collaboration are a project summary report, a technical report that addresses training standards, and a second technical report that delves into competencies for certain operational, maintenance, and emergency-response scenarios.

The project suggests interventions in several areas including competency and training for topics such as work practices and procedures, and occupational health and process safety. Additionally, it provides a call to action for key stakeholders, namely shipowners and operators, seafarers, technology providers, as well as regulators and training institutes, to implement its findings.

To aid in impending seafarer safety:

- Shipping companies are urged to conduct gap analyses, update corporate policies, and invest in seafarer upskilling initiatives.
- Regulators and flag states must work together to incorporate ammonia-related safety measures into global maritime training standards.
- Training providers are advised to develop transition journeys for seafarers and shore-based staff and update training facilities to include practical training with ammonia.

This latest report, representing Phase 3 of the partnership, follows earlier studies on vessel design and operations and human factors considerations for ammonia-fuelled vessels.

Alan Jones, Human Safety and Risk Director at The Decarb Hub, said: "The maritime industry will continually need this type of interactive collaborative action, which clearly provides exceptional outcomes, disseminating unambiguous evidence of how the industry needs to move forward."

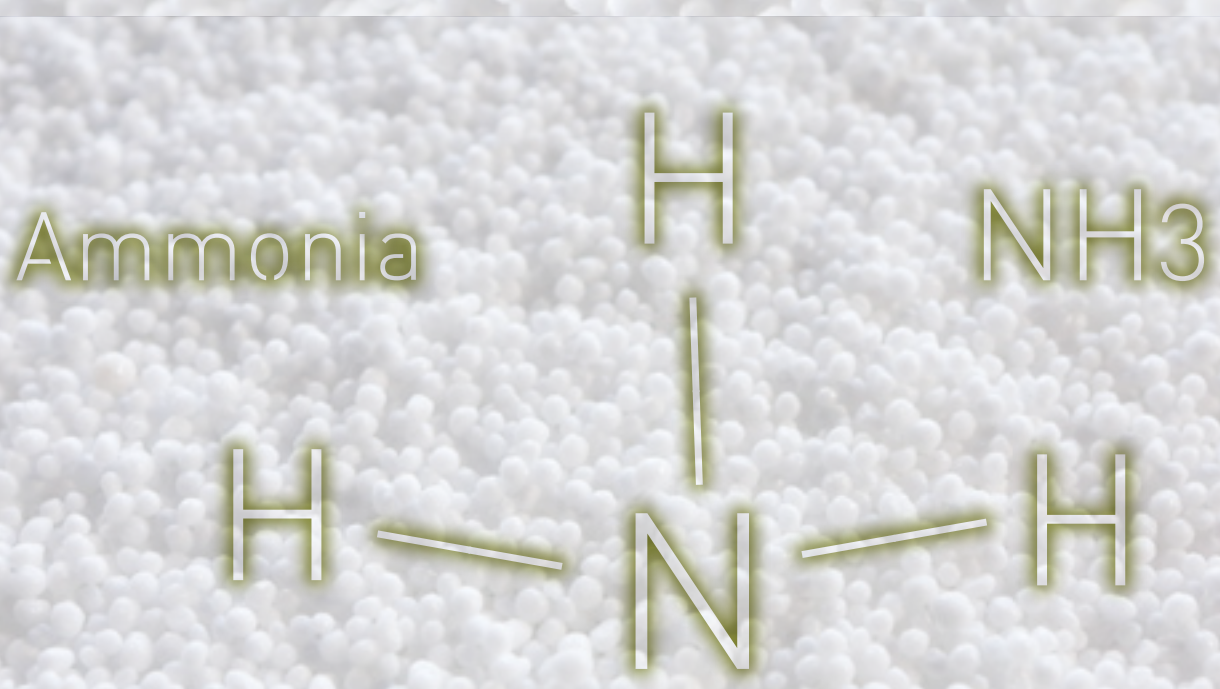
Martin Eriksen, Head of Safety Leadership & Operations at MMMCZCS highlighted that existing frameworks must incorporate specialised knowledge about the unique characteristics and hazards that accompany this fuel." Understanding their specific chemical and physical properties, handling requirements, safety protocols and emergency response strategies are a few indicative areas for intervention."

The organizations call for IMO and its members to consider this information and take appropriate action to account for ammonia as fuel in the regulatory training framework, enabling interim guidance on training for alternative fuels to be published with priority.

By leveraging the knowledge and calls to action shared in these reports, the shipping industry can help realise a green transition for maritime that puts safety at the centre.

In recent years, several ship operators have committed to adopting ammonia as a marine fuel to reduce carbon emissions and advance sustainable shipping practices. For instance, Nippon Yusen Kaisha (NYK) has completed the world's first ammonia-fuelled tugboat and is constructing an ammonia-fuelled medium gas carrier, scheduled for completion in November 2026. Mitsui O.S.K. Lines (MOL) has recently conducted the world's first ammonia ship-to-ship transfer and is designing a 210,000-DWT ammonia-powered bulk carrier.

Furthermore, in April 2024, Eastern Pacific Shipping strengthened green collaboration with Maritime and Port Authority of Singapore with six Singapore-registered ammonia dual-fuel newbuilds. At Posidonia 2024, the Korean Registry granted an Approval in Principle (AiP) for Samsung Heavy Industries' 150K ultra-large ammonia carrier and signed an MoU with them to develop 9,300 TEU ammonia-fuelled containerships.



Rising LNG demand:
Overcoming bunkering challenges

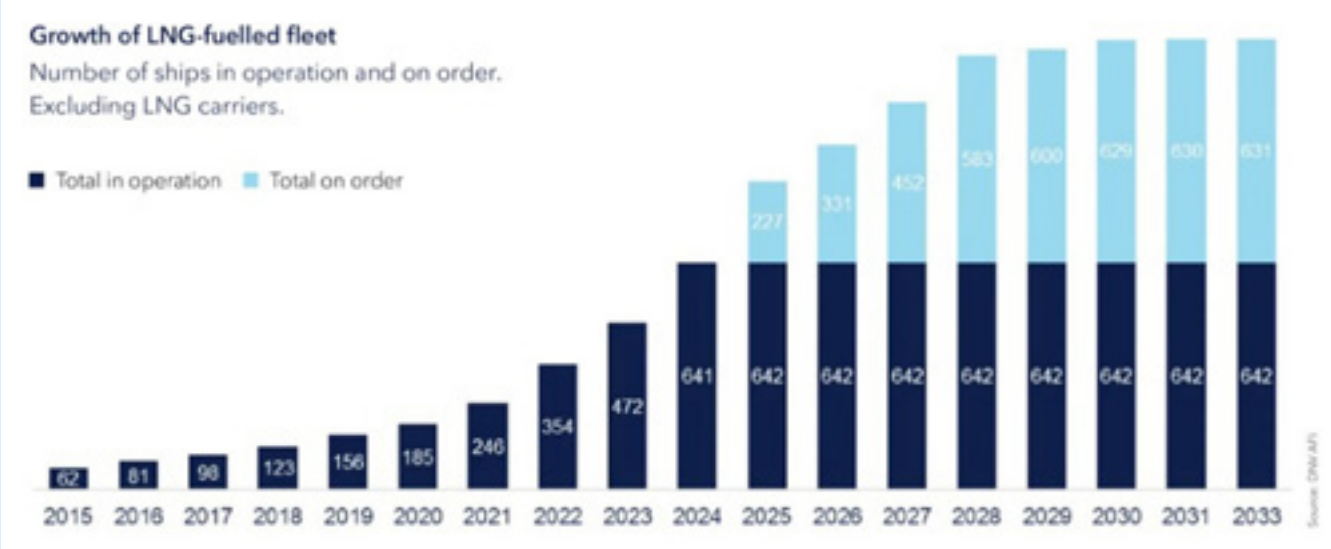
by Martin Cartwright

LNG's role in the energy transition is growing, especially with the uptake in shipping. Martin Cartwright, Global Business Director, Gas Carriers & FSRUs at DNV, explores this trend, the challenges of meeting future LNG demand, and key safety considerations for bunkering.

LNG markets are experiencing significant growth. This surge is driven by rising global demand for natural gas, particularly from China, and disruptions caused by major geopolitical events like the conflict in Ukraine. As a result, LNG demand has reached unprecedented levels.

LNG marine fuel use surges amid decarbonization efforts

The use of LNG as a marine fuel is also skyrocketing, driven by market and regulatory pressure to decarbonize the maritime industry. According to DNV's Alternative Fuels Insights (AFI) platform, 642 LNG-powered vessels are currently in operation, excluding LNG carriers. Of these, 169 were delivered in 2024, setting a record. Additionally, 264 new orders for LNG-fuelled vessels were placed in 2024, also a record and more than double the number of orders placed in 2023.



The growth curve is set to get even steeper: according to the AFI order book, the number of LNG-powered vessels in operation is set to double by the end of the decade.

LNG bunkering infrastructure lagging behind demand

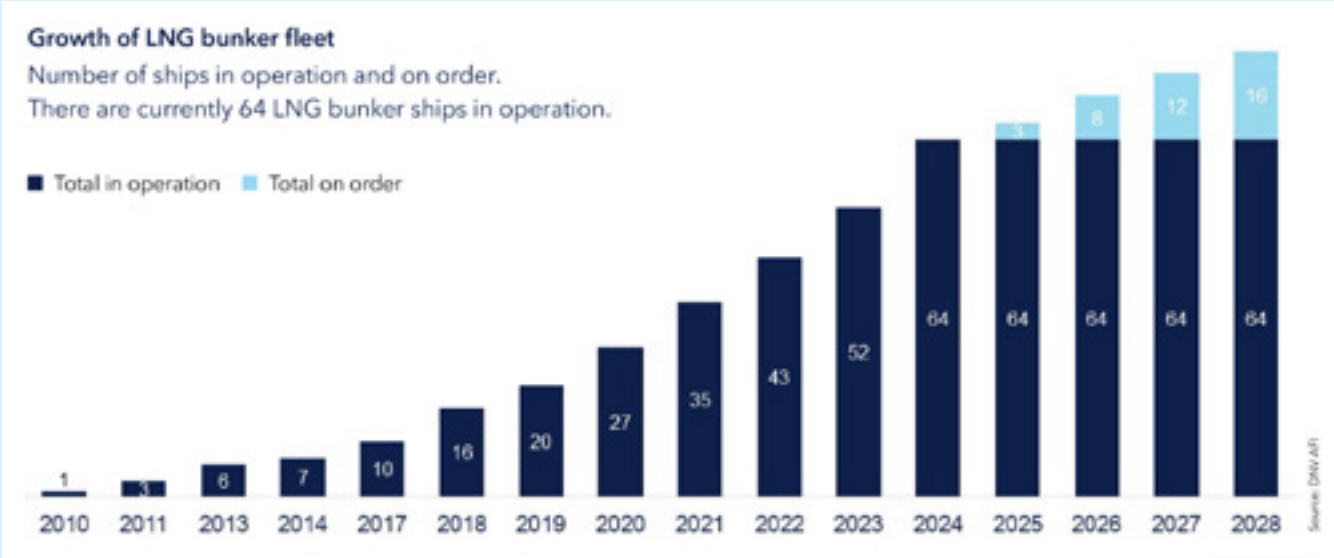
With the LNG fleet expanding rapidly, the need for supporting LNG bunkering infrastructure is intensifying. The amount of LNG consumed by LNG-fuelled ships has already seen a steep increase, with over 500% growth registered between 2020 and 2024.

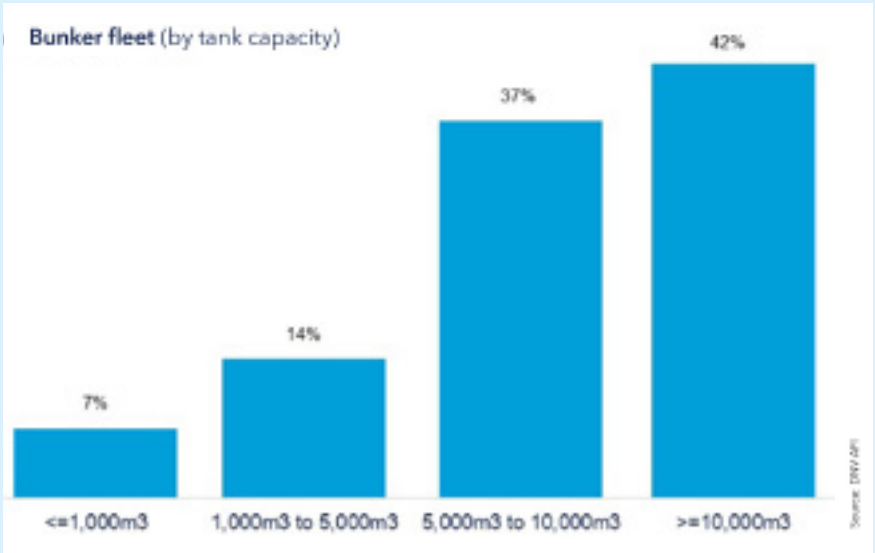
A similar growth rate is expected over the next five years. However, LNG bunkering vessels are not keeping pace, resulting in a significant gap between LNG bunkering supply and demand, with the issue being more pronounced in some regions than others.

A closer look at the LNG bunkering fleet

In general, there are three categories of small and medium-sized LNG bunkering vessels: LNG feeder vessels, LNG bunker vessels and LNG bunker barges. These range between 1,000 and 20,000 m3 in capacity and can be used either in or out of port.

Some 64 LNG bunkering vessels are in operation today, with a further 16 on order. Around 42% of these vessels are larger than 10,000 m3, with another 37% in the 5,000 to 10,000 m3 range.





These vessels are quite evenly spread across the globe, with 42% located in Europe, 28% in Asia and 18% spread across North and South America.

Of the LNG bunkering vessels on order, three are expected to come online in 2025, with a further five scheduled for completion in 2026 and the remaining expected to be delivered in 2027 and 2028.

In 2024, there were 191 ports with active LNG bunkering facilities, such as LNG storage tanks and dedicated berths for LNG bunkering vessels, as well as ready access to LNG supply. A further 81 ports have facilities under construction.

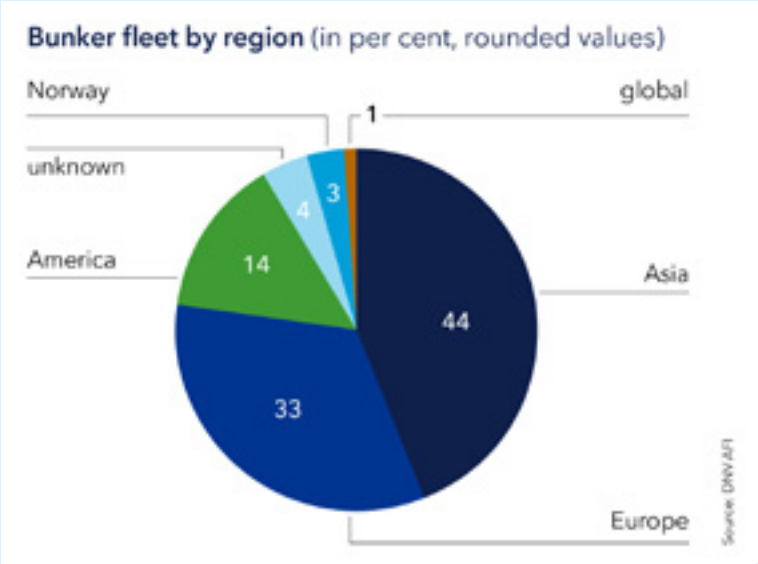



Image credit: DNV

Closing the gap

Looking at the order book, this gap between LNG bunkering demand and supply is expected to get even wider over the next five years. How can this be closed?

More yard space is crucial. In recent years there has been a shift in the kinds of yards that have an appetite to build these kinds of vessels. In particular, several yards which were previously engaged in constructing small gas carriers have progressed towards the construction of medium and large gas carriers, so there are now different yards at play for the smaller-sized vessels.

Key safety considerations for LNG bunkering

LNG bunkering is a complex business, and when it comes to safe operation some key considerations need to be taken into account.

One critical aspect of LNG management is handling the cargo heel, which involves maintaining a small amount of LNG in the tank to keep its temperature stable. This practice prevents the tank from warming up and generating excessive boil-off gas, which can lead to increased pressure.

Managing pressure during loading is crucial. To avoid overpressure situations, it is essential to monitor and control tank pressure. Pressure relief systems help manage any excess pressure effectively.

Additionally, effective vapour management is crucial for handling the boil-off gas produced during bunkering. This can be done by re-liquefying the gas, using it as fuel, or safely venting it.

Ensuring safe and steady LNG loading

The LNG loading process must be carefully controlled to ensure a steady and safe transfer. Monitoring flow rates and temperatures is crucial to prevent rapid changes that could cause thermal stress. The vapour return flow system is essential during loading, as it returns displaced vapours from the receiving tank back to the supply tank, maintaining pressure balance and reducing the risk of overpressure.

Additionally, overpressure protection systems, such as pressure relief valves, are vital to prevent tank rupture or damage. These systems automatically release pressure if it exceeds safe limits, ensuring the integrity of the tanks and the safety of the entire operation.

The importance of redundancy measures in LNG bunkering

Certain safety practices should be observed at all times during LNG bunkering. Redundancy measures are crucial, ensuring backup systems can handle any failures or malfunctions. If a component like a propeller, pressure relief valve or cargo pump fails, another can take over to maintain safety and prevent accidents.

These measures also ensure smooth commercial operations and an uninterrupted LNG supply chain.

At DNV, we support the LNG bunkering industry with notations like AP (alternative propulsion), RP (redundant propulsion) and Gas Bunker, ensuring strong redundancy on vessels. We have been involved in developing bunkering procedures and will continue to help the industry evolve.

Training is crucial as LNG bunkering becomes more common. More trained personnel, including LNG vessel crews and bunkering specialists, will be needed to ensure smooth and safe operations.

Image credit: DNV

Shore power – a promising solution for LNG bunker vessels

While LNG use reduces emissions by around 20% compared to conventionally fuelled vessels, further reductions are necessary. Options include energy efficiency technologies like fuel cells, but shore power appears most promising.

DNV's Maritime Forecast to 2050 report shows that well-to-wake emissions from on-board generators are higher than almost all cases of shore power, even when produced from fossil fuels. Shore power also benefits local environments by reducing direct emissions. The report estimates that port power accounts for about 7% of total maritime industry power use, much of which can be abated with shore power.

Push for shore power expansion for bunkering vessels

While this is promising, the nature of bunkering vessels means that this figure can be much higher. Bunkering vessels tend to operate close to or within port limits. Like ferries, their routes are short and predictable, making them ideal candidates for shore power, electrification and battery use.

For this to become more prevalent, more buy-in is needed from LNG bunker vessel operators, fuel owners and especially port owners and operators. Significant investment is required to expand and modernize infrastructure at terminals. These players will also need support from local authorities to modernize and expand grid capacity to handle increased demand.

Ports like Abu Dhabi, Rotterdam and Los Angeles are making strides in shore power infrastructure.

Broad prospects for LNG bunkering vessels

What does the future hold for LNG bunkering vessels? It is now clear that the lifespan of LNG as a marine fuel is likely to be significantly longer than many stakeholders believed a few years ago. If the need for these vessels diminishes in the future, they can be repurposed as interregional LNG carriers for small-scale LNG trade.

More importantly, these vessels could be used for bunkering bio and synthetic LNG, provided we develop more efficient value chains for these green fuels. These fuels are compatible with current LNG infrastructure and engines, offering a path to greener ambitions.

LNG bunkering vessels are in high demand, and those investing now can be confident that these vessels will be utilized for many years, playing a key role in the maritime energy transition.

This article was first published on the DNV website and is reprinted here with our thanks.

Soon to open, a new research centre for wooden boats

By Kim Kavin

Brooklin, Maine, has wooden boatbuilding in its veins.

It's home to the WoodenBoat School, which, since 1981, has taught more than 20,000 people about the construction, maintenance, repair, design and seamanship of wooden boats. The town is also home to Brooklin Boat Yard and other builders who keep the craftsmanship alive. Yes, it's a stretch when these folks call their town "the boatbuilding capital of the world," but when it comes to wooden boats, they proudly mean it.

Amid all this sawdust is the Friend Memorial Public Library, which got its start in the late 1800s and has held on with the town's tiny, year-round population of about 800 people. The current building was renovated in the 1990s and is used not just by the locals, but also by summertime tourists. They all understand how wooden boatbuilding defines the local culture, and how precious that culture has become in today's fiberglass and carbon world.

So it is that this little library has managed to raise $2 million toward a $3 million goal to build an addition that will showcase the history of wooden boatbuilding in an unprecedented way.

In fact, they're well on track to start construction this year on what will become the Anne and Maynard Bray Maritime Research Center, giving the general public in-person and online access to some of the richest collections of wooden-boatbuilding publications, photographs and more that have ever been assembled.

"I'm assuming that the addition to the library with the Maritime Research Center will be built by 2026," says Robert Baird, chairman of the capital campaign. "I never really fully comprehended how important these materials are to people who are interested in wooden boats all over the world. We've raised a lot of that $2 million from people locally, but we've also raised a lot of that money from people who don't live here and are passionate about wooden boats."

The idea for the research center began with WoodenBoat magazine founder Jon Wilson, who has amassed one of the largest private collections of materials related to wooden-boat and yacht history, building and design. In addition to historical books—some rare and irreplaceable—he gathered periodicals and more dating back to the 1880s.

"There are all kinds of real treasures," Baird says. "There are drawings and documents and journals. If you want to find out about any types of construction for traditional boats, there are books about that."

For instance, Baird says, he personally owns a 28-footer designed by C.C. Hanley and built in 1927. "It was the last catboat he designed," Baird says. "I could go to the library, find articles from Yachting magazine in 1928 about the building of that boat, and then the next year about the cruising of that boat. Those are the things that are really incredible."

Wilson's decision to give this collection to the Friend Memorial Public Library inspired longtime photographer Benjamin Mendlowitz to hand over his personal collection, too. It includes about 155,000 slides he made from 1979 to 2005.

The images will be combined with Wilson's collection to form the foundation of the new research center's holdings.

"In 2005, I went to digital, and those images will eventually go there as well as my career winds down," Mendlowitz says. "There are certainly quite a few scans that already exist of the slides because they were published in various books and the calendar, but there are lots of images that haven't been scanned. We're hoping that with the help of volunteers, we can scan the collection and make it available for research online."

Baird says the research center's name is a tribute to Anne and Maynard Bray because of yet another person who cherishes wooden boats. Anne helped to build up the library for more than 30 years, Baird says, while Maynard was technical editor at WoodenBoat for 40 years. A friend of Maynard's wanted to recognize those contributions to the culture.

"One of the friends from the wooden boat community heard about this collection coming to the Friend Memorial Library," Baird says, "and that friend said he'd raise $500,000 to put Anne and Maynard's names on the maritime research center."

Photo credit: Benjamin Mendlowitz

Mendlowitz says that from an artistic perspective, the images he's most interested in from his collection capture unique light, but he also understands the practical value of all his unseen slides becoming available to the public: "It's mostly a record, a visual record of wooden boats. Since wooden boats are unique - hey're not usually a class boat with multiple copies - a lot of them continue to exist today. If somebody purchases a wooden yacht and is undertaking a restoration of it, or it's been restored, they would be able to go back into the archives and discover what the boat was like 40 years ago when I photographed it. That has a lot of appeal to me, to think about somebody who is passionate about a boat they just acquired being able to go back and look at it."

The whole endeavor has been wonderful, Baird says, not only for the Brooklin community, but also for the global community of people who love wooden boats.

"That's the thing that's really great about it," he says. "This is a fun, positive project in a world today with so many things that can be so discouraging. It's great to be able to focus on good things."

Sustainability breakthrough as industrial alliance unveils circular model for nautical construction

Industry leaders have joined forces to revolutionise boat manufacturing with a circular economy model, so that boats can now be built using recycled materials. This pioneering collaboration to achieve circularity in boat production, launched in Western France, offers a model for composite sustainability.

This breakthrough initiative unites various global leaders in their field:

- Groupe Beneteau, world's leading manufacturer of sailing and motorboats
- Veolia, global leaders in waste management and environmental services
- Composite Recycling, pioneers in recycling composite waste
- Arkema, a world player in specialty materials
- Owens Corning, pioneers in glass reinforcements innovation
- Chomarat, specialists in technical textiles and composite reinforcements

For sailors and boat enthusiasts, the initiative lays the groundwork for a sustainable future, with boats built from recycled materials to reduce the sport's environmental impact.

Beyond the marine industry, the collaboration demonstrates how circular manufacturing can be applied across industries reliant on composites, including automotive, aerospace, wind energy, and construction. By diverting waste from landfills and conserving resources, this effort sets a high standard for composite sustainability as the industry works to reduce CO2 emissions.

The team believes this collaboration establishes a new benchmark for circular manufacturing in the nautical industry.

Production

Groupe Beneteau incorporates recyclable composite materials, including Arkema's Elium resin, into boat manufacturing.

Waste Collection

Veolia gathers composite production scraps and brings them to their site in Western France for recycling.

Recycling

Composite Recycling uses its next generation thermolysis technology to separate and recycle the scraps into reclaimed glass fibres and thermolysis oil.

Reintegration

Arkema transforms the thermolysis oil into new Elium resin, while Owens Corning produces new glass fibres and Chomarat produces new fibreglass reinforcements.

Reuse

Groupe Beneteau incorporates the recycled Elium resin and fibreglass into the manufacture of new boats, closing the loop.

"Sailing has always been a part of my life, so I'm especially proud that the first application of our industrial unit is within the marine industry," says Guillaume Perben, co-founder of Composite Recycling. "But this isn't just about sustainable boatbuilding; it's a proof of concept for every industry that uses composites."

"Elium resin was designed to make composites recyclable, and this initiative showcases how it works at scale," says Guillaume Cledat, Arkema global business manager. "By combining Elium resin with innovative recycling technologies, we're laying the foundation for a circular economy in composites."

Four years of research and development appears to have closed the loop on yacht production, enabling the extraction of useable glass fibres and resin in the recycling process that can feed back into the boat production loop.

"This collective approach is a decisive step in our commitment to accessible and sustainable boating. Our Jeanneau Sun Fast 30 One Design models and, more recently, Beneteau Oceanis Yacht 60 perfectly illustrate that circular manufacturing in the nautical sector is no longer a simple goal, but a tangible reality," says Erwan Faoucher, VP Innovation & Sustainable Development of Groupe Beneteau. "Once again in our history, we are showing audacity. The use of recycled resin reduces CO2 emissions by 70% compared to conventional polyester from the market. Whereas in the past we made boats that were built to last, today we are able to design sustainable boats."

"Transforming glass waste into circular content is a key element of Owens Corning's sustainability strategy, and our competitive advantage in the composites industry," says Chris Skinner, vice president of Glass Reinforcements Strategic Marketing and R&D at Owens Corning. "This project provides a powerful demonstration of how we are unlocking our ability to achieve circularity for our customers, our industry, and the world we share."

"At Veolia, we are always working to develop innovative and sustainable solutions through industrial collaborations," says Marie Glorennec, head of innovation at Veolia Recyclage et Valorisaiton des Déchets Centre-Ouest. "Thanks to these new advances in recycling technology, we're proud to be able to provide our clients with better waste treatment alternatives that drive circularity in the composites industry."

"Chomarat is committed to advancing composite sustainability while maintaining the highest standards of performance," says Vincent Cholvy, head of glass composites at Chomarat. "This project showcases how recycled fibres can be seamlessly reintegrated into new high-quality materials, helping industries move toward circularity."

"We have entered a new era where products are made recyclable by design, and this powerful collaboration is a prime example. Working alongside such large and visionary partners is a huge opportunity for us," says Dr Pascal Gallo, co-founder of Composite Recycling. "It feels like we are standing on the shoulders of giants and makes the scale-up journey of Composite Recycling faster and more impactful. Together, we're leading the way towards a circular economy for composites."

The basics of solar panel design

By Mike Garretson

Mike Garretson is the President of Sea & Land Yacht Works, a marine service company specializing in electronics and electrical systems in Wakefield, RI. He has a Bachelor of Science in mechanical engineering from Penn State University and is a Master ABYC Technician.

Solar panels provide a clean, quiet, and sustainable energy source. A well-designed solar system ensures your batteries stay charged and your systems run without relying on noisy generators or shore power.

In this guide we'll tell you about the essentials of a boat solar installation. By understanding these components, you can create a tailored solar setup that meets your boat's energy needs, reduces fuel dependency, and aligns with the growing demand for eco-conscious marine solutions.

Charge Controllers

A charge controller is a critical component of any solar installation, ensuring that the voltage from your solar panels is safely and efficiently converted to match your battery bank's charging profile. There is a significant performance difference between the two leading charge controller types.

MPPT (Maximum Power Point Tracking) controllers are widely regarded as the superior option for solar charging, especially on boats where space for solar panels is limited. These controllers step down the voltage from the panels while boosting the output amperage, achieving impressive efficiency levels of 94 to 97 percent. Though MPPT controllers come at a higher cost, the benefits often outweigh the expense. Many MPPT controllers also include advanced features like Bluetooth connectivity, enabling real-time monitoring of your solar output.

PWM (Pulse Width Modulation) controllers, often found in budget-friendly solar kits, are simpler but less efficient. These controllers regulate voltage by pulsing power from the solar panels to the battery bank, using the time in between to average out to the charge voltage. However, this method can result in significant energy loss, with efficiency as low as 50 percent of the solar array's potential output.

While they are inexpensive, PWM controllers are not suitable for marine use due to their lower performance and concerns over build quality. Poorly made PWM controllers can sometimes fail to regulate voltage properly, risking overcharging and potential damage to batteries. For most boaters, investing in an MPPT controller is not only safer, but a more efficient choice for meeting on-the-water energy demands.

Making Connections

How you connect your solar panels plays a significant role in the system's efficiency and overall output. Each wiring configuration has its advantages, but the right choice depends on your solar array size, potential panel shading and charger/wiring limitations.

Parallel Connections: In a parallel configuration, the positive leads of all panels are connected together, as are the negative leads, typically using branch parallel adapters. This setup is particularly effective for boats, as shading on one panel has minimal impact on the overall efficiency of the array, unlike in a series configuration, where shading can significantly reduce output.

When calculating the electrical properties of a parallel array, the voltage of the panels remains constant, while the amperage increases with each additional panel. This increase in amperage can present challenges, as most standard solar connectors and 10-gauge solar wires are rated for a maximum of 30 amps. This limitation restricts the number of panels that can be safely connected in parallel without upgrading to thicker wires or higher-rated connectors.

Series Connections: When solar panels are connected in series, the voltages of each panel are added together, while the amperage remains the same. This configuration is ideal for larger solar arrays not subject to shading, as the solar connectors and wire will be able to handle a high overall wattage output when compared to a parallel array.

However, it is critical to understand that if one panel is shaded or damaged, the output of the entire array drops.

Individually Regulated Setups: An alternative to series and parallel configurations is using individual charge controllers for each panel. This setup prevents overloading of connectors and wires, common in parallel arrays, and offers redundancy if panels are shaded. However, it requires running additional wires (two per panel) and comes with the added cost of extra charge controllers.

Additional Components

In addition to selecting the solar panels, charge controller, and the wire configuration, choosing the proper components to complete this installation is important.

Solar Wire: Solar wire comes in various insulation types, with PV wire being the preferred option because it uses stranded tinned conductors. Followed by PV wire, USE-2 is also a good recommendation, providing additional UV protection and chafe resistance. Standard marine wire should not be used because it has thinner insulation and a higher possibility of water intrusion into the connectors.

MC4 Connectors: MC4 connectors are a specialized connector designed specifically for solar panel systems and provide a watertight locking connection suitable for the outdoor environment. These connectors can be self-installed but require a special crimper to ensure proper installation. Failure to properly crimp these connectors can lead to additional resistance and, in extreme situations, result in fire. MC4 connectors should be selected based on the wire gauge being used. Note: They are typically rated for up to 30 amps of current.

Solar Fusing: Just like any other electrical system, proper fusing is an absolute requirement for marine solar systems. It not only protects against chafe and short circuits but also protects against possible fires from a fault panel. Proper fusing for solar systems starts at the battery, where the fuse is selected for the wire gauge used to connect to the solar controller.

On parallel systems, when the short circuit current of the entire array is greater than the maximum series rating listed on the panel, fuses must be installed on all parallel branches, and they must be sized to the maximum series fuse rating. When this is not the case, individual panel fuses are not required but they should still have a dual pole solar disconnect below deck. Although not listed in ABYC code, these requirements are considered a best practice.

Note, the cheaper dual pole disconnects tend to have a higher likelihood of internal failure. This is why we typically opt for rotary disconnects, or DIN mount fuse systems, which allow for easy disconnection of each pole.

Power Optimizers: Power optimizers are designed to maximize each panel in a series configuration and are typically reserved for the commercial or home installation. With a high failure rate, the benefits are not worth the risk when installed on a boat and should be avoided.

This story was published in the February 2025 issue of Soundings magazine and is republished here with our thanks.

Mounting Options

There are multiple mounting options available for boats, and the preferred method depends on the boat type, wattage requirements and aesthetic concerns.

Canvas Solar Integration: Integrating semi-flexible solar panels into canvas dodgers and Biminis is a great way to add solar while not affecting the boat's lines or appeal from afar. With this mounting style, panel dimensions are typically the greatest concern, as many arrangements require some Tetris skills to meet the minimum required wattage for running a refrigerator.

When securing panels onto canvas, it's important to ensure that the panels are secured with Velcro or zippers, and the canvas is protected from chafe. Some boaters have used rare earth magnets to secure solar panels on canvas, but high-wind events can cause failure.

Deck-Mounted Panels: Semi-flexible panels can be walked on, which makes them a great option for deck mounting. For deck applications, choose textured semi-flexible panels that have underside-mounted diode boxes. These panels provide better grip, eliminate extrusions that can jam a toe or cause a trip, and eliminate on-deck wiring. These panels do require routing into the deck to make space for the diode box and wires, and because they are attached with marine sealant, you should purchase premium solar panels to ensure maximum lifespan.

Rigid panels can also be deck mounted, and on powerboats with a large amount of additional real estate, they can be a great option due to their lower cost and longer lifespan. Rigid panels require mounting feet to secure to the deck and cable clams for waterproof cable pass through. This option is best reserved for large unobstructed hardtops that can accommodate a 400-watt-plus sized panel and gets no foot traffic.

Davits/Arches: Typically reserved for sailboats, davits and arches are a great location to install rigid panels. Although this type of installation will affect the lines and aesthetics of your boat, it will provide a premium location with lower risks of shading.

This option has the potential to protect your dinghy from the sun, as well as provide shade in the cockpit. If you're planning to install solar on your davits, be sure to take the panel height into account when using your stern ladder. Your stern pulpit may also need reinforcing to handle the additional load.

Lifelines Wing Mounts: Typically reserved for sailboats, mounting solar panels on your lifeline is a great option when trying to optimize every last inch for maximum solar output. This method typically involves installing a stainless rail between stanchions and a rigid panel.

For boaters looking for a lighter option, LightLeaf Solar manufactures an adjustable panel stabilized with carbon fiber.

The benefits and challenges of electric propulsion for recreational boats

By Maciej Rynkiewicz, Standards Developer, ABYC

Electric propulsion systems are making waves in the world of recreational boating. As technology evolves, these systems bring plenty of perks compared to traditional internal combustion engines. At the same time, they also come with their own set of challenges. Let's dive into the benefits and hurdles of electric propulsion for recreational boats, giving boating enthusiasts and industry folks a clear picture of what's on the horizon.

Environmental consideration

Electric propulsion can be a significant win for the environment. It doesn't produce emissions while running, which helps to keep marine ecosystems clean and reduces your boating carbon footprint. However, the lack of emissions while the boat runs is only one part of the boat's overall environmental impact. It's crucial to consider how the energy used to recharge your electric boat is produced - whether that energy comes from renewable sources or fossil fuels. Additionally, the sustainability of battery manufacturing and the recyclability of the batteries are important factors. These and many other considerations will influence the final rating on the eco-friendly scale.

Electric propulsion simplifies the integration of renewable energy by allowing electric boats to be recharged using solar panels or wind turbines. This reduces reliance on fossil fuels, making boating more sustainable.

It's also essential to recognize that electric propulsion is not a one-size-fits-all solution to environmental concerns. There are other ways to reduce the environmental impact of recreational boats. Internal combustion engines powered by renewable liquid fuels or hydrogen propulsion systems are also viable options for decarbonizing recreational boating.

Electric boats are significantly quieter than those with combustion engines, reducing noise pollution and enhancing your boating experience. Whether you're fishing, watching wildlife, or simply cruising, the silent operation of an electric boat makes the experience more enjoyable for both the user and people onshore.

Performance

Current battery technology may not match the energy density of fossil fuels, but electric motors are remarkably efficient. They convert nearly 90% of electrical energy into mechanical energy. In contrast, even the most advanced internal combustion engines achieve peak efficiency of only 20-40%, with significant energy losses primarily due to friction (heat). The laws of thermodynamics fundamentally limit the efficiency of all combustion engines, leaving little room for improvement.

Instant torque is a hallmark feature of electric motors. Unlike combustion engines that require revving up to reach peak power and torque, electric motors deliver maximum rotational force from the moment they start spinning. This means they can provide full torque immediately. This immediate torque delivery is one of the key advantages of electric boats, making them quicker off the mark and more agile compared to traditional combustion-powered vessels.

Maintenance

One of the great advantages of electric propulsion systems is their simplicity. With fewer moving parts, there is less that can go wrong. You won't have to deal with oil changes or replacing fuel filters anymore. That means fewer headaches and lower maintenance costs. Instead of maintaining the engine, you'll have more time to enjoy cruising on the water. Electric power makes boating smoother and more carefree, so you can focus on the fun parts of being out on your boat.

Range, refuelling and charging infrastructure

One of the significant drawbacks of electric propulsion is its limited range. Current battery technology doesn't match the energy density of fossil fuels, so electric boats typically can't travel as far on a single charge. This limitation can be a deal-breaker for long-distance cruising or activities that keep you on the water for extended periods without refuelling. However, this drawback can be mitigated with the potential for onboard power generation, including renewable sources.

It's worth noting that since lithium-ion batteries debuted commercially three decades ago, battery technology has continued to evolve. While most significant improvements have occurred on the lithium-metal-oxide cathode side, graphite anodes have largely remained unchanged. Now, a promising new anode technology is on the horizon. Silicon has long been considered a viable medium for anodes because it can hold ten times as many lithium ions by weight as graphite. If this translates into improved battery energy density, it could be a game-changer for electric propulsion, akin to the transition from lead-acid to lithium-ion batteries. After several years of research and incremental improvements, silicon-anode technology finally appears ready for commercial implementation.

Recharging batteries takes longer than filling up a gas or diesel tank. While fast-charging technology is improving, it still can't compete with the convenience of quickly refuelling at a pump. This can be inconvenient for boaters who need to get back on the water quickly, especially if charging stations are sparse.

There is still significant room for improvement in charging infrastructure and the availability of fast charging stations. Not all boaters, however, will require access to fast charging, as many will be satisfied with overnight charging from traditional shore power. However, marinas' electrical infrastructure may not yet be equipped to handle large fleets of electric boats.

Efforts to expand the charging infrastructure for electric boats are already underway. Marinas and docking facilities are starting to install charging stations, and mobile charging solutions are being developed. As the network grows, the convenience and practicality of electric boating will improve, encouraging more boaters to make the switch.

Standards and regulations

Electric propulsion systems are an increasingly important part of the recreational marine industry. Ensuring the safety of boats is a key reason why ABYC, established over 70 years ago, is actively involved in creating standards that promote boating safety through proper design, construction and installation of boat systems, including electric propulsion systems.

Standard E-30, Electric Propulsion, specifically addresses systems over 60 V DC, while low voltage systems must comply with the E-11 standard. US experts are also actively engaged in the development of ISO 16315 to harmonize boatbuilding requirements globally.

A significant challenge is the lack of proper standards for installing charging stations in marinas. This area is typically governed by NFPA 70, National Electrical Code. We anticipate that the 2026 review of this document will provide relevant guidance for the installation of boat-charging stations.

We continuously monitor regulatory activities both in the United States and globally. Additionally, we are developing a document that will address the unique challenges of charging boat batteries from shore-based charging stations, including communication, ground fault protection and integration with other onboard systems.

Wrapping it up

Electric propulsion for recreational boats offers numerous advantages, including being environmentally friendly, quiet, efficient and low maintenance. These benefits make electric boats an appealing choice for eco-conscious and technology-savvy boating enthusiasts. However, challenges such as limited range, high initial costs and the current scarcity of charging stations present significant hurdles.

As battery technology advances and charging infrastructure expands, electric boats have opportunity to become a more viable and attractive option for recreational boating. With ongoing innovations and improvements, electric propulsion systems are set to play a significant role in the evolution of the recreational marine industry.

Can you name the top 10 ship building countries in the world?

*By **Zahra Ahmed**, an alumna of Miranda House, University of Delhi.*

The shipbuilding industry is growing at a tremendous rate, with its market size expected to increase from USD 155.58 billion in 2025 to 203.76 billion in 2033, owing to greater container, dry bulk trade and the opening of new markets, per Straits Research. Around 85% of shipbuilding activities are concentrated in China, Japan, and South Korea, which are the top shipbuilding countries in the world.

Shipbuilding, which involves the construction of large seagoing vessels, manufacturing marine equipment, and refurbishing old vessels, is a lucrative industry, propelled by the rising sea trade between countries, as the world population increases amidst rising consumer demands worldwide.

Apart from commercial vessels, naval ships are also witnessing an increased demand with several navies like the Chinese and American, building new ships to showcase naval prowess.

1. China

China is the world's largest shipbuilding nation, and this dominance can be attributed to factors like government subsidies, industrial policies like 'Five Year Plans', the 'Belt and Road Initiative' and 'Made in China 2025'.

Chinese shipyards booked 74% of all new-build orders in 2024. Per the data shared by the China Association of the National Shipbuilding Industry, the country got 113.05 million DWT of new build orders.

The total orderbook stood at 208.72 million DWT by December 2024, a 49.7% increase from 2023. Output from the shipyards also increased in 2024, with a 13.8% year-on-year increase to reach 48.1 million dwt, equating to a 55.7% share in the global market.

Chinese yards are shifting their focus from dry bulkers to low-carbon ship types, like cruise ships, and green vessels such as LNG carriers and container ships. The country is also retiring old warships and building muti-mission naval vessels with advanced technology.

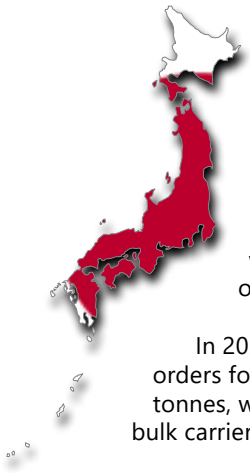
2. South Korea

The South Korean Shipbuilding Industry contributed around USD 700 billion to its economic exports and is dominated by three shipyards; Samsung Heavy Industries, Hanwha Ocean, and HD Hyundai Heavy Industries which secured orders for 112 vessels worth US$ 12.1 billion, 26 vessels worth US$ 5.7 billion, and 22 vessels worth US$ 4.9 billion in 2024, per the Observer Research Foundation.

China secured 46.45 million compensated gross tonnes, while South Korea reached 10.98 CGT across 250 ships.

South Korea's biggest competitor is China, a leader in tankers, containers and bulkers, benefitting from rapid shipyard expansion allowing it to build more vessels, with orders extending till 2029 and full yards till 2027. To counter this, South Korea plans to increase its investments in strategic projects.

Recently, Hanwa Systems and Hanwa Ocean invested US$ 100 million in the US Philly Shipyard. Seoul will also build on its strengths in research and development, vessel design and procurement.



3. Japan

Around 20% of the global output is produced by Japanese shipping companies, making it the third biggest shipbuilding country in the world. Bulk carriers fill up most part of the nation's orderbook.

In 2024, Japanese shipbuilders received orders for 251 vessels worth 11,160,206 gross tonnes, which included 24 cargo ships, 196 bulk carriers and 31 liquid cargo vessels.

The Japanese shipbuilding industry is focussing on innovating and developing eco-friendly high-tech ships, emphasising on alternative fuels and decarbonisation strategies to meet global maritime emission standards.

Japan is known for its quality and efficiency in ship design and construction, including active research in developing LNG vessels and exploring options like hydrogen-powered ships. As of March 2024, Kawasaki Heavy Industries Ltd was the biggest publicly listed shipbuilder in Japan by total assets.

While Japan is a major shipbuilder, it faces challenges like high manufacturing costs due to advanced technology integration and environmental compliance, rising prices of raw materials and labour costs which make Japanese vessels less competitive than other countries.

4. Italy

The Italian Shipbuilding Industry is rooted in its rich heritage and artisanal excellence. It is known for building luxury yachts, cruise liners and commercial vessels.

In 2024, the Italian Shipbuilding sector was dominated by Fincantieri, one of the biggest shipbuilding companies in the world. The country's shipbuilding sector is expected to witness moderate growth with a focus on specialised ships, especially in the cruise ship and naval ship markets.

A few prominent Italian shipyards and groups include Azimut Benetti, Sanlorenzo, Italian Sea Group, Overmarine, Cantiere delle Marche and Baglietto. Italian shipyards are widely recognised for their skills in refurbishing and modernising existing vessels, which attracts clients from across the world.

Italy also boasts a strong supply chain comprising local enterprises, enabling its shipping sector to maintain its position as one of the biggest while supporting the national economy and generating employment.

5. Germany

The German shipbuilding industry is known for its high-tech ship construction, marine engineering and design. In 2024, it employed 15,000 people and generated an annual revenue of USD 6.17 billion.

The country has 130 shipyards which offer an array of services to commercial vessels, inland ships, recreational craft and naval vessels, including providing general repairs and conversions.

Approximately 70% of ships made in Germany are sent to foreign markets and one-third of the revenue comes from naval orders, both for domestic and international markets.

German yards are also known for their expertise in building yachts and research vessels. Some of the biggest players include Meyer Werft, German Naval Yards, Lurssen and Thyssen-Krupp-Marine-Systems.

Germany is now focussing on custom-built vessels with sophisticated onboard systems to compete with Asian manufacturers which can build a vessel at lower costs.

6. United States

The U.S. shipbuilding Industry depends heavily on government contracts which account for 80% of the total revenue of the sector. Most contracts come from the Department of Defense, especially the Department of Navy and so changes in the defense budget have an impact on the shipbuilding industry.

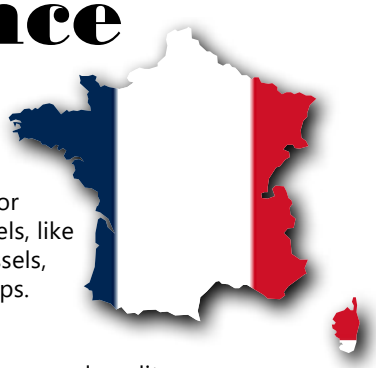
The shipbuilding industry has experienced moderate growth as tensions with China have led to increased defence spending.

The Navy's 2025 shipbuilding plan has a $32.4 billion budget required for building 6 new ships and a goal to expand the fleet to 390 battle force ships while retiring 19 existing vessels.

Its shipbuilding costs are estimated to average 40 billion dollars per year through 2054 as the navy plans to build more submarines, aircraft carriers, surface combatants etc. There are over 150 shipyards in the U.S with Virginia being the hub of military shipbuilding, since it is close to many military bases and its capabilities align with the national defence requirements.

The U.S. shipbuilding sector is expanding steadily. It employs 110,000 people and is a significant contributor to the country's GDP.

7. France



The French shipbuilding sector has a rich history and heritage going back centuries. The country has many specialised facilities for building sophisticated vessels, like commercial ships, naval vessels, luxury yachts and cruise ships.

It is known for its high-tech infrastructure, skilled workforce and quality workmanship. Though the industry has faced competition from its Asian counterparts, it is expected to be driven by increased investments and rising demands for advanced and eco-friendly ships. The industry generates around 32 billion euros of annual revenue and employs about 120,000 people.

The country's major shipbuilders include the Naval Group, which specialises in naval defence and Chantiers de l'Atlantique, one of the biggest shipyards which construct cruise ships, and commercial and naval vessels.

8. The Philippines

Manila's shipbuilding industry is considered one of the largest in the world, employing a massive workforce of about 48,000.

The industry is mainly concentrated in the Cebu region and is actively working to modernise and expand its capabilities through government initiatives like the Maritime Industry Development Plan to further solidify its position.

Companies such as Tsuneishi Heavy Industries (Cebu), Austal Philippines Pty Ltd., and Keppel Philippines Marine Inc. are key players in the industry. The country will focus on building container ships, bulk carriers and tankers for export. It is also seen as a potential hub for offshore wind energy development.

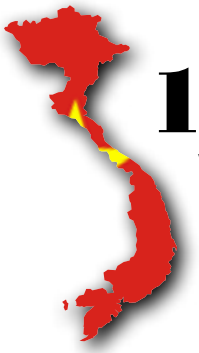
9. The Netherlands

The Netherlands is known for constructing innovative ships and its shipbuilding sector is famous for its technical expertise and specialisation in custom-designed vessels.

Around 398 businesses comprise the country's shipbuilding sector which grew at a CAGR of 5.3% between 2019 and 2024. The centre of shipbuilding is Rotterdam and the country builds naval ships, luxury yachts, dredgers and superyachts.

In 2023, the country completed 34 ocean-going vessels and the government invested €60 million in "innovative shipbuilding". It is also exploring autonomous navigation systems.

10. Vietnam



Vietnam's shipbuilding sector is expected to witness a CAGR of 6% from 2023 to 2032, with the value of produced ships reaching around $680 million by 2032.

The nation has around 120 operational yards, producing a total capacity of about 2.6 million tonnes annually, though the actual production is closer to a million tonnes per year. Most components are imported from nations like Japan, China, South Korea and European countries.

Many international companies are active in the country's main centres for shipbuilding; Hai Phong, Da Nang and Ho Chi Minh City.

Vietnam has an extensive port infrastructure with approximately 120 ports, of which 37 can accommodate ocean-going vessels. There are 9 main shipbuilding factories, two in the south with a capacity to build ships sized 25,000-50,000 DWT, in the centre are four factories while the north has the remaining three.

This article has been lightly edited from the original, which was first published on the Marine Insight website and is reprinted here with our thanks.

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The world's largest container ships

In recent years, the maritime industry has undergone a drastic transformation as container ships balloon in size.

By Andrew Yarwood, Brookes Bell

The construction of these Ultra-Large Container Vessels (ULCVs) capable of transporting well over 20,000 twenty-foot equivalent units (TEU), has been driven by the need for greater efficiency and economies of scale.

When compared to their contemporaries from the 1970s, which held loads of up to 3,000 TEU, these modern day container ships truly dwarf anything previously thought possible.

What has caused this growth?

This growth comes as no surprise, given that international shipping makes up nearly 90% of the global trade in goods, with approximately 50,000 container ships currently in operation. The same too can be found in the busiest cargo ports in the world, which are vastly increasing in size and capacity.

With demand for large, reliable goods transportation higher than ever before, the maritime industry needed to adapt. No stranger to innovation, shipbuilders around the world have taken on board the need for improved methods of transportation, which went beyond simply expanding the total capacity of container ships.

New hull designs and propulsion systems are at the forefront of efforts to reduce fuel consumption in container ships. Innovations such as hydrodynamic hull forms, energy-saving ducts, and air lubrication systems help minimise drag and improve fuel efficiency.

To tackle harmful emissions, many modern container ships are equipped with scrubbers and selective catalytic reduction systems. These technologies help reduce the levels of sulphur oxides (SOx) and nitrogen oxides (NOx) emitted during operations.

Shipping companies are increasingly adopting strategies to minimise waste, such as composting, recyclable packaging, and onboard waste treatment systems. These measures help reduce the environmental footprint of maritime operations.

Efforts to promote sustainable shipping include practices like slow steaming, which reduces fuel consumption by operating ships at lower speeds, and port electrification, which allows ships to plug into shore power while docked, reducing emissions. Additionally, research into alternative fuels, such as LNG and hydrogen, is ongoing to find more sustainable options for the future.

The top 20 biggest container ships in the world

The following are the 20 largest flagship container vessels as of 2025, ranked by maximum TEU capacity:

20. Ever Golden

Capacity: 20,124 TEU
Operator: Evergreen Marine
Class: Evergreen G Class
Flag: Panama
Dimensions: Length - 400 m, Beam - 58.8 m
Sister ships: Ever Goods, Ever Genius, Ever Given, Ever Gifted, Ever Grade, Ever Gentle, Ever Glory, Ever Govern, Ever Globe, Ever Greet

Launched in 2018, the Ever Golden and its sister ships form part of the Evergreen G Class, a series of 11 container ships built for Evergreen Marine by Imabari Shipbuilding in Japan. The Evergreen G Class ships range in TEU capacity from 20,124 to 20,388.

The sister ship, the Ever Given, drew global attention in March 2021, when it ran aground and blocked the Suez Canal for six days.

19. Ever Glory

Capacity: 20,160 TEU
Operator: Evergreen Marine
Class: Evergreen G Class
Flag: Liberia
Dimensions: length - 400 m, beam - 58.8 m
Sister ships: Ever Goods, Ever Genius, Ever Given, Ever Gifted, Ever Grade, Ever Gentle, Ever Golden, Ever Govern, Ever Globe, Ever Greet

Flying under the Liberian flag, the Ever Glory is part of the Evergreen G Class, capable of carrying 20,160 TEUs. The Ever Glory uses advanced technologies for better performance, and a reduced impact on the environment. The Ever Glory launched in 2019.

18. MOL Triumph

Capacity: 20,170 TEU
Operator: ONE (Japan) / Mitsui O.S.K. Lines
Class: The Triumph Class
Flag: Marshall Islands
Dimensions: Length - 399 m, Beam 58.8 m
Sister ships: MOL Trust, MOL Tribute, MOL Tradition, MOL Truth, MOL Treasure

Completed in 2017 by Samsung Heavy Industries in South Korea, the MOL Triumph is a container ship with a maximum cargo capacity of 20,170 TEU. It was the first container ship to break the 20,000 TEU threshold, a remarkable feat in 2017. In September 2022, during a 5-year inspection, the MOL Triumph was renamed to "ONE TRIUMPH".

17. MOL Truth

Capacity: 20,182 TEU
Operator: ONE (Japan)
Class: The Triumph Class
Flag: Panama
Dimensions: Length - 399 m, Beam - 58 m
Sister ships: MOL Triumph, MOL Tribute, MOL Tradition, MOL Truth, MOL Treasure

Part of the Triumph class of six container ships, the MOL Truth was completed in late 2017 for Ocean Network Express. Built by Saijo shipyards of Imabari Shipbuilding Company Limited, the MOL Truth is 399 meters long and 58 meters wide, capable of carrying 20,182 TEU. It uses low-friction hull paint, a high-efficiency propeller, and a high-efficiency engine plant to lessen its environmental impact.

16. Madrid Maersk

Capacity: 20,568 TEU
Operator: Maersk
Class: Maersk Triple E Class
Flag: Denmark
Dimensions: Length - 399 m, Beam - 58.6 m
Sister ships: Munich Maersk, Moscow Maersk, Milan Maersk, Monaco Maersk, Marseille Maersk, Manchester Maersk, Murcia Maersk, Manila Maersk, Mumbai Maersk, Maastricht Maersk

When it launched in 2017, the Madrid Maersk was the largest container ship in the world, but this was a short-lived title usurped by the OOCL Hong Kong. The Madrid Maersk was the second container ship to surpass the 20,000 TEU threshold, with an impressive 20,568 TEU capacity.

15. CMA CGM Antoine de Saint-Exupéry

Capacity: 20,954 TEU
Operator: CMA CGM
Class: Antoine de Saint-Exupéry Class
Flag: France
Dimensions: Length - 400 m, Beam - 59 m
Sister ships: CMA CGM Jean Mermoz, CMA CGM Louis Blériot

Taking its name from French author and aviator, the CMA CGM Antoine de Saint-Exupéry is the flagship of her class. This container ship boasts several eco-friendly features, including a new-generation engine and a ballast water treatment system. With a capacity of 20,954 TEUs, it serves the French Asia Line 1 (FAL-1), the longest sea route between Asia and Northern Europe.

14. COSCO Shipping Universe

Capacity: 21,237 TEU
Operator: COSCO
Class: Universe Class
Flag: Hong Kong
Dimensions: Length - 400 m, Beam - 58.6 m
Sister ships: COSCO Shipping Nebula, COSCO Shipping Galaxy, COSCO Shipping Solar, COSCO Shipping Star, COSCO Shipping Star

Made in 2018, COSCO Shipping Universe is a vital component of China's One Belt, One Road initiative. With a capacity of 21,237 TEUs, this vessel is the largest cargo ship in China, equipped with ABB Turbochargers for enhanced fuel efficiency, supporting trade between China, Europe, and Africa.

13. OOCL Hong Kong

Capacity: 21,413 TEU
Operator: OOCL
Class: G Class
Flag: Hong Kong
Dimensions: Length - 399.87 m, Beam - 58.8 m
Sister ships: OOCL Germany, OOCL Japan, OOCL United Kingdom, OOCL Scandinavia, OOCL Indonesia

Briefly snatching the title of largest container ship from the Mardid Maersk when it launched in 2017, the OOCL Hong Kong was the third ship to pass the 20,000 TEU threshold, and the first to pass 21,000 TEU.

Lead ship of the G class, the OOCL Hong Kong is an impressive vessel with a capacity of 21,413 TEUs. It links East Asia to Northern Europe through the Suez Canal, facilitating the efficient movement of goods between these major regions.

12. CMA CGM Jacques Saadé

Capacity: 23,112 TEU
Operator: CMA CGM
Class: Jacques Saadé Class
Flag: France
Dimensions: Length - 399.9 m, Beam - 61.3 m
Sister ships: CMA CGM Champs Elysées, CMA CGM Palais Royal, CMA CGM Louvre, CMA CGM Rivoli, CMA CGM Montmartre, CMA CGM Concorde, CMA CGM Trocadéro, CMA CGM Sorbonne

Named after the founder of CMA CGM, the CMA CGM Jacques Saadé is a pioneering vessel powered by liquefied natural gas (LNG), making it an environmentally sustainable option in the shipping industry.

With a capacity of 23,112 TEUs, she is the largest container ship to sail under the French flag, and plays a crucial role in the French-Asia trade route, supporting the global supply chain.

11. MSC Mina

Capacity: 23,656 TEU
Operator: MSC
Class: Gülsün Class
Flag: Panama
Dimensions: Length - 399.8 m, Beam - 61 m
Sister ships: MSC Isabella, MSC Arina, MSC Nela, MSC Sixin, MSC Apolline, MSC Amelia, MSC Diletta, MSC Michelle, MSC Allegra

The MSC Mina is part of the Gülsün class of container ships. Built by Daewoo Shipbuilding and Marine Engineering, with a capacity of 23,656 TEU, the Gülsün class was the first to feature 24 containers wide on deck. The MSC Mina operates for the Mediterranean Shipping Company.

10. Berlin Express

Capacity: 23,664 TEU
Operator: Hapag-Lloyd
Class: Berlin Express Class
Flag: Germany
Dimensions: Length - 399.9 m, Beam - 61 m
Sister ships: Manila Express, Hanoi Express, Busan Express, Singapore Express, Damietta Express, Hamburg Express

Delivered in 2023 to form part of Hapag-Lloyd's fleet, the Berlin Express has a load capacity of 23,664 TEU. The Berlin Express Class ships are equipped with dual-fuel technology, allowing them to run on LNG and alternative fuels like e-methane. It features a MAN main engine capable of over 75,000kW output, useful for serving trade routes across the Far East and Northern Europe.

9. MSC Gülsün

Capacity: 23,756 TEU
Operator: MSC
Class: Gülsün Class
Flag: Panama
Dimensions: Length - 399.9 m, Beam - 61.5 m
Sister ships: MSC Samar, MSC Leni, MSC Mia, MSC Febe, MSC Ambra

Built by Samsung Heavy Industries in South Korea, the MSC Gülsün was the largest container ship in the world when it launched in 2019.

Featuring a cargo system designed by MacGregor International AB, it has a wide breath that allows for 24 container rows, and a load capacity of 23,756 TEU. This design helps reduce the carbon footprint, aligning with the industry's move towards more sustainable shipping practices.

8. HMM Oslo

Capacity: 23,820 TEU
Operator: HMM
Class: Algeciras Class
Flag: Panama
Dimensions: Length - 399.9 m, Beam - 61.5 m
Sister ships: HMM Algeciras, HMM Copenhagen, HMM Dublin, HMM Gdańsk, HMM Hamburg, HMM Helsinki, HMM Le Havre, HMM Rotterdam, HMM Southampton, HMM Stockholm, HMM St Petersburg

Delivered in 2020 by Samsung Heavy Industries, the HMM Oslo is designed with a focus on environmental regulations, making it an eco-friendly container ship. With a capacity of 23,820 TEUs, tit was the largest container ship in the world upon delivery, though it has since been surpassed.

7. HMM Algeciras

Capacity: 23,964 TEU
Operator: HMM
Class: Algeciras Class
Flag: Panama
Dimensions: Length - 399.9 m, Beam - 61 m
Sister ships: HMM Oslo, HMM Copenhagen, HMM Dublin, HMM Gdańsk, HMM Hamburg, HMM Helsinki, HMM Le Havre, HMM Rotterdam, HMM Southampton, HMM Stockholm, HMM St Petersburg

Built by Daewoo Shipbuilding and Marine Engineering, the HMM Algeciras features an eco-friendly design with a scrubber system and smart hull design for energy efficiency. With a capacity of 23,964 TEU, the HMM Algeciras deployed on the FE4 service of THE ALLIANCE between Asia and Europe, having the largest capacity deployed.

6. Ever Ace

Capacity: 23,992 TEU
Operator: Evergreen Marine
Class: Ever A Class
Flag: Panama, Taiwan
Dimensions: Length - 399.9 m, Beam - 61.5 m
Sister ships: Ever Act, Ever Aim, Ever Alp, Ever Arm, Ever Art, Ever Apex, Ever Atop, Ever Alot, Ever Aria, Ever Acme, Ever Aeon, Even Alyy

Powered by a 2-stroke Wartsila engine, providing a cruising speed of 22.6 knots, the Ever Ace is part of the Ever A - or Evergreen A - class of container ships built by Samsung Heavy Industries and China State Shipbuilding Corporation. With a capacity of 23,992 TEU, the Ever Ace took its first voyage in July 2021.

5. Ever Alot

Capacity: 24,004 TEU
Operator: Evergreen Marine
Class: Ever A Class
Flag: Panama, Singapore
Dimensions: Length - 399.9 m, Beam - 61.5 m
Sister ships: Ever Act, Ever Aim, Ever Alp, Ever Arm, Ever Art, Ever Apex, Ever Atop, Ever Alot, Ever Aria, Ever Acme, Ever Aeon, Even Alyy

Built by Hudong-Zhonghua Shipbuilding Group Co, and China State Shipbuilding Corporation, the Ever Alot was given to Taiwanese Shipping Company Evergreen Marine in 2022.

The Ever Alot is equipped with hydrodynamic optimisation technology, enabling higher speeds and reduced fuel consumption, and features a load capacity of 24,004 TEU.

4. MSC Tessa

Capacity: 24,116 TEU
Operator: MSC
Class: Tessa Class
Flag: Liberia
Dimensions: Length overall - 399.9 m (1,312 ft), Beam - 61.5 m (202 ft).
Sister ships: MSC Celestino Maresca, MSC Gemma, MSC Mette, MSC Claude Girardet, MSC Nicola Mastro, MSC China, MSC Raya

The MSC Tessa belongs to the Tessa Class - sometimes known as the Hudong Class - and is renowned for its hybrid scrubber, large diameter propellers, and energy-saving ducts. Based on the Ever A Class ships, it features a capacity of 24,116 TEU, and primarily transports cargo between Europe and East Asia.

3. ONE Innovation Class

Capacity: 24,136 TEU
Operator: ONE
Class: ONE I Class
Flag: Liberia
Dimensions: Length - 399.95 m, Beam - 61.4 m
Sister ships: ONE Infinity, ONE Integrity, ONE Inspiration, ONE Ingenuity, ONE Intelligence

The ONE Innovation and its kin represent a significant leap in maritime transportation. Built by Imabari Shipbuilding and Mitsubishi Heavy Industries in Japan, the fleet was delivered in 2023 with the ONE Innovation as the flagship.

Featuring a capacity of 24,136 TEUs, these ships are designed to transport 25 rows of 40ft containers, serving liner services between Europe and East Asia.

2. OOCL Spain

Capacity: 24,188 TEU
Operator: OOCL
Class: OOCL G Class
Flag: Hong Kong
Dimensions: Length - 399.9 m, Beam - 61.3 m
Sister ships: OOCL Piraeus, OOCL Türkiye, OOCL Felixstowe, OOCL Gdynia, OOCL Zeebrugge, OOCL Valencia, OOCL Abu Dhabi

Acting as the flagship of the OOCL G Class for Hong Kong-based Orient Overseas Container Line, The OOCL Spain offers a capacity of 24,188 TEU. The OOCL Spain was one of eight ships constructed in the class by Nantong COSCO KHI Ship Engineering Co.

The OOCL G Class vessels are notable for their smart technologies that enhance operational efficiency, fuel economy, and safety. These ships primarily serve the Asia-Europe route, connecting major global markets.

1. MSC Irina

Capacity: 24,346 TEU
Operator: MSC
Class: Irina Class
Flag: Liberia
Dimensions: Length - 399.95 m, Beam - 61.3 m
Sister ships: MSC Loreto, MSC Michel Cappellini, MSC Mariella, MSC Micol, MSC Türkiye.

Currently the largest container ship in the world, the MSC Irina represents the pinnacle of modern container ship design. One of six flying under the Liberian flag, the MSC Irina and its kin are currently unmatched in size.

Built by Chinese Jiangsu Yangzijiang Shipbuilding Group in 2023, the MSC Irina features an impressive 24,346 TEU load capacity, and a smart design that enhances fuel efficiency. It utilises large propellers and an air bubble system to reduce water resistance, and also features hybrid scrubbers that cut down CO2 emissions by 3-4%.

The MSC Irina and its class primarily operate between Europe and East Asia, facilitating global trade.

Will container ships continue to grow larger?

The answer to that is not so straightforward.

Though the size and capacity of these modern day container ships may astound those of the past, the future of container shipping shows no sign of slowing.

It is no surprise that the top ten largest classes were all built from 2020 onwards, showcasing the vast rate of expansion capable as the world continues to adapt and evolve.

As global trade continues to expand, the demand for larger and more efficient container ships is expected to grow. These vessels will play a crucial role in meeting the increasing demand for goods and services around the world.

The shipping industry is continuously exploring new designs, propulsion systems, and alternative fuels to push the technological boundaries of container ships. Innovations in artificial intelligence and automation are also being integrated to enhance operational efficiency.

The future of container shipping holds the promise of even larger and more advanced ships. These vessels will likely feature improved efficiency, sustainability, and safety measures, further revolutionising global trade.

However, there are serious challenges that arise with a container ship fleet focused on growing bigger.

Ultra-Large Container Vessels (ULCVs) have made headlines for their sheer size, but their future is fraught with challenges that extend beyond the impressive dimensions. These giants of the sea, while promising economies of scale, bring with them a host of complexities that question the true benefits they offer.

On paper, ULCVs appear to be hyperefficient. Take, for instance, the HMM Algeciras. With its low-speed MAN B&W 11G95ME-C engine exceeding 50% thermal efficiency, it boasts a capacity just shy of 24,000 TEU. However, this figure represents only the dimensions of the containers, not their weight. Assuming each container weighs approximately 14 tonnes, the HMM Algeciras can realistically carry around 16,800 TEU before reaching its weight limit.

While it might seem more fuel-efficient for a single ULCVs to transport cargo compared to multiple smaller vessels, the reality is more nuanced. Smaller ships - with utilisation rates often around 80% - are easier to book cargo on. Ships like the HMM Algeciras frequently operate with load factors rarely exceeding 60%, and sometimes even less. Additionally, the assumption that these ships will always sail the most efficient routes is questionable.

With the ongoing situation with the Panama Canal casting uncertainty over the popular trade route's future, or the hefty canal tolls of the Suez Canal, many container ships may be forced to determine whether burning 1000s of tonnes of fuel extra is a more suitable alternative to the political and financial ramifications associated.

Port infrastructure presents another significant challenge. Only a limited number of hub ports can accommodate the massive investments required for a fully loaded ULCV. Maintaining the necessary depth in port approaches and berthing areas demands constant dredging, which is both costly and environmentally damaging. New cranes with greater overreach must be installed to handle the 24 containers across ULCV decks. The strategic placement of these hubs remains a contentious issue, as competing European ports continuously outdo each other in depth, capacity, and fee reductions, often without considering end-user demand.

"In both agriculture and container shipping, policies – notably those of the European Union – are designed to pursue economies of scale," Ports and Shipping Expert at ITF, Olaf Merk wrote in Transport Policy Matters, drawing parallels between big shipping companies and big agriculture.

"There is of course another major difference: agriculture is vital, [but] container shipping is essential to the extent that global trade is. With many world leaders pleading for more regional sourcing, long-range containerised transport might be less inevitable than thought – which opens the perspective for possible fundamental change".

Of course, an economy based on endless growth is unsustainable - a point Merk raises as he suggests that public policies can change. This may lead to a focus on smaller, more environmentally friendly ships leading the charge.

What the future holds for the maritime industry remains uncertain, and while there are a great many benefits to building bigger and bigger, so too are there concerns. Advancements in technology may hold the key to more efficient goods transportation, which may well see the giants of this list relegated to the history books. Only time will tell.

bigger is not necessarily better

This article by Brookes Bell first appeared on the company's website and is republished here with our thanks.

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MENTAL HEALTH AND THE MARINE SURVEYOR

By ***Frances Birkett***

Working in the maritime industry can be a risky business. Seafarers are challenged on a physical, mental and emotional level. Their profession can mean they work long and irregular hours, sometimes in extreme conditions, and depending on the nature of their role, expose themselves to hazardous materials and chemicals. To be able to do their job safely, they need to trust the vessel they work on is in good condition.

That's where the marine surveyor steps in. They are the ones who examines a vessel to ensure it complies with international and local safety regulations and is fit for purpose.

So that's the physical element covered, but what about the mental and emotional toll of working in this industry?

There are numerous studies that look into crew wellbeing. In a press release, the International Seafarers' Welfare and Assistance Network's (ISWAN) said that in the first half of 2024, its SeafarerHelp helpline saw a 17% increase in the number of contacts relating to mental health concerns, with 109 seafarers contacting SeafarerHelp, up from 93 in the same period in 2023. This included 15 cases in which the seafarer raised thoughts of suicide.

In 2019, the ITF Seafarer's Trust and Yale University released a study which found that 25% of surveyed seafarers had scores suggesting depression, 17% suggesting anxiety, with 20% of surveyed seafarers reporting suicidal ideation.

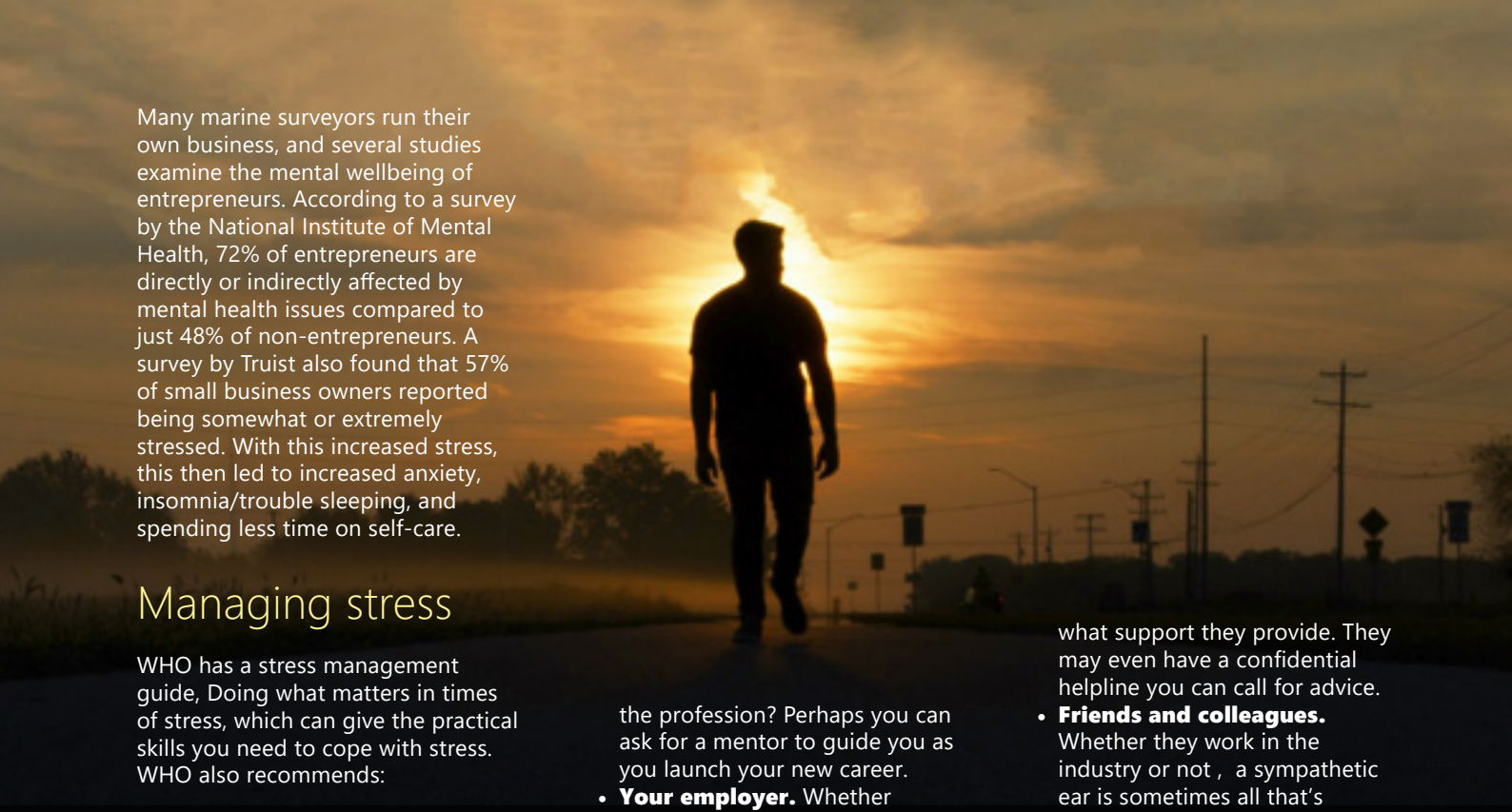
But when it comes to the mental wellbeing of marine surveyors, there was little information out there. In researching mental health for marine surveyors, I'm not saying there aren't any articles on the subject, but I certainly struggled to find them.

Marine surveyor mental wellbeing

However, there are similarities between the work life of a seafarer and a marine surveyor. A marine surveyor can also work long and irregular hours, sometimes in extreme conditions and in isolation too. Depending on the nature of the survey, they can expose themselves to hazardous materials and chemicals. And like seafarers, their role can also be a lonely and lonesome one.

As a marine surveyor you may come across difficult clients, struggle to drum up business, experience cash flow problems, or feel like you have no one there to support you – all classic symptoms facing a small business owner.

As you can imagine (or even personally attest?) this can lead to a stressful occupation. The World Health Organization (WHO) has said an estimated 12 billion working days are lost annually to depression and anxiety at a global cost of US$1 trillion per year in lost productivity.



Many marine surveyors run their own business, and several studies examine the mental wellbeing of entrepreneurs. According to a survey by the National Institute of Mental Health, 72% of entrepreneurs are directly or indirectly affected by mental health issues compared to just 48% of non-entrepreneurs. A survey by Truist also found that 57% of small business owners reported being somewhat or extremely stressed. With this increased stress, this then led to increased anxiety, insomnia/trouble sleeping, and spending less time on self-care.

Managing stress

WHO has a stress management guide, Doing what matters in times of stress, which can give the practical skills you need to cope with stress. WHO also recommends:

- Keeping a daily routine
- Getting plenty of sleep
- Eating healthily
- Exercising regularly
- Connecting with others

IIMS member, Martin Pittilo FIIMS, has been working in the marine industry since 1988 and surveying small craft since 2007. He shared his concern for marine surveyors who work on their own, who may have little support and possibly feel isolated with no one to help them rationalise what is going on. He added having a well-developed support network is crucial and can make it much easier to cope.

Mental health resources

Mental health services and organisations vary country to country. However, there numerous options available to marine surveyors that can provide support and peace of mind no matter where you are based:

- **Professional bodies.** Work on your own? Membership organisations, like the International Institute of Marine Surveying (IIMS), don't just help prove your expertise. Peer networking opportunities are also a way to ask for help and remind you that you're not alone (even if you work alone). New to the profession? Perhaps you can ask for a mentor to guide you as you launch your new career.
- **Your employer.** Whether you work for a small business, a classification society or as a government-appointed marine surveyor, there's a good chance your employer has some sort of mental health at work service. This could come in the form of an Employee Assistance Programme, a mental health and wellbeing hub or even a mental health first aider.
- **Medical assistance.** Your mental health is as important as your physical health. If you are really struggling, ask an expert and seek medical help. Resistant to the idea or don't like going to the doctor? Check out your local mental health charities and see what support they provide. They may even have a confidential helpline you can call for advice.
- **Friends and colleagues.** Whether they work in the industry or not , a sympathetic ear is sometimes all that's needed to help put things in perspective. They may not be able to help you solve what's causing you stress or anxiety, but the act of talking it out may help you come up with ideas on how to better manage your situation.

Mental health for in the maritime sector is a growing concern. However, efforts are being made by the wider industry to understand and provide support, and the stigma surrounding mental health is shrinking each year. Remember the adage: don't ask, don't get. Looking after your mental wellbeing doesn't just help you personally but also professionally. Help is out there. You just need to ask and seek.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Consequences of incidents involving battery powered vessels

ITOPF has studied the potential damage and liabilities arising from a shipping incident involving a lithium-ion (Li-ion) battery powered vessel.

In its "Fate, Behaviour, Potential Damage & Liabilities Arising from a Shipping Incident Involving a Li-ion Battery Powered Vessel" report, at least half of existing vessels with Li-ion batteries utilise the technology as part of a hybrid system paired with a traditional combustion engine using conventional fuels (or possibly biofuels).

Li-ion batteries can be considered as inert when functioning normally and do not pose the same risk of pollution as the fuel oils in traditional combustion engine propelled vessels. However, if damaged, Li-ion batteries have the potential to undergo thermal runaway, generate large vapour clouds, and result in vapour cloud explosions.

Thermal runaway is an internal exothermic reaction resulting in the release of explosive and toxic gases. Within a battery cell, the chemical reactions that store and release electrical energy produce small amounts of heat. This is usually regulated by natural heat dissipation or by active thermal management systems.

The point at which a battery will go into thermal runaway cannot be predicted with certainty but is more likely to occur after excessive heat exposure if the battery is physically damaged, or is overcharged. Increased heat production increases the reaction rate, in turn producing more heat, which then leads to uncontrolled positive feedback: the thermal runaway.

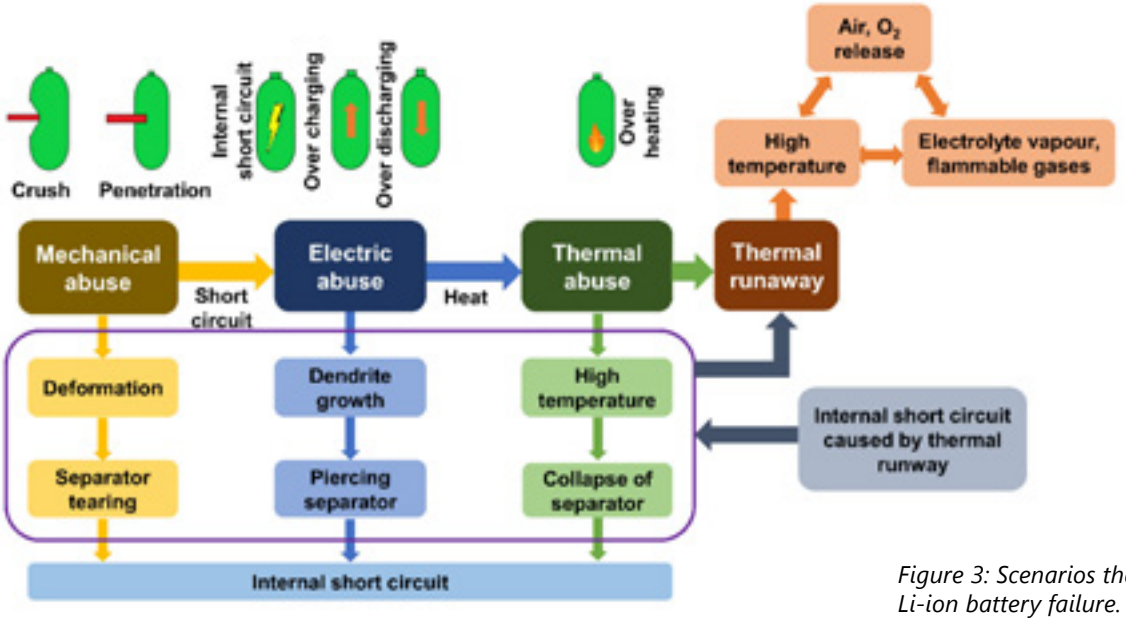

Figure 3: Scenarios that can lead to Li-ion battery failure. Image credit: ITOPF

The sharp rise in internal battery temperature causes the inner structures of the battery to destabilize and degrade, which leads to failure of the battery. This will result in extremely high temperatures and may lead to jet-like flames emanating from the battery on very short timescales (seconds to minutes).

This is a self-sustaining heat source that is challenging to extinguish, with the potential to reignite hours to days after the initial flames have been extinguished. If a battery undergoes thermal runaway, the resulting flames and/or explosion are likely to result in the propagation of thermal runaway to neighbouring battery units.

When a Li-ion battery enters thermal runaway, prior to ignition, a large white vapor cloud will be produced. The greater the power density of the battery, the greater the amount of gas likely to be produced.

Li-ion battery fires and maritime incidents

Li-ion batteries within a propulsion mechanism are not necessarily more prone to fire compared to traditional combustion engines, however, the consequences can be more significant because they are far more difficult to extinguish and are capable of spontaneously reigniting hours or days after the initial fire has been extinguished. From recent industry experience of incidents involving Li-ion battery-powered electric vehicles (EVs) being transported at sea, the speed at which thermal runaway initiates and the ability of the Li-ion batteries to sustain fire may lead to the vessel sinking or being declared a constructive total loss (CTL).

Hazards of Li-ion battery incidents

Flammability

A Li-ion battery in thermal runaway provides a self-sustaining ignition source. The vapour cloud produced during thermal runaway is made up of a number of flammable gases, therefore a sustained fire is likely. If gases are vented at high pressure, jet-like flames may be produced. Given that thermal runaway produces a self-sustaining heat source and generation of oxygen, Li-ion fires can be difficult to extinguish. Extinguishing external flames will not remove the risk of fire; the internal battery temperature must be reduced, and thermal runaway stopped to prevent further fire. Batteries undergoing thermal runaway are also prone to reignition hours to days after the initial flames are extinguished.

Explosion
If the Li-ion battery undergoes thermal runaway but the gases do not escape the battery unit, a confined VCE is likely to happen with little warning. The explosion is likely to cause ejection of shrapnel. If the gases vent from the battery into the surrounding area during thermal runaway, there may be a delayed explosion or ignition if the gas saturates a confined area.
If a Li-ion battery has entered into thermal runaway and is emitting flames, any response measures that extinguish the fire without reducing the battery temperature and halting internal thermal runaway may change the primary hazard from fire to explosion.

Toxicity
Several gases emitted during thermal runaway are considered toxic, but the exact composition of the vapor cloud depends on the type of battery being used. The gases of most concern in terms of toxicity are carbon monoxide (CO), benzene (C6H6), nitrogen dioxide (NO2), hydrogen chloride (HCl), hydrogen fluoride (HF), hydrogen cyanide (HCN), and toluene (C7H8). When considering the relative quantity of gas produced and the Immediately Dangerous to Life or Health (IDLH) values, laboratory studies have shown that CO, NO2, and HCl will be the first gases to reach their IDLH values. The IDLH values of many of the toxic gases are lower than the approximate LEL. Therefore, the atmosphere is likely to be toxic to levels damaging to human health before it reaches its ignition level.

Corrosivity
Several of the gases likely to be produced when a battery enters into thermal runaway are corrosive. Of note are HCl, HF, and HCN. Following exposure to the water vapor naturally present in air, these corrosive gases will form dense white corrosive vapours.

Asphyxiant
Like with any gas in a confined environment, such as a vessel engine room or cargo deck, high concentrations of vapours can displace oxygen in the air, decreasing oxygen availability and therefore leading to asphyxiation to those present in these confined environments without suitable breathing apparatus.

Ecotoxicity of firefighting water run-off
Large quantities of water are typically used to manage Li-ion batteries in thermal runaway. However, since Li-ion batteries contain various metals and solvents, and the vapor cloud also contains several harmful gases and heavy metals, the impact of the firefighting water run-off should be considered.

In addition, there is evidence that thermal runaway in Li-ion batteries can continue even when submerged in water. There is little research into the impacts of such an incident, but any gases that are released into the water may dissolve or rise to the surface, and there may be impacts to the environment linked to any dissolved toxic gases.

Key points for consideration to note:

1 Legal framework
Pollution relating to vessels powered solely by Li-ion batteries is not covered specifically by an International Convention at present, with liabilities relating to a Li-ion battery incident a matter of national legislation. Li-ion batteries transported as cargo are classed as dangerous goods by the IMDG code. If batteries are used as part of a hybrid propulsion system, damage and liabilities arising from the hybrid fuel (oil, biofuel, ammonia, methanol, etc.) should also be considered. In addition, a spill of cargo from a vessel powered in whole or in part by Li-ion batteries may result in additional damage and/or liabilities not considered here.

2 Clean-up and preventive measures
In comparison to the costs associated with clean-up and preventive measures from a traditional spill of persistent hydrocarbon bunker fuel oil, the costs for this claim heading for a Li-ion battery incident would likely be for different measures, primarily limiting/managing thermal runaway, firefighting, and monitoring.
The rehabilitation of wildlife is another potential cost associated with clean-up and preventive measures.

3 Personal injury and loss of life
This claim heading is included within the HNS Convention for Li-ion batteries cargoes. Although incidents involving Li-ion battery propelled vessels are not covered by the HNS Convention, this claim heading is equally relevant to such incidents.

4 Environmental Damage
The environmental impact of Li-ion battery incidents in the marine environment is not as widely researched as the impact associated with spills of other, more persistent, hydrocarbon oils. However, due to the fate, behaviour, and chemical hazards of a Li-ion battery in thermal runaway, only a short-term, acute negative impact in the immediate vicinity of the incident location is expected.

5 Property Damage
Costs arising for property damage will be spatially confined to properties in close proximity to the incident.

6 Economic Loss
Economic loss can be split into "consequential loss," whereby compensation is payable for loss of earnings suffered by the owners of property that have been impacted, and "pure economic loss," whereby compensation is payable for loss of earnings suffered by persons whose property has not been impacted.
In the event of a Li-ion battery incident, both consequential and pure economic loss could be experienced.
In conclusion, given the risks associated with batteries in thermal runaway, claims arising from such incidents would greatly contrast those associated with conventional persistent hydrocarbon oil spills.

Guidance on carriage of Direct Reduced Iron

International Group of P&I Clubs (IGP&I) has issued a circular with guidelines for handling and transporting Direct Reduced Iron (DRI).

Direct reduced iron (DRI) is formed by passing hot reducing gases, such as hydrogen, methane and carbon monoxide, over iron ore, which is usually in the form of lumps or pellets. This produces a highly porous iron material which has a very large internal surface area available for re-oxidation. The principal hazards associated with DRI are its ability to undergo self-heating through oxidation and its ability to generate hydrogen from reaction with water/moisture. When stowed within the confines of a cargo hold, hydrogen produced by reaction with water can form an explosive atmosphere inside the hold, presenting a risk of explosion.

The principal forms of DRI are Type A (hot-moulded briquettes) and Type B (pellets), but fines are also generated during manufacture and handling (via abrasion) and from filtering particles out of off-gases. Fines are not generally suitable for inclusion with Types A and B, so these are screened out and handled separately.

Formerly, fines would be shipped under DRI Type C, but the IMSBC Code entry for this type defines the moisture level of the cargo as not exceeding 0.3%. That low moisture level is often not feasible due to handling practices for fines, such as outdoor storage and handling being subject to rain.

In addition, the Code calls for DRI (C) cargoes to be shipped under inert gas, as for DRI (B). Inert gas is intended to exclude air (oxygen), thus limiting self-heating due to reaction with oxygen. However, as set out below, self-heating is typically not the main issue with fines. Instead, the prevalent risk is the generation of flammable hydrogen gas due to reaction with water, leading to a scenario where the holds need to be ventilated in order to maintain low hydrogen concentrations, below the lower explosive limit plus a margin of safety.

With the production of DRI(C) fines having a moisture content not exceeding 0.3% being difficult to achieve, in the IG Clubs' experience shippers often sought to ship such cargoes under exemptions in accordance with section 1.5 of the IMSBC Code. Those exemptions often sought to avoid shipment under inert gas, instead using mechanical ventilation as an alternative arrangement, but this proved difficult due to the need for tripartite agreement. Therefore there was a need for the industry to work collectively to seek a more permanent, but safe, long-term solution.

Accordingly, Amendment 07-23 to the Code introduces a fourth DRI schedule: DIRECT REDUCED IRON (D) (By-product fines with a moisture content of at least 2%). Like DRI (C), DRI (D) is described as a by-product of the manufacturing and handling process of DRI (A) and DRI (B) but has a higher moisture content (≥2% as compared to ≤0.3% for DRI (C)).

There is also reference in the new DRI (D) schedule to the risk of liquefaction if shipped with a moisture content

exceeding its transportable moisture limit (TML). DRI (D) is therefore classified as both a Group A and Group B cargo.

The principal hazard associated with DRI (D) fines is the generation of hydrogen, due to the relatively high moisture content and reaction with water. By contrast, the dense packing of the fines often reduces oxygen/air ingress into the bulk, with the result that the propensity for self-heating through atmospheric oxidation reactions is reduced, often to non-problematic levels.

As such, there is no requirement in the DRI (D) schedule for purging the cargo hold with inert gas to prevent an explosive atmosphere from forming, nor in keeping the cargo hold tightly sealed to exclude oxygen ingress, whereas there are such requirements for DRI (B) and DRI (C). Instead, a regime of controlled mechanical surface ventilation and regular gas concentration measurements should be introduced in order to keep the hydrogen concentration within the holds below a designated limit.

Image credit: UK P&I Club

Hazards of DRI (D)

The entry for DRI (D) leads with a reference to a potential temperature increase when the material is handled in bulk; and the risk of overheating, fire and explosion due to the reactivity of the cargo with air and water to produce hydrogen gas and heat.

Whilst DRI (D) will react with oxygen and generate heat, its dense packing and the very small spaces between particles are often such that oxygen/fresh air is not able to diffuse into and through the stow to the same extent as with other types of DRI types, particularly the larger briquette/pellet forms. This low permeability means that self-heating is considered a secondary hazard. The primary hazard observed is hydrogen generation, due to the reaction between the DRI and water / moisture. The focus of the new DRI (D) schedule is on the measurement and control of the hydrogen gas concentrations in the ullage spaces.

Although self-heating is considered a secondary hazard, the reaction with air can lead to oxygen depletion in the cargo spaces, and possibly also adjacent spaces, where flammable gases (i.e. hydrogen) might also accumulate. The Code therefore stipulates that no person shall enter a loaded cargo space (or enclosed adjacent space) unless such space has been ventilated and found to be gas-free. The Code refers here to the Revised recommendations for entering enclosed spaces about ships (Resolution A.1050(27)).

DRI (D) cargoes are liable to liquefaction if shipped at a moisture content in excess of its Transportable Moisture Limit and is therefore classified as a Group A cargo in the Code in addition to the Group B designation due to its reactivity hazard.

The dust produced during handling of DRI (D) can be hazardous to health (irritation to the respiratory system and/or damage to the eyes).

Preparation of cargo and loading

Holds

As for other DRI cargoes, cargo spaces being prepared for carriage of DRI (D) should be clean, dry and free of salt and residues of previous cargoes. Wooden battens, loose dunnage, debris and other combustible materials shall be removed.

The specific reference to salt is because the reaction between DRI and water is more vigorous in the presence of salt than without (in other words, DRI is much more reactive with sea water than with fresh water).

Cargo ageing

For material being prepared for loading, outdoor stockpiles are permitted, provided that the stockpiles are arranged to promote exposure to the atmosphere and thus facilitate natural ageing.

This "ageing" is the process by which the most active sites on the external and internal surface of the particles react with atmospheric oxygen and thus become "passivated" against further reaction during carriage.

The cargo should be aged in this way for at least 30 days prior to loading, and the shipper is expected to provide the master with a certificate issued by a competent person (who is recognised by the competent authority of the port of loading) stating that the cargo has been prepared and aged appropriately (i.e. naturally aged for at least 30 days).

The shipper shall also provide the master with a certificate issued by a competent person (again recognised by the competent authority of the port of loading) stating that the cargo does not meet the criteria for class 4.2 materials (i.e. it is not liable to self-heat).

This is effectively declaring that the cargo does not behave like, say, DRI (B), which can self-heat problematically.

Moisture
Whilst outdoor storage is permitted, the risk of liquefaction means that the moisture content should be kept below its TML during loading operations. This means that the cargo should not be handled in the rain and that non-working hatches are kept closed. Discharge in the rain is permitted as long as the total cargo package in a given hold is to be discharged at that port.

The TML for DRI fines is typically between 9-12%.
Once discharged ashore into the open air, the potentially hazardous consequences of hydrogen production and liquefaction no longer apply.

Temperature
DRI at elevated temperatures should not be loaded, the threshold temperature being 65°C with measurements being taken at the stock pile over three consecutive days prior to loading. Measurements are to be taken 20-30 cm beneath the surface at 3m intervals throughout the stockpile. Temperatures shall also be measured during loading, with a log detailing the temperature of each lot being recorded, and with a copy being provided to the master. Once loaded, thermocouples are placed into the stow for the cargo temperature to be monitored remotely, without entering the holds.

The measurement of temperatures in this way might be limited due to the high degree of thermal insulation offered by the cargo, which can mean that measurements in isolated points throughout the hold might not be representative of the bulk conditions of the stow. Also, localised heating 'hot spots' in areas of the stow away from the thermocouple positions might be missed. That said, a network of thermocouples placed within the stow is preferable to single measurements from bilge sounding pipes or "temperature" sounding pipes, which are usually at only one or two places per hold and are therefore not representative.

Hatch cover closing
Weather permitting, hatch covers shall be left open after completion of loading to allow cooling of the cargo, stabilisation of cargo temperature and natural ventilation of the hold.

This seems to be contrary to the current advice to keep non-working hatches closed, see above. The intention appears to be that the closure of non-working hatches is to protect the cargo against being wetted by rain (if applicable), but once loading is complete, and if there is an opportunity to do so (i.e. a period of dry weather), then the hatch covers should be kept open to assist with heat dissipation and natural ventilation.

Once loading has been completed and the hatch covers are closed, the Code calls for the ship to wait for at least 24 hours before sailing to ensure that the cargo temperatures are stable and do not exceed 65°C, and that the concentration of hydrogen in the ullages has stabilised and does not exceed 1% by volume for at least 12 consecutive hours.

Hydrogen is a flammable gas; the minimum concentration of hydrogen that is needed to form a flammable mixture with air is 4% by volume. This is the "lower explosivity limit" or LEL. Therefore, the 1% by volume mentioned here represents a quarter of the LEL (25% LEL). Not exceeding 1% LEL gives a safety margin between this 'action level' and 4% LEL, which is the lowest hydrogen concentration in air at which an explosion could occur.

Certification
Prior to sailing, a further certificate shall be issued by a competent person (once again recognised by the competent authority of the port of loading), stating that the proportion of material larger than 12mm in diameter is no more than 3% by weight, that the moisture content is at least 2% and below the TML, and that the temperature of the cargo loaded does not exceed 65°C.

This section of the Code therefore calls for three certificates to be provided by the shipper stating that the cargo:

- Does not meet the criteria as a class 4.2 material;
- (ii) Has been appropriately aged; and
- Has proportions of large particles, moisture content and temperature below the specified limits.

In addition, the master is to be provided by the shipper with the temperature log of the cargo during loading.

Carriage and cargo management

General precautions

As noted above the primary hazard associated with the carriage of DRI (D) is the generation of hydrogen, a flammable gas, within the ullage spaces of the hold. Unlike other DRI cargo types, the entry for Type D makes reference to a risk assessment to be undertaken in advance of the voyage and which is based on the "comprehensive information on the risk of hydrogen generation and the factors which might affect the rate thereof", to be provided by the shipper.

This risk assessment might include other factors such as the weather conditions expected en route, the speed of the ship and distance to the discharge port, the availability of ports of refuge along the way, and any information on hydrogen evolution that might be available. The master, with the aid of the shipper, should also ensure that the crew are properly briefed on the risks involved prior to loading commencement.

The ship should be equipped with the means to take measurements of the concentrations of hydrogen and oxygen. This is achieved using a suitably configured gas detector fitted with a pump and length of hose which can be inserted into the gas sampling points of each cargo hold.

In practice, and as recommended by the Code, the measurement of hold gases and cargo temperatures might typically be undertaken by an experienced cargo technician appointed by the shipper. The Code recommends that the technician is present during loading and throughout the voyage.

The Code calls for such measurement devices to be suitable for use in an oxygen-depleted atmosphere. This is because some types of combustible gas analysers ("catalytic bead sensors"), which are sensitive to hydrogen, require a minimum level of oxygen in order to operate correctly. In oxygen-depleted atmospheres, as is often found with DRI cargoes, catalytic bead sensors might not provide reliable results. Similarly, some other types of combustible gas sensor that can operate in low oxygen environments are blind to hydrogen. The selection of appropriate sensor equipment is therefore extremely important for all DRI cargoes.

Ventilation

The Code sets out that mechanical surface ventilation shall be provided in each hold to maintain the hydrogen concentration less than 1% by volume (25% LEL).

Given the risk of flammable atmospheres being present, only fans which are suitable for use in explosive environments should be used for mechanical ventilation. It is also important that the ventilation applied is surface ventilation, and that fresh air is not introduced into the stow itself (through fan ducts lower down in the hold, for example) as this could encourage oxidation reactions in the bulk, leading to an increase in the heat being generated due to and an increase in the rate of reaction.

Ventilation should be limited to the time required to remove any hydrogen gas accumulations to below 1% by volume, in order to minimise the risk of fresh air/oxygen being introduced into the cargo. The length of time and frequency that ventilation is applied will be derived to some extent by prior experience, and in this respect the Code introduces the concept of a time-based gas prediction curve, the results of which should be used to update the voyage risk assessment.

The time-based gas prediction curve is a tool for understanding the likely rate of hydrogen evolution. It is a graphical representation of how the hydrogen evolution occurs over time, and it is constructed by measuring the hydrogen concentration in the ullage of each hold after ventilation has reduced the concentration to <0.2% by volume (i.e. to below 5% LEL), and plotting this data against time. With mechanical ventilation stopped and natural vents closed, measurements are taken every 2 hours over the course of the next 24 hours, or until the hydrogen concentration exceeds 1% by volume, whichever occurs first.

The data are then used to estimate the time required to reach a hydrogen concentration of 1% by volume in the absence of ventilation, and this time period can then be used to optimise the ventilation schedule. It is also useful to understand how quickly hydrogen gas might accumulate within a hold during periods of heavy weather, when it might not be possible to apply ventilation. All of this information is then fed into the risk assessment process.

Expert assistance might be required to analyse the gas concentration data and to derive an appropriate ventilation regime.

Mechanical ventilation shall be by extraction, rather than blowing in air from the outside, with exhaust ducts removing the expelled gases to a safe location (e.g. away from the accommodation). Two spare sets of ventilation equipment shall be available on board, and the crew or other authorised persons shall be familiar with its installation, operation and maintenance. The Code sets out minimum airflows of 1.2 m3 per hour per tonne of cargo.

Emergency procedures

If the hydrogen concentration is approaching or exceeds 1% by volume, then the hold(s) in question shall be ventilated (via mechanical and/or natural surface ventilation) until the concentration falls to or below 0.2% by volume. The hydrogen concentration should be measured more frequently if it exceeds 1% by volume (preferably hourly) provided that prevailing conditions permit. If an elevated hydrogen concentration persists, expert assistance may be required.

Experience has shown that measurement of gas concentrations during period of active ventilation may lead to unreliable results, particularly if the remote sensing hose of the gas detector is inserted into the hold within a stream of intake air or expelled gases. Care therefore needs to be taken when measuring gases during ventilation, which might be indicative only. Accurate gas readings might only be possible once ventilation has stopped, even if only for a short period of say a few tens of minutes.

In the event of a breakdown in mechanical ventilation, continuous natural ventilation can be applied until the mechanical fans can be restored. Weather conditions will need to be considered of course, and the frequency of monitoring hydrogen concentration and cargo temperatures should be increased.

If cargo temperatures increase above 65°C, the Code calls for increased mechanical and natural ventilation to dissipate heat and any hydrogen, and to increase the frequency of gas and temperature measurements. It precludes the use of CO2, water or steam on the cargo, but does suggest bulkhead cooling if possible (e.g. spraying water from empty adjacent holds).

The Code does not set out the possible circumstances under which the cargo might exhibit elevated temperature, and clearly there might be issues with ventilating a cargo that is exhibiting heating due to reaction with air / oxygen. It might be appropriate in some circumstances to seek expert advice; any expert involvement would certainly have to include consideration of the full history of the cargo, including the logs of temperature and gas concentrations since loading.

Discharge

Hatch covers should only be opened if the hydrogen concentration in the ullage space of a hold has been determined to be below 1% by volume. Additional ventilation may therefore be required to achieve this threshold before discharge can commence.

A hydrogen concentration of 1% by volume is substantially below the lower flammability limit, giving a built-in safety margin. Moreover, the hydrogen content in the hold atmosphere will become increasingly diluted once the covers have been cracked open, adding a further safety margin.

As noted above, the Code allows for DRI (D) cargoes to be discharged during rain, but only if the entire complement of cargo within a hold is discharged at the same port and not transshipped on to another vessel or leaving part of the (wet) cargo on board. If holds do need to be closed during periods of rain at the discharge port, the hydrogen concentration monitoring process will need to be restarted for those holds.

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Preventing bulk shortage claims

Britannia P&I Club has issued guidance and preventative measures regarding bulk storage claims.

Bulk cargo shortage claims are a common yet complex issue, they usually occur when there is a significant discrepancy between the quantity of cargo noted on the Bill of Lading (B/L) and the quantity received at the port of destination.

According to Britannia, such discrepancies can be attributed to various factors, including inaccurate measurement of cargo, improper stowage, mishandling during transport, spillage or even theft.

Prior to loading:

The International Maritime Solid Bulk Cargoes (IMSBC) Code provides comprehensive guidelines for the safe loading, stowage and transportation of bulk cargoes. The first step is to comply with the recommended guidelines stipulated. For example, the cargo hold preparation and cleanliness standards.

Before any cargo is loaded, the ship's crew must prepare to establish a solid foundation for accurate cargo measurement and documentation.

- Conduct risk assessments prior to loading cargoes with special emphasis on the type of cargo, geographical location and expected weather. For example, a cargo which is susceptible to wet damage will require enhanced weather forecasting and monitoring of conditions to obtain an early warning of rain.

- Obtain detailed planning and instructions from the shipper for cargo stowage, segregation and whether the cargo can be handled in precipitation. The IMSBC Code provides accurate information about the cargo's characteristics, including the weather precautions, flow moisture point and transportable moisture limit.

- Identify if a Letter of Indemnity (LOI) is being offered for any reason during cargo handling, e.g. to accept an LOI for loading in the rain. If so, the Club should be consulted for technical advice to assess the potential risks and ensure that the terms of the LOI are clear and enforceable.

- Maintain records of hold cleaning progress and consider keeping photographic evidence of the cleaned holds and bilges prior loading. Photographic evidence of cleaned holds and bilges prior to loading can serve as valuable documentation in the event of a dispute.

- Regularly clean and dry bilge wells before loading, then cover them properly to stop cargo from falling in. This helps prevent blockages, protects the drainage system and reduces the risk of damage or contamination during the voyage.

During loading:

Cargo shortage claims often stem from inadequate monitoring during the loading process. Effective supervision should be in place to ensure the cargo is loaded correctly into the correct cargo hold, with the proper grade and quantity planned for.

- A designated officer or crew member should be assigned to carefully supervise loading and unloading operations, such as stevedores using appropriate cargo handling equipment like grab buckets or conveyors, and the proper placement of the cargo in the hold.

- If different types/grades of cargo were mixed or if the cargo was not properly segregated, marked or labelled, it could lead to confusion over the quantity of cargo on board. Clearly segregate.

- Ensure that working cargo holds are closed and sealed (if required) when a delay is anticipated, this may help to maintain the integrity of the cargo and reduces the risk of disputes over quantity loss or contamination.

- The accuracy of weighbridge systems typically ranges from 0.5% to 1.0%, depending on the port. To ensure reliability, the master should request a copy of the weighbridge certificate, which includes details on the system type and its latest inspection or calibration by an ISO-certified inspection company or government authority.

- Sensor issues can occasionally impact the accuracy of the loading apparatus' weight detection system. Therefore, it is advisable for shipowners to verify the calibration details, if available, at the port of loading.

- An independent surveyor may be used to establish the suitability of the cargo holds prior to loading, the apparent condition of the loaded cargo, and to determine the quantity and quality of cargo loaded. A surveyor may also be employed to assist the master, by conducting tasks such as regularly sampling, testing and documenting the condition of the cargo.

- Draft surveys are essential when confirming the cargo has been accurately measured to determine ship's figures during loading.

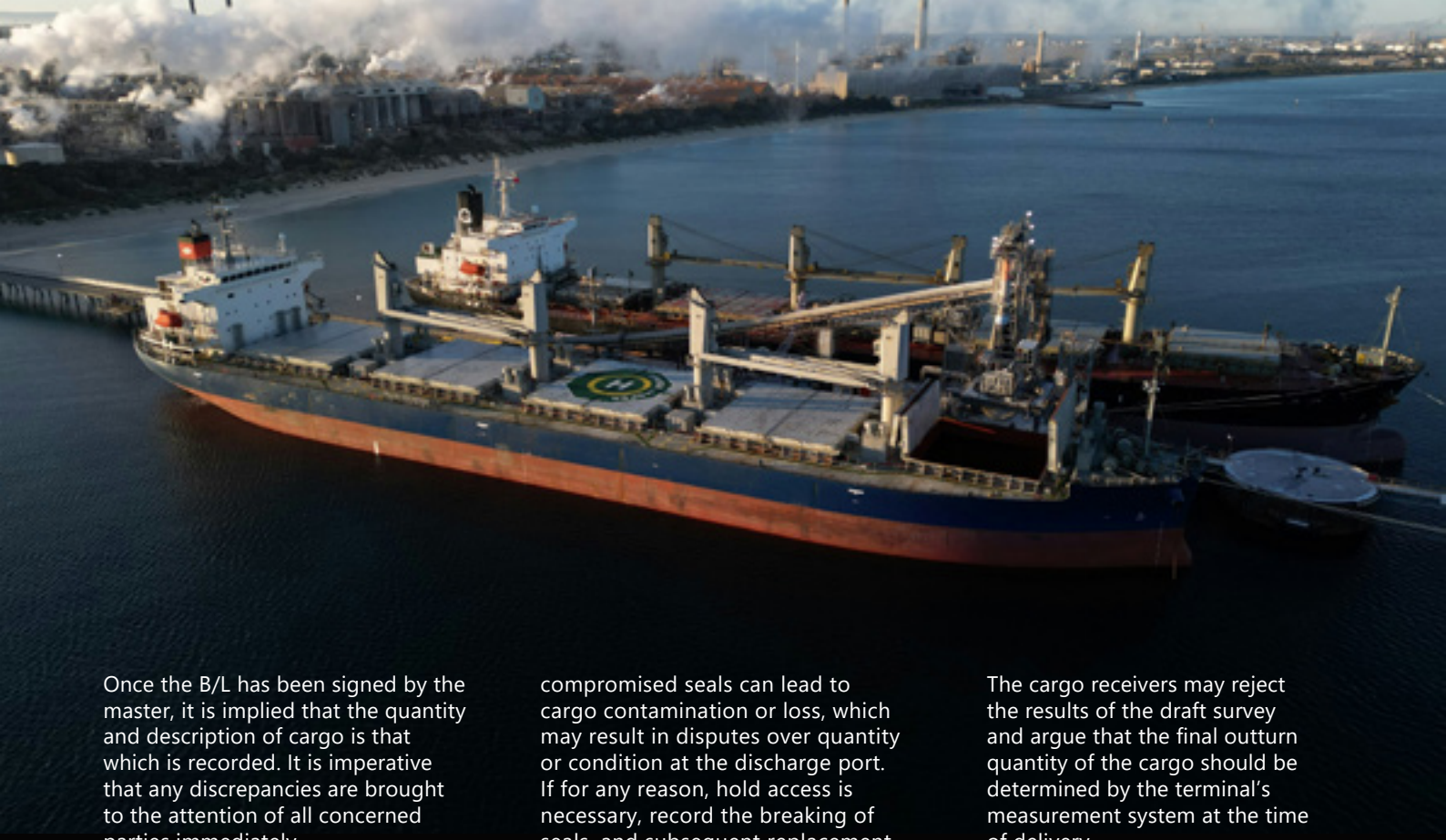
- If the cargo measurement is inaccurate, the reported shortage may be incorrect. This could be due to errors in the measurement process or when the loading survey is carried out at a roadstead, where the weather and sea conditions would render the survey inaccurate. Therefore, it is imperative to maintain draft marks at all times and strive for full accuracy of measurement. If the draft survey is conducted in open or choppy seas, we would recommend issuing a letter of protest (LOP) highlighting the potential inaccuracy of the loaded figures.

- Take measurements of the hold volume, stowage factor and broken stowage to countercheck the amount of cargo loaded in each hold. These measurements provide an additional layer of verification and can help identify discrepancies between the cargo loaded and the figures recorded in the B/L.

- The B/L should accurately state the quantity of cargo and other details, such as the weight, volume, grade and description of the cargo. The B/L figures should consider the water content of the cargo, and if necessary, should be claused to reflect the condition, and record the ships figures for quantity of cargo loaded.

- The correct unit of measurements should be detailed in the B/L to avoid cargo dispute, i.e., claims sometimes arise for certain cargoes being bought / sold in dry metric ton (DMT) but shipped in wet metric ton (WMT). Failing to clarify the unit of measurement can lead to disputes over the actual quantity of cargo delivered.

- Sealing cargo hatches after the completion of loading helps to maintain the cargo's integrity, prevents unauthorised access and pilferage.



Once the B/L has been signed by the master, it is implied that the quantity and description of cargo is that which is recorded. It is imperative that any discrepancies are brought to the attention of all concerned parties immediately.

During the voyage:

During the sea voyage the cargo needs to be protected against apparent damage. This damage could be due to the formation of moisture within the cargo hold or ingress of seawater. Therefore, ship's crew will need to ensure the cargo remains secured and protected.

With high moisture cargoes, weight loss may be significant in quantity due to discharge of free water. This is especially true when it comes to coal cargo loaded in the rain. The master should ensure that frequent soundings are carried out of the cargo hold bilge wells, with details logged. When necessary to empty water from the cargo hold bilges that has drained from the cargo, the bilge record book should be updated to account for the quantity of bilge water pumped out. To assist with demonstrating the accuracy of these figures, we recommend confirming the volume of bilge wells at various soundings in advance. If any shortage claim arises, then cargo receivers will insist on proof of bilge discharge quantity.

Regularly checking cargo hold seals helps to ensure hold weathertightness and that the cargo remains secure and protected during transport. Damaged or compromised seals can lead to cargo contamination or loss, which may result in disputes over quantity or condition at the discharge port. If for any reason, hold access is necessary, record the breaking of seals, and subsequent replacement.

Ventilation is crucial in protecting cargo from moisture-related damage such as sweating and rust. It is especially important for hygroscopic cargo, like agricultural goods that absorb moisture and spoil easily, as well as non-hygroscopic cargo, which, though less moisture-sensitive, can still be affected by condensation. Effective ventilation reduces humidity, preserves cargo quality, and helps minimise claims.

To manage ventilation, two key rules are followed: the Dew Point Rule, which requires precise humidity measurements, and the Three Degree Rule, which offers a simpler approach by comparing external and cargo temperatures.

Maintaining ventilation logs with cargo temperature, dew points, and ventilation timings is essential for defending against damage claims.

During discharge:

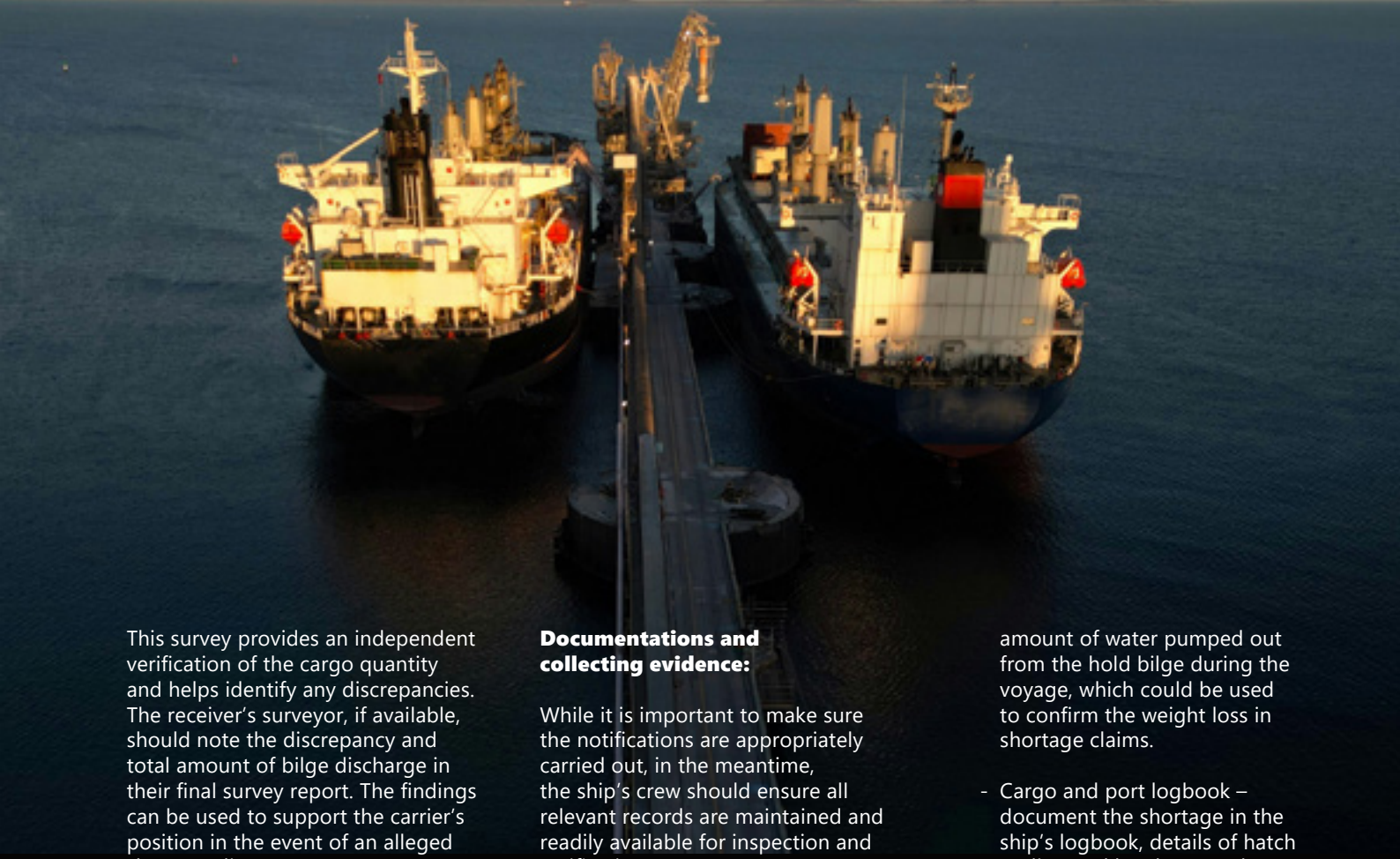
Often, the outturn quantity of the bulk cargo discharged is calculated based on a joint draft survey. If the calculated quantity discharged compares favourably with the quantity stated in the B/L, the ship will be unlikely to bear any liability unless the cargo interests dispute the results of the joint draft survey.

The cargo receivers may reject the results of the draft survey and argue that the final outturn quantity of the cargo should be determined by the terminal's measurement system at the time of delivery.

On other occasions, the discharging method, for instance, discharging of cargo using grabs or conveyor belts may result in some spillage of the cargo discharged. This issue is occasionally exacerbated when the cargo discharged is 'dumped' in an open quay stacking area where the receiver will take a longer time to take delivery of the cargo, while exposing the cargo to the inclement weather.

A surveyor may be appointed at the discharge port to certify that seals are intact before breaking with receiver's/ charterer's representative invited to attend the verification. This step ensures transparency and helps to demonstrate that all cargo received at the load port, was offloaded at the port of discharge.

Ship's staff should document the discharging process and preserve available photographic evidence of in-port spillage of cargo due to rough handling or leakage from grabs and trucks. A draft survey should be carried out at every discharge port to account for the amount of the cargo discharge comparing the figures with the actual B/L.



This survey provides an independent verification of the cargo quantity and helps identify any discrepancies. The receiver's surveyor, if available, should note the discrepancy and total amount of bilge discharge in their final survey report. The findings can be used to support the carrier's position in the event of an alleged shortage dispute.

Notifications:

In the event of cargo shortage, timely notification and investigation are essential to resolve the issue and mitigate any potential losses.

- The master should notify the cargo owners or shippers immediately, detailing the shortage, such as the quantity and location of the alleged missing cargo. Prompt notification demonstrates the carrier's commitment to transparency and helps to initiate the claims resolution process.

- Issue a LOP if there is a short loading or discrepancy between the shore figure or quantities from surveys, and if possible, have the LOP signed by cargo interests.

- The master should take immediate steps to mitigate any further losses or shortages, including monitoring the remaining cargo, taking additional soundings, and requesting assistance from shore-based personnel/ surveyor and/or equipment.

Documentations and collecting evidence:

While it is important to make sure the notifications are appropriately carried out, in the meantime, the ship's crew should ensure all relevant records are maintained and readily available for inspection and verification.

- B/L – verification of the actual quantity of cargo with relevant parties and if necessary, include clauses to address any discrepancies or issues.

- Draft survey records – quantity of cargo actually loaded at loading port and discharged at port of destination.

- Mate's receipt (MR) – document the condition and quantity of the cargo presented for shipment (ship's figures); any discrepancies should be worded in the MR.

- Certificate of quality and certificate of moisture content (MC) – in the case where loaded cargoes have high moisture content, then it would be prudent to have the certified documents to compare with the MC in discharging port.

- Empty hold certificate – to certify the hold is completely discharged and will assist in refuting claims of residual cargo.

- Water discharge log or bilge pumping record – keeping record of free water being discharged can confirm the amount of water pumped out from the hold bilge during the voyage, which could be used to confirm the weight loss in shortage claims.

- Cargo and port logbook – document the shortage in the ship's logbook, details of hatch sealing and hatch open/close timings and prepare a detailed report of the incident.

Other documentation which may be useful:

- Statement of Facts (SOF) from master

- Overtime sheet/ time sheet for hold loading and discharging

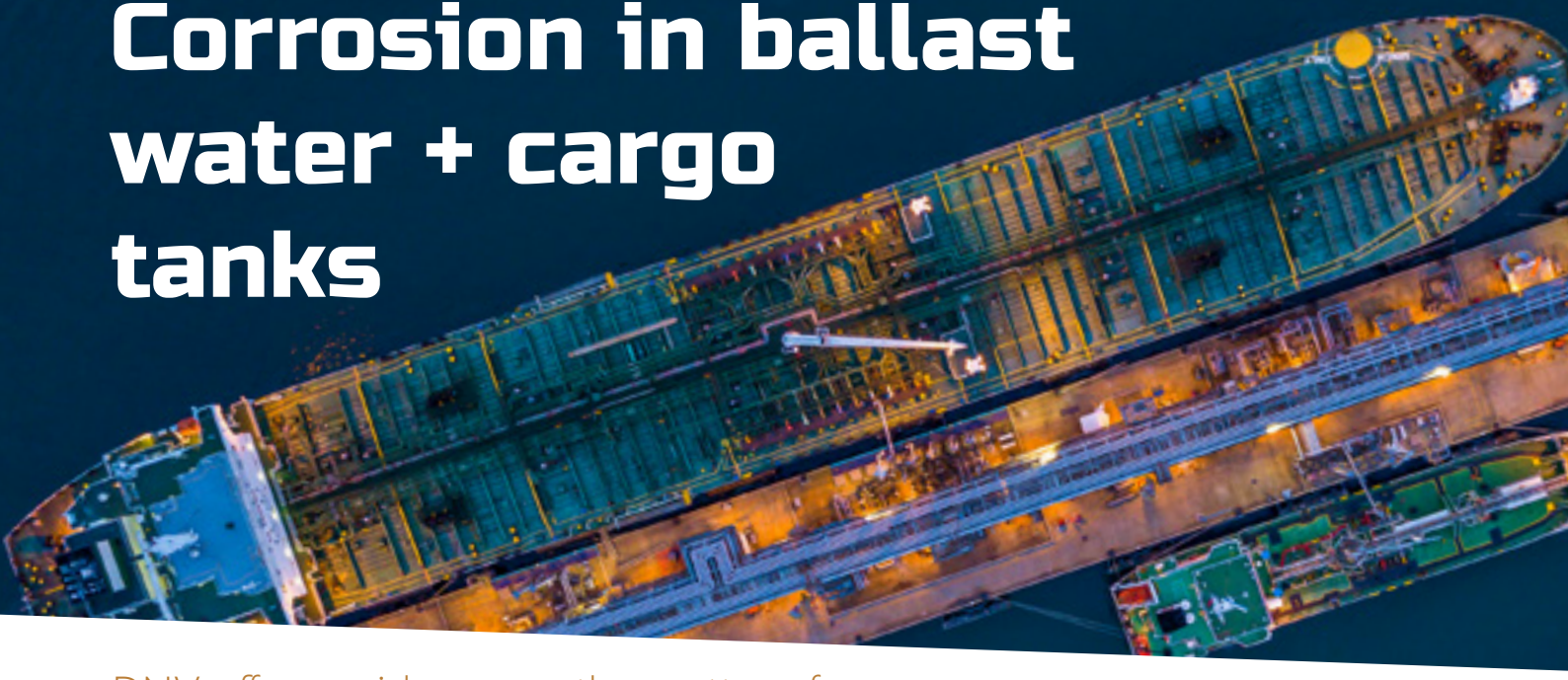
- Deck logbook – details of in port/ enroute weather and bunker ROB

- Ballast exchange log – details of water ballast exchange and any change in ballast weight

- CCTV recordings or photographs of port operation, for example visible spiling from the grab etc.

Prevention and responding to bulk cargo shortage claims generally requires a combination of technical expertise, operational diligence and proactive risk management. Therefore, in the event of an alleged claim, timely notification, thorough documentation and collaboration with the Club and local correspondents are very helpful to achieve a favourable resolution.

Corrosion in ballast water + cargo tanks



DNV offers guidance on the matter of corrosion in ballast and cargo tanks, highlighting that the actual corrosion rate may differ, with factors like temperature and coating condition playing significant roles in the deterioration process.

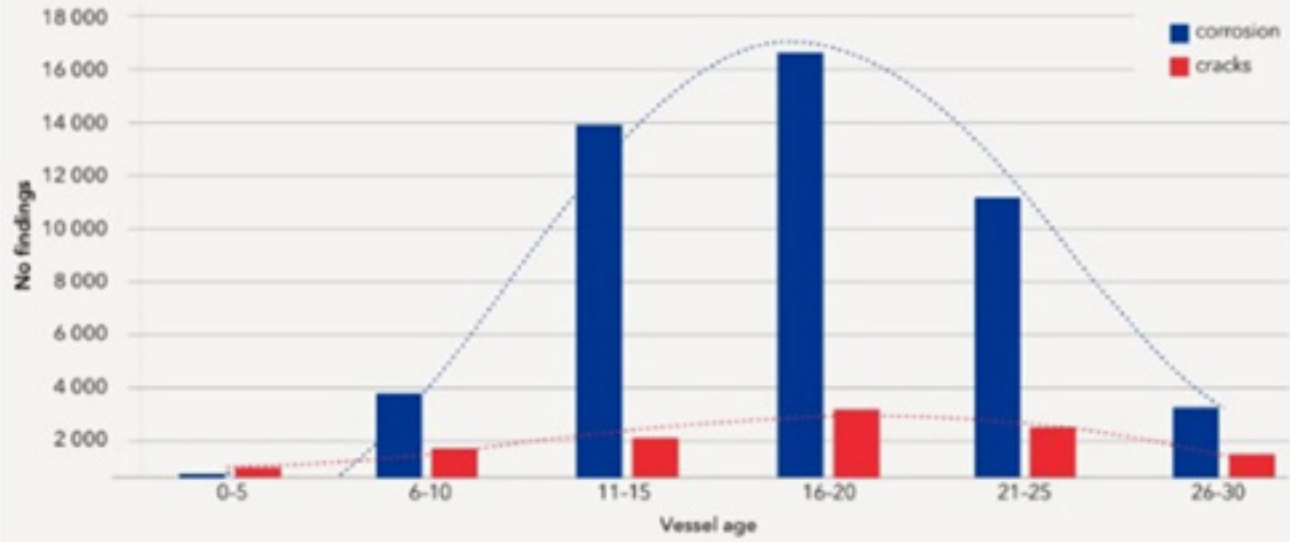
According to DNV, the actual corrosion rate in ballast and cargo tanks may differ from the assumptions in the rules and the embedded corrosion models. DNV survey data reveals a significant rise in corrosion findings in water ballast and cargo tanks in oil tankers and bulk carriers at the third renewal survey, with a peak at the fourth renewal. That means that for some vessels, the useful life of the effective coating protection may only be about two-thirds of the requirement of the Performance Standard for Protective Coatings (PSPC).

DNV material experts emphasize that the deterioration process is not linear, nor are the consequences. Once the protective coating begins to break down, corrosion advances swiftly, leading to issues such as pitting, edge or grooving corrosion. An analysis of the DNV survey data indicates that many findings were recorded in locations suspected to be exposed to elevated temperatures, where the corrosion rate and spreading were even more advanced.

Causes of coating deterioration

The causes of coating deterioration and failure are complex, often involving

Figure 1: DNV fleet hull findings: oil tankers / bulk carriers, 2005-2020

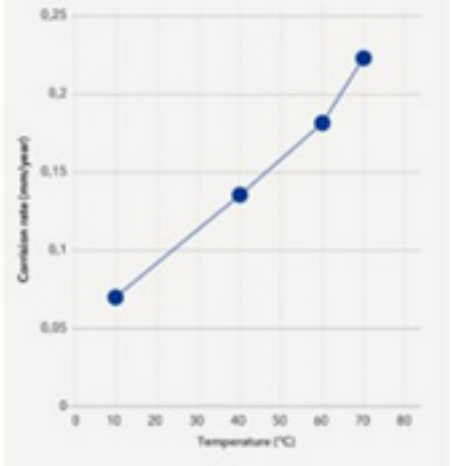


Credit: DNV

multiple factors simultaneously. Corrosion depends on ambient conditions such as salinity, acidity, humidity, temperature, time of exposure, and coating condition. The degradation rates are highly non-linear and time-dependent and vary significantly.

Coating makers claim that most coating failures result from poor surface pre-treatment and/or an inadequate coating application. Conversely, ship insurance companies and charterers argue that most coating failures stem from incorrect specifications (poor design or quality) and operational conditions that exceed design limits. Examples include higher cargo storage temperatures for extended periods, incorrect cleaning procedures,

Figure 2: Influence of temperature on the corrosion rate of carbon steel exposed to seawater



Credit: DNV

and mechanical damages during cargo and ballast operations.

Influence of temperature on corrosion

Among all factors affecting the corrosion rate, exposure to high temperatures is often overlooked. Simulation models based on actual test data performed by DNV show that the corrosion rate of bare carbon steel increases by approximately 30% for every 10°C increase in temperature. Coated steel will also be impacted by temperature, as it accelerates the ageing of the coating, leading to early signs of local coating breakdown at hard points, welds and other vulnerable areas.

Ballast tanks adjacent to heated cargo/fuel tanks are a prime example. DNV's recent surveys reveal that increased steel corrosion was recorded even though the tank coating had been rated "Good" in the previous class survey.

Effects of corrosion damage

Loss of structural integrity:

Corrosion leads to thickness reductions at both the local and general level. While local corrosion such as pitting or grooving may not represent an overall safety problem, it can facilitate the formations of cracks, holes or surface anomalies, leading to leakage into ballast tanks, which in turn can cause environmental damage, or contamination of cargo with ballast water. A "domino" effect may also occur, whereby steel/welding wastage and cracking due to local corrosion in multiple members lead to an overload of adjacent members. This can result in their failure under short-term exposure to loads higher than designed, potentially causing serious overall structural failure.

Maintenance/operation cost:

Corrosion increases maintenance and repair cost if not addressed promptly. Misjudging the coating condition in areas with an accelerated corrosion rate may necessitate steel renewals even between the scheduled class survey periods, impacting off-hire cost or breaches of contract.

Recommendations

- Maintenance of coating: Maintaining the original protective coating of the interior surfaces of ballast tanks is one of the most effective methods to prevent corrosion. Repairs should be performed by qualified personnel adhering to the coating maker's instructions. If not, the risk of early coating damages after repairs is very probable.
- Regular coating inspections: Implementing a regular inspection and maintenance scheme is essential to identify and address corrosion issues before they become severe.

by David Browbank,
Fuel Chemist, Brookes Bell

Understanding the science behind using cashew nut as a green fuel alternative

With shipping under pressure to cut emissions, the industry is exploring a range of suitable alternative fuels to lower its carbon footprint. However, with supply of certain options limited, ship owners are turning to sources that are in abundance which can be easily blended into their fuel mix, albeit with risks to operational performance.

Cashew Nut Shell Liquid (CNSL) has recently emerged as leading option – a renewable fuel derived from waste produced during cashew processing. As a by-product of the cashew industry, CNSL is extracted from discarded shells and blended with regular marine fuels, offering a circular-economy approach to decarbonisation. Its appeal lies in its ready availability, especially after good cashew harvests, and the fact that it does not compete with food crops. While advocates believe the by-product could help shipping meet strict emissions rules, early tests show that there are technical challenges and risks that the maritime sector must address before it is widely adopted.

From shell to ship

The process of making CNSL is straightforward. After cashew nuts are removed from their shells, the shells are collected, and the oil is extracted—usually by heating or pressing. This process turns agricultural waste from cashew-growing regions like West Africa, India, and Vietnam into a valuable and sustainable resource. By using CNSL, the industry can potentially reduce waste and lower overall CO_2 emissions throughout the fuel's life cycle. In theory, if the supply chain is managed well and CNSL replaces part of the fossil fuel used, it could help lower the overall carbon emissions of marine fuel.

Despite its promise, early experiences with CNSL-blended fuels have raised concerns. Initial ship trials and bunker fuel tests have uncovered problems when CNSL is mixed with marine fuel oil. In 2024, tests linked fuel containing CNSL to a series of engine issues in major ports like Singapore and Rotterdam. Ships that unknowingly filled up with fuel containing up to about 20% CNSL soon suffered from problems such as thick fuel sludge, blocked filters, injector failures, and deposits forming in the fuel system. In some cases, there was even corrosion in fuel pumps and damage to critical parts like turbocharger nozzle rings. These issues can lead to engine power loss or costly repairs for the ship owner.

David Browbank, a Fuel Chemist at Brookes Bell and a respected scientific analyst, warned that CNSL is still in the early stages of being used as a marine fuel component. *"There is currently very little data or published research to support the safe use of CNSL in bunker fuels, especially in its raw or only slightly processed form. We have observed that while some engines have run smoothly on blends containing CNSL, others have encountered significant issues—ranging from clogged filters to premature injector failures,"* he noted.

"This inconsistency highlights that several factors - such as the precise percentage of CNSL in the fuel blend, the liquids quality, and the specific design and tolerances of the engine - all play a part in determining performance. Without more robust and consistent data, it is challenging to draw definitive conclusions about its reliability. Further testing is essential if we are to truly understand how to use cashew nut by-products as a means of reducing shipping's overall carbon emissions."

Uncovering chemical hazards

In recent lab test, detailed analyses found very high levels of the natural chemicals in CNSL, such as cardanol and cardol, which can react under heat and pressure. These reactions may cause the formation of gums and sediments that clog filters and create sludge. The high acidity of CNSL has the potential to corrode metal parts in the fuel system, especially under prolonged exposure within conventional marine fuel systems. In short, although fuels containing CNSL can efficiently combust in an engine, it may also react with other components in the blend in ways that lead to poor combustion and damage to the engine.

In one pilot project, a highly refined form of CNSL was blended at 30% with marine gasoil and ran without any noticeable problems. However, David stressed that, in many cases, *"certain engines simply cannot tolerate this blend. Unlike well-known biofuel blends such as FAME or HVO, there are no standard specifications for CNSL. Without clear guidelines, ship operators face uncertainty about the fuel's performance and risks."*

The discussion around CNSL comes at a time when maritime decarbonisation policies are becoming more stringent. The IMO's 2023 strategy aims for net-zero emissions by 2050 and encourages the use of zero or near-zero greenhouse gas fuels by 2030. Similarly, the EU's FuelEU Maritime regulation, which came into effect in January 2025, will require progressive reductions in the greenhouse gas intensity of ship fuels—for example, a 2% cut by 2025, 6% by 2030, and up to 80% by 2050.

However, the regulatory framework for marine fuels has not yet fully adapted to include fuels containing blend components such as CNSL. Current standards such as ISO 8217 specify only certain types of biofuel blends, such as those with FAME or paraffinic biofuels like HVO, can be used. As a result, CNSL is not yet officially recognised in these standards. Clause 5 of ISO 8217 requires that fuels must not contain any substances that could damage engine systems. As such, fuel containing CNSL might violate this section of the standard if operational issues or damage to the engine are traced back to its presence in the fuel.

Although a 2024 update to ISO 8217 introduced guidelines for "Bio-Residual Marine Fuel", these new rules do not yet explicitly cover additives like CNSL. Therefore, any supplier looking to use CNSL must secure the buyer's agreement.

Regulatory roadblocks

Comparing CNSL with other biofuels helps illustrate its unique challenges. The most common bio-component in marine fuel is FAME biodiesel, produced from vegetable oils or animal fats. FAME is also used by blending with marine fuels and is chemically similar to diesel. It has clear standards, as set out by the European Committee for Standardization, and is well tested by engine manufacturers. Although FAME can oxidise, form sediments, attract water, and even encourage microbial growth, these issues are typically managed with additives and proper storage.

Another biofuel option, HVO (Hydrotreated Vegetable Oil), is

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a renewable diesel produced by hydrogenating bio-oils. HVO is nearly identical to fossil diesel and can be used directly in engines, but it is more expensive and relies on limited feedstocks. CNSL, being a waste product, might be cheaper, but in its raw form it is not as easy to use as a drop-in fuel. Its chemical makeup brings risks like a high tendency to thicken and cause corrosion. It may require strict limits and special treatment.

The growing interest in CNSL as a blend option in marine fuels reflects the urgent need to find sustainable solutions, yet it also serves as a cautionary tale. CNSL shows that not every green fuel idea can be rushed into service without proper testing.

David noted, "*The early warnings—engine sludge, blocked filters and corroded components—demonstrate that adopting new fuels must be based on solid evidence. Brookes Bell's team is working diligently to better understand CNSL and its impact on engine and vessel operations. By analysing its unique chemical profile and its interactions within different blends and engine configurations, we aim to create a solid data foundation that not only verifies its potential but also supports its safe adoption. In the move towards low-carbon fuels, safety and reliability must always come first.*"

Collaboration is essential. Engine manufacturers must share information about the limits of their equipment, fuel producers need to be transparent about their processing methods, and shipowners should report their experiences. Regulatory support for pilot projects, such as class notations or temporary waivers for vessels testing new fuels, can help encourage innovation under controlled conditions. Ultimately, the goal is to unlock CNSL's potential to reduce carbon emissions without compromising the safety or reliability of ship operations.

By proceeding carefully and being guided by data, standards, and expert insight, the maritime industry can stay on course towards a more sustainable future, avoiding unintended problems in the engine room while pursuing lower emissions on the open seas.

Rise in collisions of attendant ships with offshore structures

The Health and Safety Executive has identified a rise in the number of incidents of attendant ships colliding with offshore oil and gas and renewable energy structures. Failure of navigational watch processes and systems, is resulting in collisions or risk of collisions.

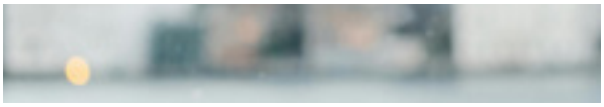
Incidents are occurring because:

- personnel who are responsible for watchkeeping and the safe navigation of a vessel are being distracted with non-navigational tasks.
- situational awareness is not being maintained at all times.
- there is insufficient communication between all members of a bridge team.

Duty holders and vessel operators should have in place processes and systems, as part of a wider safe system of work, to ensure that, during connected activities, vessels are operated in a way that ensures, so far as is reasonably practicable, the safety of people on nearby installations.

Outline of the problem
The following cases all involve a vessel engaged in an operation in connection with an offshore installation, or an activity connected with an offshore windfarm, within the last five years.

The UK Health and Safety Executive has issued a safety alert regarding the issue of the rise in incidents where attendant ships are colliding with offshore structures.



Loss of situational awareness

Case 1. A platform supply vessel (PSV) was requested to enter the 500m zone of a fixed installation. The Chief Officer and a watchkeeping officer were on the bridge. Pre-entry checklists were completed, and the Chief Officer began manoeuvring the vessel towards the 500m zone. The Chief Officer allowed the speed of the vessel to increase above the normal rate and the watchkeeping officer was engaged in other tasks. The Chief Officer made attempts to control the movement of the vessel, during which time it struck the leg of the installation.

Failure to keep a proper lookout

Case 2. A multi-role emergency response and rescue vessel (ERRV) was standing-by outside the 500m zone of a jack-up drilling installation. The Master had just handed over to the Officer of the Watch (OOW). It was dark, the weather was good, and there was a lookout on the bridge. The OOW became engaged in non-navigational tasks, including writing minutes to a recent meeting and testing the bridge radios. The lookout asked the OOW if he could use the bridge computer and was given permission to do so. Neither the OOW nor the lookout noticed that a change in environmental conditions meant the vessel was now drifting towards the jack-up. A PSV was alongside the jack-up and raised concern that the ERRV had entered the 500m zone and was on a collision course with the installation. The jack-up control room attempted to call the ERRV and instructed them to leave the zone. The ERRV collided with one of the legs of the jack-up.

Distracted by administrative tasks

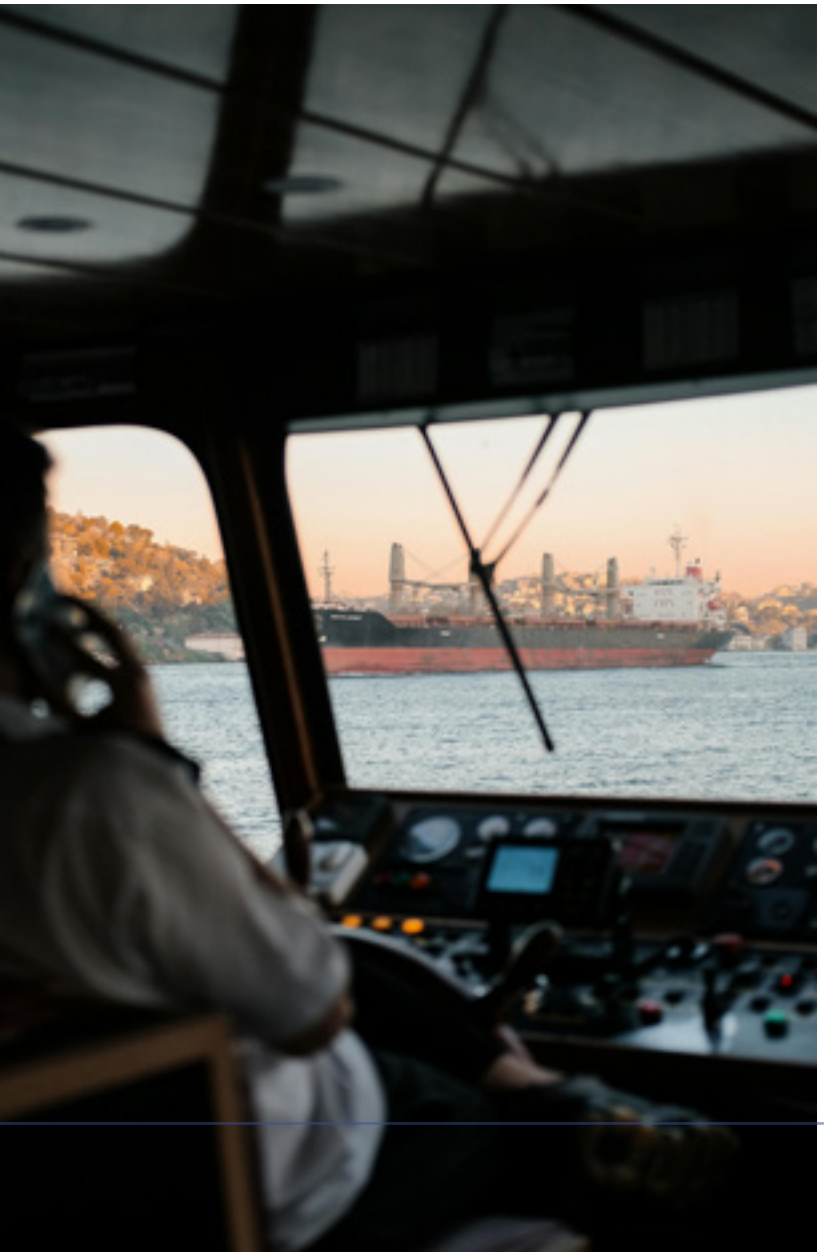
Case 3. A PSV was standing by a jack-up drilling installation. It was daytime, the weather was good and there was a single OOW on the bridge. The vessel was configured in 'green dynamic positioning' (DP) meaning the DP system was controlling surge but not sway. The OOW began some administrative tasks on the bridge computer but kept an eye on the installation through the bridge front window, knowing that if he kept the installation ahead of the vessel, the 'green DP' configuration meant he would not drift towards it. The view from the OOW's position at the bridge computer out the side window was blocked by the bridge toilet and ships funnel. The OOW was therefore unaware that the vessel was drifting sideways towards a neighbouring fixed installation. The PSV drifted inside the 500m safety zone and collided with the leg of the installation.

Failure to assess environmental conditions

Case 4. A PSV was engaged in cargo operations alongside a mobile drilling installation. It was dark, weather conditions were marginal, and the vessel was in a drift-on position with the bow into the wind. The Master was in control of the DP system and a watchkeeping officer was supporting him on the bridge. The crane operator on the installation asked if the vessel could change heading to enable access to cargo outside the reach of the crane. The Master pulled away from the installation a short distance and changed the vessel heading. This action resulted in the DP system being unable to maintain position and the vessel drifted towards and collided with the drilling installation.

Lack of communication between bridge team

Case 5. A windfarm service operation vessel (SOV) was transiting through the windfarm. It was daylight, weather was good, the vessel was in DP mode and there was an OOW and Dynamic Positioning Officer (DPO) on the bridge. The DPO had control of the vessel and was changing heading to pass a wind turbine. The OOW was engaged in a non-navigational task. The change of heading resulted in the vessel being on a collision course with a wind turbine. The Master, who had gone to the bridge for another purpose, noticed the developing situation and took control of the vessel, but was unable to prevent collision with the wind turbine.



Action required

Vessel operators and duty holders responsible for marine activities connected with offshore oil and gas installations and windfarms should review operating procedures and take actions relevant to the operations.

- Provide clear watchkeeping instructions.
- Review bridge resource management.
- Review the use of bridge alarms.
- Monitor attendant vessels.
- Consider sailing audits for marine assurance.

What's behind the latest spate of boat fires?

IIMS CEO, Mike Schwarz, has been alarmed at what seems to be a growing number of destructive boat and yacht fire incidents reaching his desk since the start of 2025. Mike has been motivated to write this article so he can set out and catalogue some of the higher profile fire incidents, as well as some of the less well publicised ones.

This is an expanded article following the introduction I wrote for the IIMS June News Bulletin on this subject. It may have passed you by, but there seems to have been a string of eye-catching large yacht and boat fires erupting around the world since the start of 2025 with devastating consequences. So, what is behind this surge in yacht and boat fires? Is there a common thread? Not sure yet, is the simple answer.

So, what we do know is that boat fires are nothing new. I have no idea who records the number of yacht and boat fires across the world from one year to the next - someone must - but it seems to me that 2025 has been an appalling year so far, although how it compares in reality with previous years, I cannot be sure. Remarkably the death toll has been low, but the instances of catastrophic fires have become too frequent. And of even greater concern, are the fires affecting tour and dive boats.

In some cases, we must wait for the results of ensuing investigations. Some causes, tragically, will never be known. And what about the impact for insurers in what is already a tight market? How often can they keep paying out sometimes extraordinary sums of money?

Marseille yacht fire. Image credit: Tom Moreau/Marine Nationale

Whilst the reason of a boat fire is not always known instantly, lithium-ion batteries are said to have been the cause of one devastating fire in Marseille in January which kick started this unwelcome run of boat fires.

This fire destroyed Naisca IV and spread to two nearby yachts. The second yacht was also destroyed, while the third sustained severe damage to her port side. Dubtless there was damage to the marina infrastructure too. Oil booms were deployed to mitigate the environmental harm. Who knows what the final cost to insurers will be, once the dust settles.

Image credit: CBS Miami

Remains of Ramonda.
Image credit: prlainovic_m_13_

Miami river fire.
Image credit: Fire Engineering

Also in January, a 29-metre Princess Yacht was destroyed in a blazing inferno. The vessel was allegedly being chartered by the renowned hip-hop producer Metro Boomin, who was not on board at the time. The Miami-Dade Fire Department mobilised more than 30 units, including ground crews and rescue boats, to contain the growing fire. However, the yacht eventually took on too much water and capsized into the river.

Three further major fires occurred during March. The 29.63-metre Azimut motor yacht Ramonda was destroyed in the Portonovi resort marina in Montenegro. The images are horrific and very little remains of the vessel - just a charred and burnt-out hulk from what I can see. The local police force managed crowd control and supported the operation, whilst firefighter units worked to extinguish the fire. However, according to reports, the fire could not be contained on site.

That same month, three yachts were destroyed following a marina fire in northwest Miami-Dade County, Florida, on the Miami River. According to local reports, authorities arrived at the scene to discover all three yachts ablaze. Firefighting efforts ensued from both shore and sea, with the fire extinguished three hours later by “foam techniques”. Two of the affected vessels were below 24 metres, with the other confirmed to be the 30.8-metre Rodman yacht Nirvana.

The other fire to catch my attention involved a Colombian catamaran tour boat. The incident forced 89 tourists to abandon ship. The Daily Mail reported that “all 92 passengers and crew in the Caribbean Sea off the city of Santa Marta in northern Colombia were forced to abandon ship after their vessel caught fire”.

An initial investigation revealed that the blaze on the tour boat Katamaran Tayrona I ignited after one of its engines suffered an electrical short. Taximarino, operator of Katamaran Tayrona I, has since issued a statement, which is of little comfort, saying that the engines fitted on the vessel were rebuilt approximately two months prior to the incident. Does that make it OK? Of course not!

Moving on to April, a massive fire erupted on a yacht in Fethiye's Karagozler Marina in Türkiye. Firefighting teams from Fethiye and Seydikemer initially responded but were unable to contain the flames. Arriving swiftly at the marina, emergency crews worked intensively to control the fire, but it seems they could not prevent it from spreading to other nearby boats. Actual facts about the incident are sketchy. Eyewitnesses stated that one of the burning yachts had recently been launched and was a relatively new vessel.

And then bizarrely by coincidence in April, two dive-boat engine fires occurred on successive days in southern Thailand. All passengers and crew involved were able to be rescued.

In the second incident, 18 tourists and Thai passengers and 8 crew had to take to a life-raft in the Andaman Sea in the early hours. The vessel, the 35m steel DiveRACE Class E, had brought divers to Khao Lak National Park, and anchored for the night ready to visit the 1980s wreck of the tin-mining dredger Boonsung and surrounding coral reef the next day.

Just the previous day, fire had broken out in the stern of a smaller commercial boat, the Aor Subpiti, as its engine burst into flames. Sixteen-year-old helmsman Manawat Bialy sustained significant burns to his arms and face when the engine exploded close to where he had been working, but he was still said to gone on to help get the family safely into the water before trying to put out the fire.

These two incidents happened less than a month after 26-year-old London backpacker Alexandra Clarke went missing when the charter dive-boat David John caught fire and sank. Clarke had been one of 22 tourists and crew on the vessel when the fire broke out some 10km off the coast of Ko Tao on the western side of the Gulf of Thailand.

According to police the boat's fuel tank overflowed while being refilled, with the vapour ignited by a spark when the engine was started. Fire spread quickly through the engine-room, as the divers and crew jumped into the sea. They were rescued by the crews of private boats alerted by an emergency call. The vessel eventually sank and the captain and the crewmember who had been filling the tank have been charged with negligence.

Karagozler Marina, Fethiye, Türkiye fire. Image credit: Patronlar Dunyası

The burnt-out dive boat. Photo credit: Phuket Info Centre

Fire on the David John: Photo credit: Surat Thani Provincial PR Office

Emperor Seven Seas ablaze

Boat fire at Imperial Yacht Club

More problems for Egyptian maritime authorities

Egypt's liveaboard industry received another blow with the news that the Emperor Seven Seas had been burned out by a fire while docked in Port Ghalib marina. Thankfully, no crew or passengers were injured, and while the vessel was declared a total loss, everyone was safely evacuated as the fire took hold and could not be dealt with.

A statement from Emperor said: 'In the early hours of Thursday, 13 March, Emperor Seven Seas was moored in Port Ghalib when a fire broke out that could unfortunately not be contained.

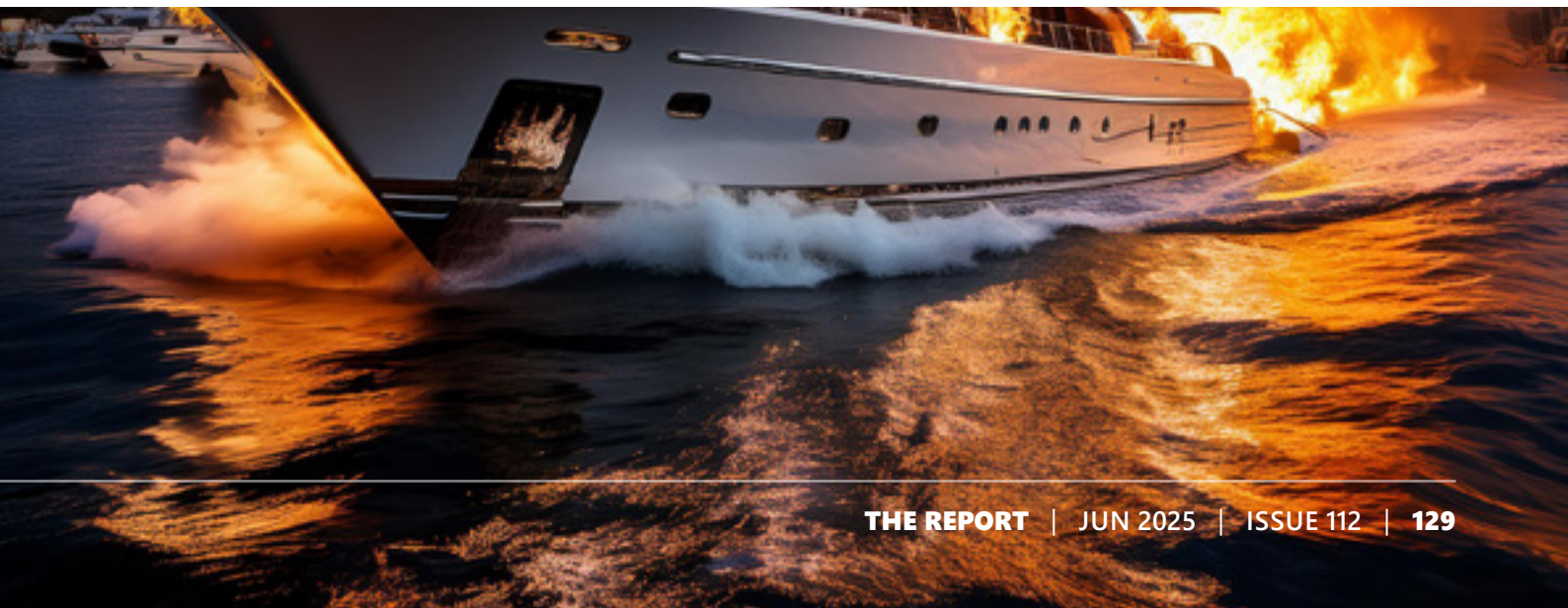
On the other side of the world, two separate boat fires in New York and New Jersey on the same night killed 2 women, with a further 3 hospitalised.

The newspaper report said, "Raging fires engulfed boats in New Jersey and Westchester in separate incidents overnight that saw two people dead and three hospitalised, according to officials. The two females were taken to University Hospital, where they were pronounced dead." Bet that story passed you by?

Then just four hours later, a larger blaze broke out at Imperial Yacht Club, a marina on the Isle of San Souci in New Rochelle. A total of seven boats were destroyed as it took firefighters two hours to get the blaze under control.

There have been other serious yacht fires too in recent months. What I have shared with you is the tip of the iceberg. So, what are we to make of this situation, which seems to be setting a rather worrying trend? The intensity and severity of these fires are also of concern. It is remarkable that more people were not killed.

Once again, these cases highlight the continuing spate of fires affecting the boating and tour boat industries. While it could certainly be argued that these fires are disproportionately reported due to the sensational and excessive use social media, the rate of total losses caused by such incidents would seem to be increasing. Until the industry identifies and addresses the root causes of yacht and tour boat fires, it seems inevitable that such incidents will likely persist and only grow in volume and severity.



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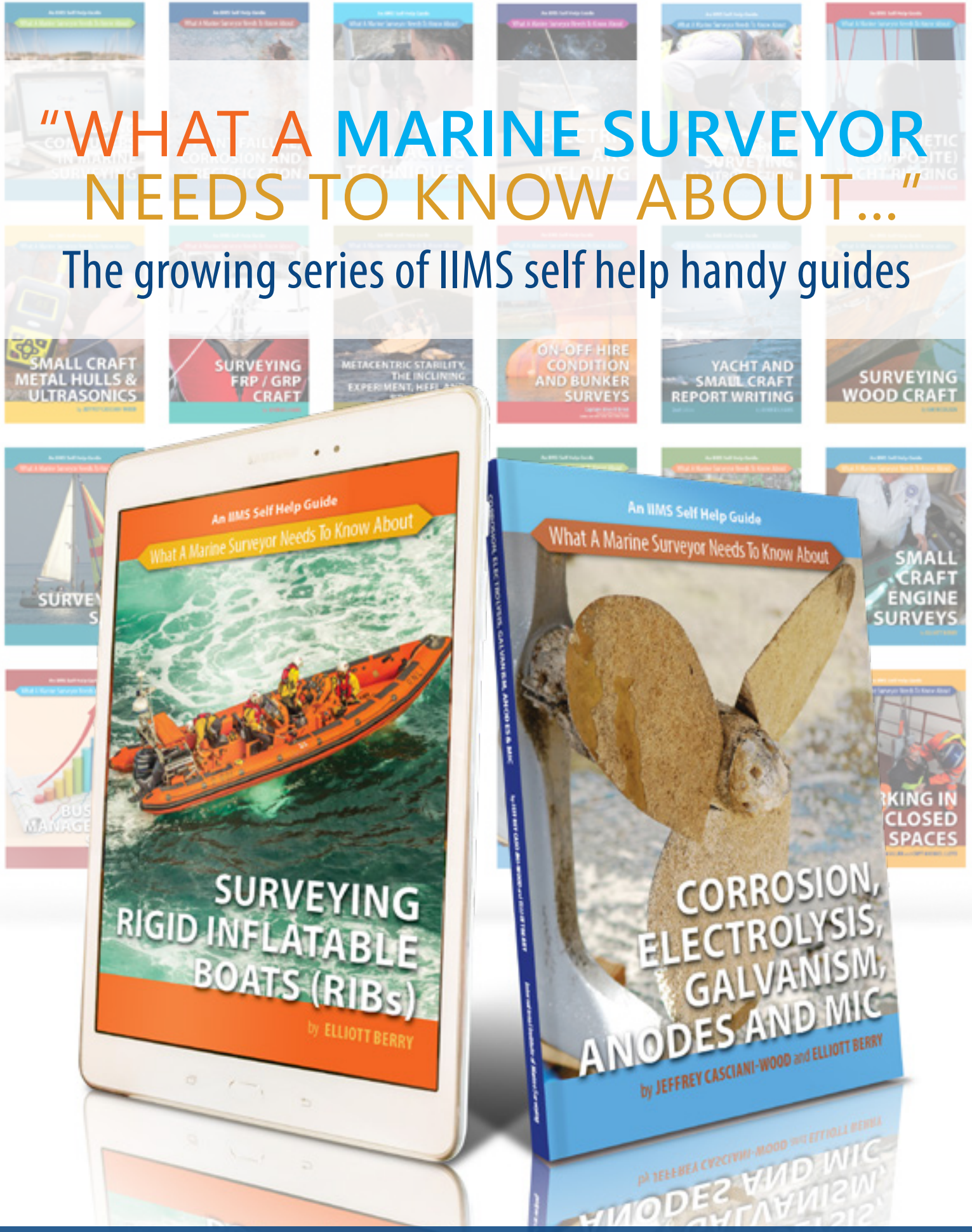

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By Peter Broad, *Immediate Past President of IIMS, CEO, Broadreach Marine Technical Consultants and Marine Surveyors*

DUE DILIGENCE
- a cautionary tale -

Dear fellow marine practitioners. I feel that I need to put pen to paper and write about the increasingly poor standards within some Classification Societies and Flag Administrations.

This serves as a word of warning to any buyers or charterers considering the construction of a new ship. You may consider that I am stating the obvious here, but let me assure you, this is a cautionary tale.

1. If you are entering into a new building project, you must have a robust specification at the time of signing the contract. - If you enter into a new building contract and your specification is not reasonably detailed and mature, it will cost you a lot of money and time. The shipbuilder will, of course, be helpful in providing you with additional detailed design and machinery and equipment, but if these are not specified within the contract specification, then these items will all be a variation to the original contract and be charged as extras.

2. Please get a qualified law firm and experienced marine technical consultancy to review the shipbuilding contract, shipbuilding specification, and General Arrangement plans before you sign it.

3. You need someone in your team who can understand the shipbuilder's quality standards and HSE procedures. These must be reviewed before signing the shipbuilding contract. If you do not review and agree on the shipyard standards at the time of contract, you cannot reasonably ask for anything extra unless you pay more. Be aware that if you do ask for additional quality control and or additional HSE requirements then the shipbuilder may consider these too onerous and want to charge you more and certainly will imply extra time.

You need to be aware of what are reasonable standards in the country where the shipbuilding yard is located. It may be impossible for the shipyard to implement your required standards. That is why it is so important to carry out due diligence before you enter into a contract with a newbuilding shipyard. It is appropriate to send someone who has newbuilding experience to visit the shipyard and carry out an audit on behalf of the Buyer before signing a shipbuilding contract – this should be part of the tender process.

4. You also need to consider the experience of the main shipbuilder and its subcontractors. You must get a list of subcontractors as part of the shipbuilding contract, and you should audit them as well as the main building yard to establish their quality and HSE standards under the main shipyard contract. You do not have to accept subcontractors if they do not meet the same minimum standards as the main building yard. The main building may not use subcontractors for hull block construction unless they are agreed upon within the shipbuilding contract.

5. Choose your Classification Society and Flag Administration wisely. Not all Class Societies are the same and do not have the same level of Plan Approval capabilities around the world. The shipbuilder may have a preferred Class Society which they have worked with before and have a good working relationship with. This can be advantageous to expedite plan approval in a timely manner.

6. The Flag Administration for the new build does not have to be the same as the vessel it will Flag with when entering into service. It is not unusual to Class and Flag with one organisation for the ease of the newbuilding process (plan approval and onsite supervision) and then change Class and Flag at the time of delivery. You should consider this and discuss it with your shipbuilder before you sign the shipbuilding contract.

7. Normal Plan Approval exchange between Shipbuilder to Class and Flag and Shipbuilder and Buyer should be around two weeks. Then the Class / Flag / Buyer should respond to the Builder within two weeks. This is a reasonable time frame and a reasonable expectation to progress the plan approval process in a timely manner. The shipbuilder should clearly define the required plan approval process at the time of the contract. Based on recent experience, we have noted that some Class and Flag plans have taken over 200 days to be returned with comments back to a shipbuilder. This can cause significant delays and uncertainty for the builder and can cause delays to the overall project delivery schedule. Class and Flag need to confirm that they have sufficient resources to support the plan approval process and the expectations of the shipbuilder.

8. Note there can be anything from 200 to 1000+ drawings for plan approval, depending on the complexity of the vessel. Each of these drawings will need several revisions and exchanges between Builder / Class / Flag / Buyer before all comments are agreed. There can be five sometimes more revisions of each hull and system drawings through the plan approval process, each exchange takes time to assess, which adds time at the front end of the project or even can overlap with the initial construction stages of the vessel. The longer the lead time you have for plan approval before steel cutting (the start of construction), the better.

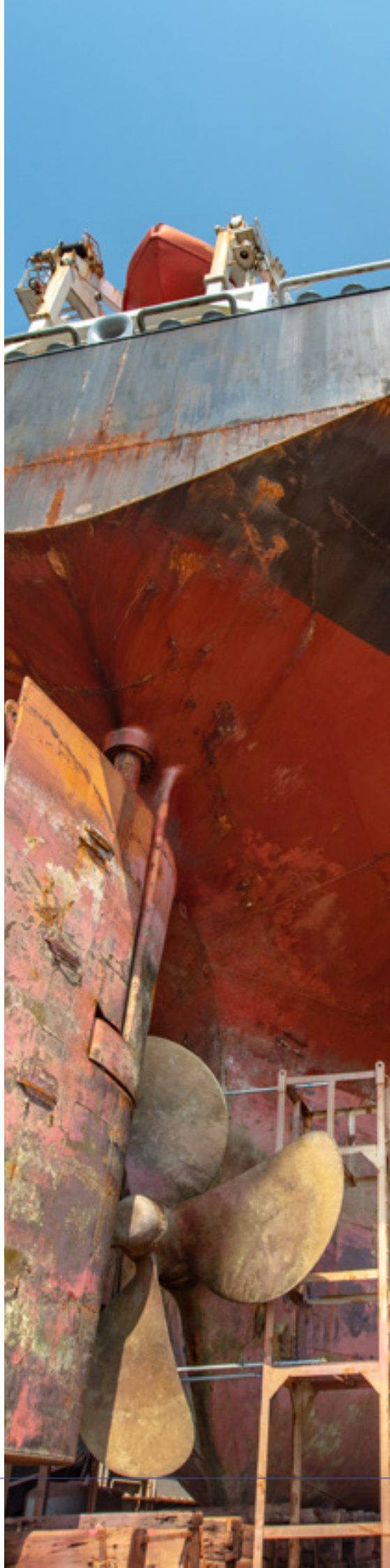
9. If you have existing vessels in service with one particular Class and Flag then it is definitely worth contacting them in advance and asking them what support they will give you and the shipbuilder during the newbuilding project. It is definitely worth getting some reassurance about their ability to deliver plan approval in a timely manner and what onsite supervision they can provide during the building phase.

10. Note that the contract for Classification Services and with the Flag Administration is made between the shipbuilder and those organisations, not through the buyer. But the buyer can and must be part of that discussion at the time of contract negotiations.

11. Do you as the buyer have the skills and experience in-house to carry out the Plan Approval and newbuilding supervision? Do not underestimate the considerable amount of manhours that are required for Plan Approval. This is not a part-time job. You need to employ experienced staff who have the correct skill sets for Plan Approval.

12. Consider the lead time from signing the shipbuilding contract to when Plan Approval will start. And more importantly, the time from when Plan Approval starts to steel cutting. It is really important to have a considerable amount of the Plan Approval complete for hull and machinery before steel cutting. Once the vessel construction has started, it is very difficult to re-design anything.

13. Consider that while your buyer's Plan Approval team are reviewing drawings many of them are also being reviewed by Class, concurrently. You will almost certainly have to review every hull drawing three or four times, and the machinery outfitting drawings five or six times as they evolve. The comments are exchanged between your Plan Approval team and the shipbuilder and the Class comments are also exchanged with the shipbuilder. This all takes precious time.



14. Do not take the Class Plan Approval and acceptance of drawings for granted. They are not always correct. You must have a knowledgeable and experienced Plan Approval team that can challenge and facilitate competent design reviews and present credible information back to the shipbuilder to challenge Class Plan Approval mistakes.

15. Rules are rules, but there are interpretations, and if there is a lack of experience, the application of the rules can be very restrictive to the design of a vessel and its systems. Class surveyors are not ship operators, so the buyer needs to make sure the ship and its systems are fit for purpose and in accordance with the contractual shipbuilding specification.

16. As an aside, we see this at many levels, especially with recent Flag Administration amendments to Codes of Practice, where the minimal consultation with industry experts has been totally ignored and the new codes are unworkable and will prejudice current operators who have to apply retrospective approval for existing vessels.

17. How will you manage Plan Approval?

18. Who will be your Plan Approval team, and who will be your site team?

19. How long do you have between the start of plan approval and steel cutting? If this is a new design for the buyer and the shipbuilder, you need more than six months to process the basic plans before steel cutting. But six months is still a very short time – ten months or so would be better. All time spent in preparation (Plan Approval) will reduce variations, cost escalation and less impact on the build schedule.

20. Do you have the necessary skills and experience as a ship buyer to supervise a newbuild project? Being a ship operator does not necessarily mean that you have in-house experience to supervise a newbuild project.

- Do you have an experienced naval architect in your team who has experience on the ground as a hull inspector? Do they have experience and any qualifications in non-destructive testing or understanding of what may be presented by the shipbuilder to question and challenge information?

- Do you have an engineer in your team who can effectively read piping and system drawings and understand pipe and machinery fabrication and outfitting? - Do you have an electrical and control engineer on your team who can understand all the control engineering and power management systems as well as all the equipment installation requirements?

- Do they have experience of attending Factory Acceptance Tests (FATs) for machinery, and can they cover all the FATs and the Plan Approval, and onsite supervision? How many people do you need to cover all the buyer's interests?

- Do you have a qualified paint inspector in your team? Painting is often forgotten when it comes to the buyer's supervision. If you are investing £ millions in your new vessel, then you should confirm that it is painted correctly internally and externally to protect your assets. Employing a qualified paint inspector (NACE or FROSIO qualified) in your site team will certainly pay for itself in the long run.

21. Are you prepared for variations to specifications and contract?

22. How will you deal with variations?

23. Do you have a contingency fund in your newbuilding budget to cover variations?

24. It takes time for the shipbuilder to review and prepare variations, and then it will take time for the ship buyer to assess the scope of work for the variation and its cost. (Cost in monetary value and possibly additional time to the overall newbuild schedule).

25. Alternatively, you as the buyer could put all your trust in the shipbuilder, the Class Society and Flag Administration and not have a robust Plan Approval and site team. You can just decide to attend the sea trials and accept the vessel as it is presented by the builder. Will this save you money? Well, some shipyards are offering US$1,000,000 discounts to buyers if they do not have an onsite build supervision team.

All of these are based on my experience over 23 years working in the shipbuilding industry all over the world and what I have observed in recent years. It is provided in good faith for your consideration.

'Caveat Emptor' - buyer beware.

Yacht design:
AI is not accountable

By Hans Buitelaar

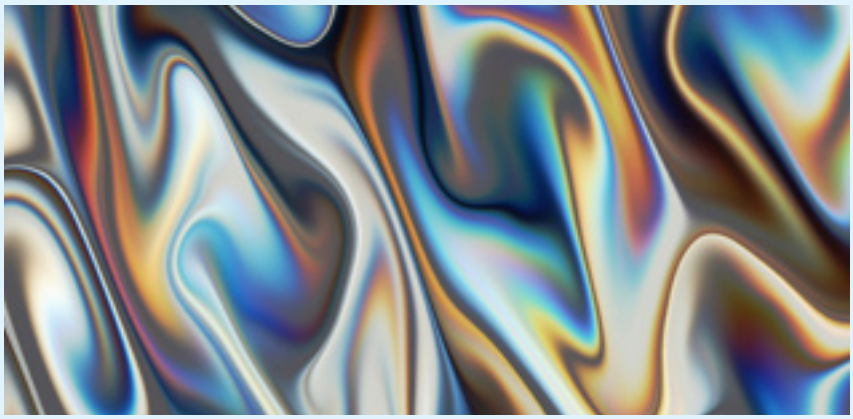
All the images are the results of Open AI when asked to design: "An innovative racing sailing yacht with sailors on it".

Artificial Intelligence cannot design yachts, but it can be used to run calculations when looking for optimisation of elements within yachts. Designers use it. However, verification is always required. As the neural networks – often named AI - use a multitude of databases, how can one be sure there are no false data? For comparison of design options and for image creation, AI adds real value. This article focuses on the use of AI by yacht designers.

Computers are really much better than humans in repeating a task over and over. Asking a computer to generate a lot of variations of a preliminary design can result in a myriad of possibilities to compare in seconds. Yacht designers use this unhuman capability in their process to achieve an optimum for various properties of a yacht, like hydrodynamics, interior lay-out or energy management.

Understanding limits

Asking the most popular artificial intelligence application Open AI to design a sailing yacht from scratch, immediately shows that this advanced algorithm for searching meaningful connections on the internet, is not able to identify basic conditions for sailing. Sure, the image presented looks like a sailing yacht but the sails may have their camber into the wind. What the computer presents, is clearly an interpretation derived from a lot of images found online without understanding the essence. It may be good for a laugh. So how can yacht designers effectively use AI to improve their design process and their yachts?



The above images are the results of Open AI when asked to design:
"A sailing yacht interior with four cabins, a central salon with a galley."

Balancing innovation and caution

Adrian Budde from superyacht design studio Espen Ønio analyses: "Artificial Intelligence supports various stages of the design process, from initial concept generation to final detailed renderings. AI automates repetitive tasks, generates innovative design variations, and assists in data-driven decision-making. While these technological advancements have greatly enhanced efficiency and creativity, I would also like to issue a warning against an over-reliance on technology." In a lecture on the use of AI in Yacht design, Budde concludes: "The integration of AI into yacht design offers both opportunities and challenges. While AI enhances efficiency and creativity, its impact on the traditional design process requires careful consideration to avoid a superficial approach. AI makes it easier to explore multiple design variations rapidly. However, this capability can also be overwhelming for both designers and clients, as the sheer volume of possible variations may complicate decision-making. Beyond image generation, AI plays a valuable role in various other areas during the concept development phases, layout optimisation, research tasks, and automating repetitive tasks. These applications make AI a versatile tool that enhances both the creative and technical aspects of yacht design."

Designers' tools

Designers share their experiences and tip each other by addressing the tools they use. Budde identifies Unreal Engine, a programme developed in the gaming industry, is a powerful tool to make realistic images, including detailed backgrounds. Vizcom is a tool that can make realistic renders, based on initial design sketches. This helps designers to translate an initial idea into a quite presentable rendering that can be shown to a client and verify if this idea meets the wishes for the yacht. Going from some lines to a complete 3D model requires decision making, that is what basically distincts A.I. from the more traditional programmes, that only execute what the designer instructs.

Concept creation

Industrial designer Scott Henderson, not specialised in yacht design, used A.I technology Midjourney 5.1 to create a whole idea for a modern superyacht. "The process begins by considering key features of next-generation charter superyachts, such as large sun deck, helicopter pad, pool deck, jacuzzi and swim deck. Using these as text prompts, the software generates multiple concepts. I select the ideas that are tracking in the right direction, and the software works on those some more, so after about 8 cycles, it has really explored a lot of ideas." The concept for a yacht is generated and visualised.

Set restraints

"I utilise software to optimise hull shapes. For that, using a neural network is a great way of saving time because the computing power is awesome! For example, coming up with 5.000 different variations of a shape is something no human can do – especially not in such a short period of time," Italian Yacht designer Matteo Polli shared in an interview with Lars Reisberg. "Nobody needs 5.000 iterations, of course. Those programs are useless without a human giving an input. Someone who is setting the marks, the restraints." Reviewing all the different hull shapes that software van generate, only has a point if you know what you are looking for – what improvement does the designer want to achieve? Polli explains: "It all starts – always – with a hull shape made by myself. I use my experience, my imagination, my creativity and knowledge to develop a new hull. And of course I already have a very specific idea of where, which parts or which area, we could need an optimisation for. So I develop another shape. Those two hulls are then fed into the software. We never start from scratch – the system needs a starting point and an end point. What it then needs are the parameters. These are the commands, telling the machine what is to be achieved when running its calculations. Now, the neural network will spit out iterations between the first and the second along the said parameters."

Chaos

"You simply can't tell the computer to just „make the boat better". It needs a very exact set of rules and parameters. You need to be very specific and strict, otherwise, the outcome is corrupt. For example, you can tell the machine to optimise CFD (Computer Fluid Dynamics) in for upwind performance or

downwind performance. But there are limits. In this example, the limit would be the sea state: Waves, wave patterns and their somewhat chaotic behaviour are very, very hard to simulate. So, mostly, the simulations and iterations are based on either no sea state, which doesn't exist in real life as you know, or a "perfect" wave pattern, which also can never be natural." It is up to the designer to take such consideration into account and ensure that the final yacht will still perform on waves.

Ethics?

While AI can be a handy tool for designers to use, the outcomes of the calculations cannot be followed without human verification. "Legitimate concerns and considerations must be addressed to ensure their responsible and ethical implementation," project manager Kirsten Odendaal at research centre MARIN writes in maritime technology paper SWZ Maritime. "One primary concern is the reliability and accuracy of the data upon which AI algorithms rely. Inadequate or flawed data can lead to wrong decisions and potentially compromise the safety and security of yachts. Additionally, the potential for biases within AI systems must be carefully monitored, especially regarding decision-making processes that impact crew members, passengers and the environment. Furthermore, the legal and regulatory frameworks surrounding AI in the yachting industry are still to be fully developed and enforced to ensure compliance with ethical standards, privacy protection and liability attribution. Addressing these concerns and considerations will be vital in fostering a harmonious integration of AI and machine learning in the yachting industry, allowing for sustainable growth and ensuring the safety and well-being of all stakeholders involved."

People power

Even without safety, legal and copyright issues, conceiving a yacht remains a skill that only seasoned designers can master. As Polli puts it: "Humans are the most powerful tool. This means, when we receive a set of AI generated designs, there will always be a set good designs – never only one. So the choice, which variation to take and which to discard, is a human decision. In relation to the sea state or waves, me, the designer, will ultimately have to decide which hull will master the waves better and which won't."

About the author

Nautical journalist and technical writer Hans Buitelaar is a keen regatta sailor who takes a special interest in the science behind sailing and innovation in the maritime and nautical industries.

This article first appears on the METSTRADE website.

The abandoned wreck of MS World Discoverer in Roderick Bay, Solomon Islands (Sheridan Ward)

Shipwrecks and the urgent need for the Nairobi Convention

By Sheridan Ward

It is estimated that there are 3,800 shipwrecks scattered across the floor of the Pacific Ocean. Most date from the Second World War. However, shipwrecks are not an issue consigned to the past. In the last decade, a global average of 73 ships with a displacement of more than 100 tonnes became stranded each year – and many of these ships are subsequently abandoned due to the exorbitant costs of shipwreck removal, especially in remote locations.

The impact that unaddressed shipwrecks have on local communities and their environment can be devastating. The Pacific – and world – needs a unified approach to dealing with shipwrecks as soon as they occur.

Pacific shipwrecks have been in the headlines in recent months. In October, HMNZS Manawanui ran aground on a reef and sank near Tafitoala in Samoa. The New Zealand government is currently extracting diesel fuel from the vessel and is scheduled to remove equipment, weapons, ammunition and other debris. New Zealand has also pledged a wreck assessment to study the reef and marine environment. Concerns about the ongoing impacts of the shipwreck on the livelihoods of the local communities are being voiced, with many communities lodging requests for compensation while they are unable to safely fish in the waters surrounding their homes.

The Manawanui is an exceptional case involving a government-owned military ship, but is especially notable for the rapid response by the authorities. Most shipwrecks are commercially owned vessels, and often involve slow responses, lengthy legal battles, or complete abandonment of the shipwreck.

Six years after the 2019 heavy fuel oil spill in Kangava Bay, Solomon Islands, local communities are now taking their bid for compensation to the courts over damage to the UNESCO World Heritage Site and the largest raised coral atoll in the world. No wreck remains, but the damage to waters and concerns over food safety will linger.

The wreck of HMNZS Manawanui off Samoa (NZDF)

In other cases, wrecks are never removed. In April 2000, the German passenger ship World Discoverer carrying 112 passengers and 80 crew hit a rock in Sandfly Passage, Solomon Islands. To prevent the ship from sinking fully, the captain decided to beach the vessel in Roderick Bay. For the past 25 years, the local village of only a few hundred people have put up with the mess.

On a recent visit, they told me of several pressing concerns. The ship was drained of fuel, and villagers assured that the fuel tanks were completely cleaned. Yet fuel continues to visibly leak into the water around the wreck and has been getting worse in recent years. The children swim in the oily water and climb the ship to jump off it or swing from a homemade zipline from the ship, despite the risk of cuts from rusted metal. The coral around the ship is crushed and almost completely dead. Villagers also still rely on the fish in these waters for food, despite the potential health risks.

The Solomon Islands government doesn't have the capacity to pay for the removal, especially in such a remote location, and the company that owned the vessel is not legally obliged to take any further action. The villagers, while concerned about the health of their waters, environment, and livelihood, have had to accept that the wreck will remain.

The challenge for the future is to seek ways to ensure similar situations don't occur. One option is to strengthen international accords. The Nairobi Convention on the Removal of Wrecks provides a legal basis for shipwrecks within a signatory states' Exclusive Economic Zone (EEZ) to be removed if they

present a risk to navigation or the marine environment. This convention was adopted in 2007, entering into force in 2015, and is driven by the need for consistency internationally. There are presently 70 signatory countries – up from 42 in 2015 – covering 79% of global merchant shipping (by tonnage).

Importantly, under the Nairobi Convention, registered ship owners and their insurers are financially and legally responsible for locating, marking, and wrecking ships that have been sunk or stranded. They are equally responsible for recovering sea containers that are lost overboard, with the possibility of imposing criminal offences for failure to comply. The convention removes legal loopholes and provides tighter definitions from its outdated predecessor.

Cook Islands, Marshall Islands, Niue, Palau, Tonga, and Tuvalu are all original signatories to the Nairobi Convention, with Nauru entering in 2020. Australia is yet to accede to the convention, but a government spokesperson confirmed legislative amendments are being worked through to see Australia join. Solomon Islands also took the initial steps in 2018 to align its domestic legislation with the convention in preparation for accession. The protections under this convention could offer further assurance to Fiji, Kiribati, Micronesia, New Zealand, Papua New Guinea, Samoa, and Vanuatu should these countries also choose to accede. This should be a maritime priority for the Pacific region in the face of the vulnerability and challenges of maintaining such expansive EEZs.

There have been three recent incidents within Australia's EEZ that would have been covered under the convention. In 2018, the YM Efficiency, flagged from Liberia, lost 81 containers within 30 kilometres of the Australian coastline, for which the remediation cost the Australian government close to $20 million. As the ship owner disputed there had been a wreck, the Australian government had to go through the courts to determine fault and seek compensation. In 2020, the APL England, flagged from Singapore, lost 50 containers, for which $22 million was reimbursed to the Australian government. In the same year, Navios Unite (Liberia) lost three containers that sank immediately, with the Australian government covering the costs of a 1,600 square kilometre aerial search to confirm there were no outstanding hazards.

For each of these cases, the Nairobi Convention would have clarified any doubt and provided an avenue to deal directly with the ships' insurers to manage compensation.

Containers askew on board the APL England (AMSA)

The Nairobi Convention doesn't provide an answer to the thousands of shipwrecks currently located in the oceans – consequently, this means it doesn't pose a threat to any underwater heritage sites, including historic shipwreck sites. However, it provides a uniform mechanism to address future wreckages and maritime accidents and loss of cargo into the ocean.

The increased variability of weather – especially in the Pacific – is also cause for concern, with three major container loss events occurring in the Pacific in recent years. In 2020, One Apus (Japan) lost 1,816 containers northwest of Hawai'i, while in 2021 the Maersk Essen (Denmark) lost 750 containers northeast of Hawai'i, and the Maersk Eindhoven (Denmark) lost 260 containers.

Growing rates of freight shipping globally and increasingly volatile weather patterns exacerbated by climate change further contribute to the risk of ships being wrecked or abandoned within the Pacific region. The "Blue Continent" concept refers to the 22 Pacific Island countries and territories that manage 20% of the world's EEZs. Taken together with areas managed by Australia and New Zealand, this is almost 30% of the world's EEZs for a region that homes less than 1% of the world's global population.

There is a need for greater protection to support our oceans and ensure that states and communities can access appropriate avenues to have wrecks removed, without putting the financial burden of this on small island states with limited fiscal resources. Australia, Fiji, Kiribati, Micronesia, New Zealand, Papua New Guinea, Samoa, Solomon Islands and Vanuatu would all benefit from accession to the Nairobi Convention, and should hasten their efforts. This could save millions of dollars and protect small communities from the experiences Roderick Bay has been living with for the past 25 years.

About the author

Sheridan Ward is a researcher on non-militarisation and countries without sovereign military institutions. She holds a BA in International Security from the ANU and a Masters of Sustainable Development and Diplomacy from the United Nations Institute of Training and Research / The University for Peace, based in Costa Rica.

This article appears courtesy of The Lowy and is published here with our thanks.

PROJECT PERFECT STORM

The Evolution of Operator-Centric Vessel Design

How one combat veteran's scars ignited a movement to redefine high-speed maritime safety. ***By Clay Ratcliffe.***

Operators aboard the Ocean Craft Marine 11.5M Offshore Interceptor engage in live demonstration during tactical testing.

The Hidden Cost of Speed at Sea

Professional operators in both military and law enforcement patrol craft face some of the most extreme working conditions in modern service. Their bodies absorb punishing g-forces during high-speed maneuvers and wave reentries—accelerations reaching up to 23 Gs have been recorded on many of these boats and in only moderate sea conditions. These impacts lead to long-term spinal degradation and injuries, reduced alertness, and in too many cases, lead to an early medical retirement.

That status quo might have remained, had it not been for a group of industry veterans and engineers who decided that enduring pain and injury shouldn't be part of the job—it was a failure of design.

"We didn't just want a better boat. We wanted to redefine what's possible when performance, safety, and innovation align."

Enter Project Perfect Storm

Todd Salus knows these consequences all too well. A former U.S. Navy combat craft operator with more than 300 missions under his belt, Salus suffered spinal damage that sparked a decades-long pursuit of safer high-performance vessels. Now co-founder and vice president of Ocean Craft Marine (OCM), he helped spearhead Project Perfect Storm—a collaborative mission to create a vessel that didn't just survive the sea but worked with it.

The centerpiece of this project: The Ocean Craft Marine 11.5M Offshore Interceptor—a new breed of RHIB, designed with operator survivability at its core.

Reimagining the Hull—and the Mission

In partnership with Porta Performance Products, TMS Group, Ullman Dynamics, Seakeeper, Skydex, and over a dozen other marine innovators, OCM executed a four-phase redesign and testing protocol unlike anything in the industry.

The first major leap came from below: a fully reimagined hull form designed by Scott Porta. Known for his world records and hull designs in offshore racing, Porta developed a strakeless running surface that reduced hydrodynamic drag while absorbing wave impacts more fluidly than traditional stepped designs.

"Strakes are drag," Porta explained. "In designing the hullform for Project Perfect Storm, we engineered the water to travel only in a single direction under the hull, reducing slamming forces and improving directional stability."

The result? A hull bottom that allowed for faster reentry, tighter tactical turns, and most importantly, a substantial drop in vertical acceleration—meaning less trauma to the operator's spine.

Layered Innovation, Quantifiable Results

Each phase of testing for Project Perfect Storm introduced new technologies—from the Porta hydraulic transom bracket, which optimized engine height in dynamic sea states, to Seakeeper's RIDE control system—an adaptive pitch, roll, and yaw stabilizer never before used on military-grade RHIBs.

The final configuration delivered remarkable results. With integrated systems from Ullman Dynamics, Skydex, Porta, and Seakeeper all working in unison, vertical shock (acceleration) to the operator was reduced by as much as 77%. Pitch and roll were also significantly minimized. Real-time inertial data confirmed what every operator on board could feel.

"We were launching the boat into the air," said Salus. "And I was bracing for a bone-jarring landing—but it touched down softly. That's when we knew we had something revolutionary."

Tech by the Numbers

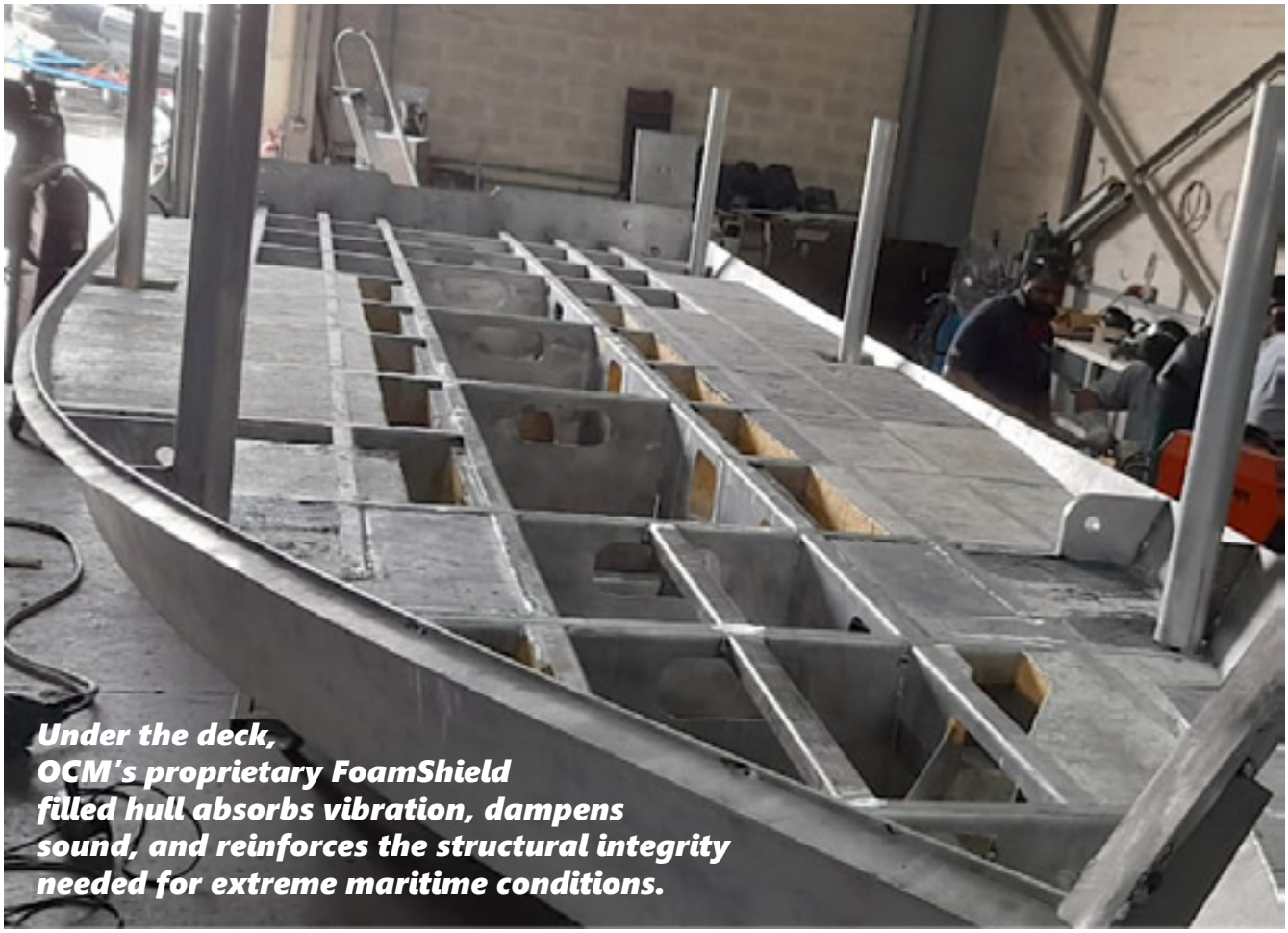
- **23:** Peak G force measured as vertical acceleration before modification
- **77:** Percent reduction in vertical G-forces after integration of ride technologies
- **44:** Percent reduction in pitch reduction documented by TMS Group findings
- **31:** Percent reduction in roll documented by TMS Group findings
- **350:** Range in miles with triple 400HP Mercury V10s
- **64:** Sprint speed in miles per hour
- **20: The number of Project Perfect Storm partner companies collaborating across 4 test phases**

Crew-First Design, Built to Last

The Offshore Interceptor's layout supports a wide range of mission profiles, but its core focus is operator endurance.

Features include:

- FoamShield technology below deck
- Porta Products Hydraulic Transom Motor Bracket
- Twin operator consoles for a clear division of labor
- Ruggedized bow pushing knees and boarding platform
- Ullman Dynamics shock-absorbing seating on adjustable deck tracks
- Sharrow Marine propeller technology
- Skydex energy-dampening flooring system
- Reconfigurable weapon mounts from Military® Systems Group, Inc.
- Weapon systems from FN America
- Ballistic Protection from Iten Defense
- Dual diver recovery notches
- Four Fully integrated Garmin digital displays
- David Clark wireless headset crew communication system.
- Tocaro Blue PROTEUS 3D Navigation System
- Hefing Marine IMAS vessel telemetry and impact monitoring system
- Brnkl Black vessel security and telemetry monitoring system
- CopaSAT Storm V3 satellite communication system



Under the deck, OCM's proprietary FoamShield filled hull absorbs vibration, dampens sound, and reinforces the structural integrity needed for extreme maritime conditions.

A Blueprint for the Future

Project Perfect Storm wasn't just about building a better boat. It was about proving what's possible when you put the operator's life and well-being at the center of design—and when an industry chooses collaboration-over-competition.

More than 20 companies donated engineering talent, and their latest intellectual property innovations to realize the vision. From AI-based helm guidance to weapon-ready ergonomic layouts, the result is more than a vessel—it's a template for the next generation of high-speed craft.

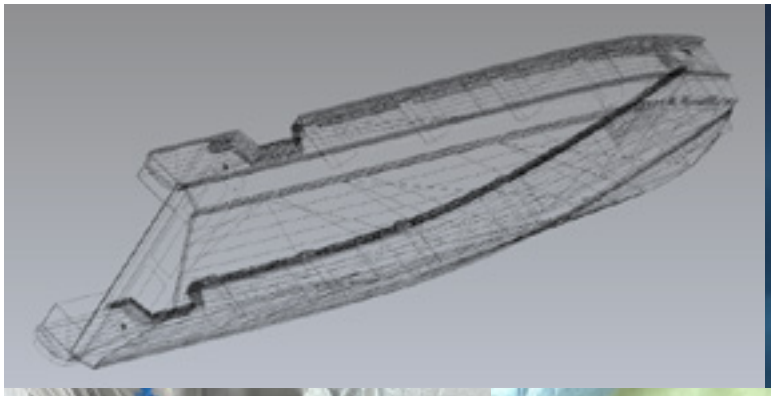
"This is a legacy project," said Salus at MACC 2024. "If this saves even one life, it's worth everything we've done."

> "It's not just a faster boat—it's a safer way to fight, patrol, and protect."

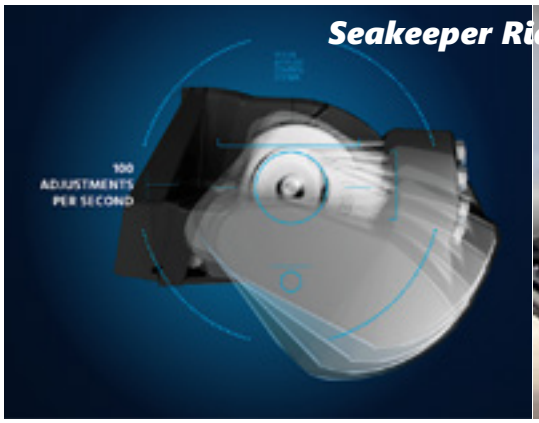
High-speed tactical maneuver with a full combat crew onboard.

Rear view of the triple Mercury V10 outboard configuration—unmatched performance and aggressive stance.

Operator's-eye view of the 11.5M Offshore Interceptor underway with other Ocean Craft Marine RHIBS in formation.

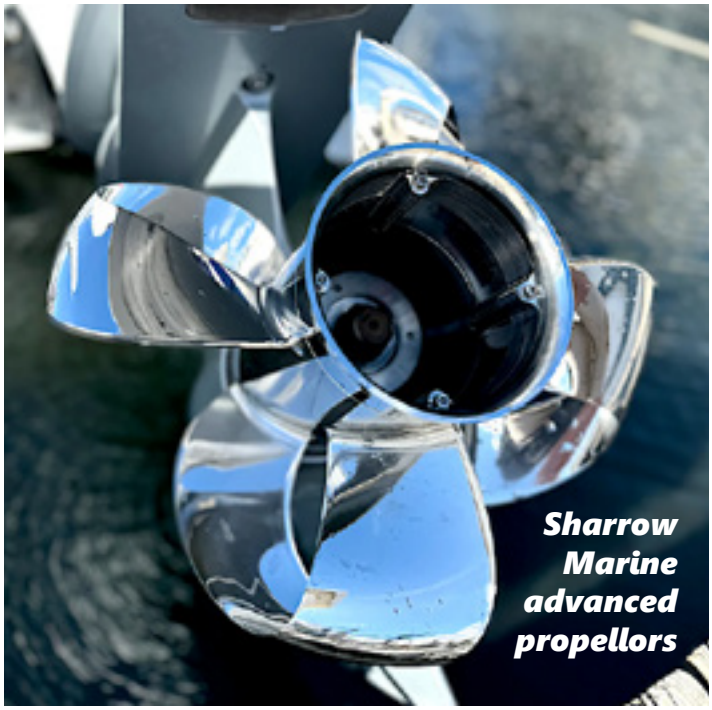


Scott Porta custom offshore race proven running surface



Seakeeper Ride® vessel attitude control system

Porta Products hydraulic transom bracket



Sharrow Marine advanced propellors

A day in the life of Capt Nick Sloane

FNI, HonFIIMS, a Member of the Lloyds' Panel of Special Casualty Representatives (SCR), Chairman World Sailing Safety Commission ISCO - Exco Council Member.

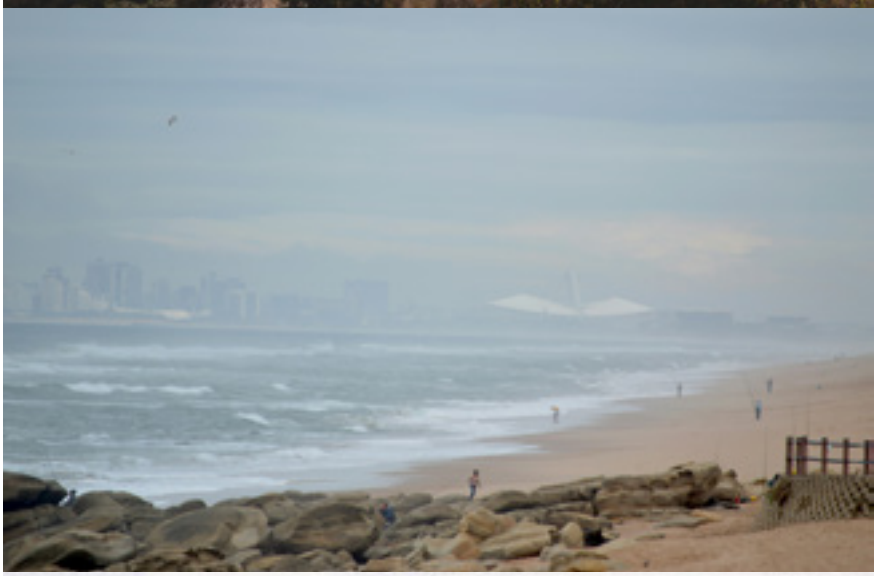
Nick Sloane is a friend of IIMS as well as an Honorary Fellow of the Institute. He has spoken at various IIMS events over the years, most recently at the London Conference last month when he recounted the events of recovering the tall ship Bark EUROPA after she experienced an accident in Cape Town in May 2023, while undergoing maintenance. The vessel fell over on its starboard side while being launched from dry dock. He speaks here to Mike Schwarz about his life and work as a salvor.

Q1. Growing up as a child and a teenager, I can't for one minute imagine you dreamt of a career as a marine salvor. When you look back, what did the young Nick Sloane aspire to be?

I believe that growing up in Zambia and then later Botha's Hill (outside Durban) I was more of an outdoor person – riding horses – camping – completing the mountain leadership and outdoor leadership programmes. I only started sailing during high school at Kearsney College – sailing Mirrors and Enterprise boats on Midmar Dam – and then later racing Flying Fifteens with my father on Durban Bay.

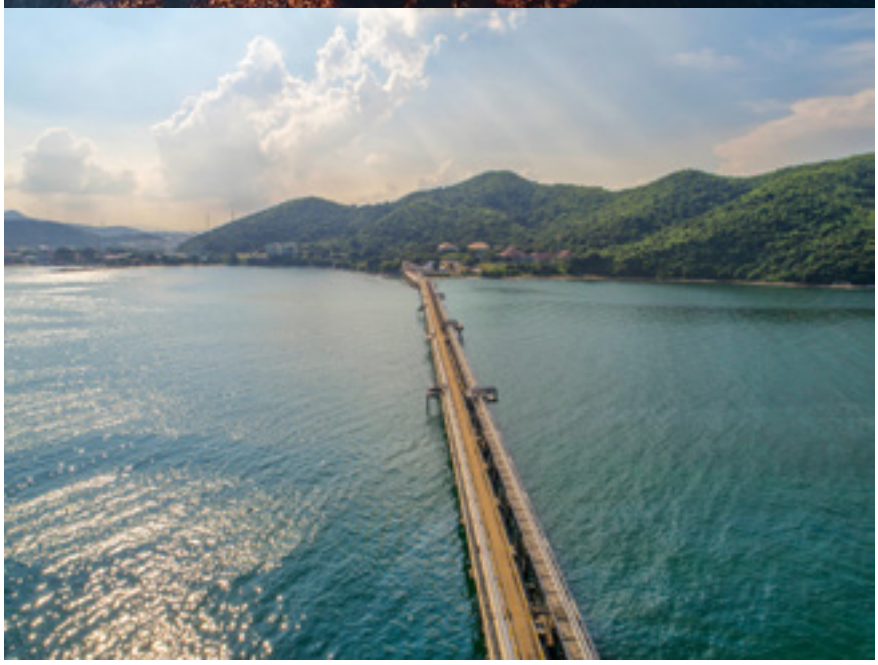
Q2. How did your seafaring career begin and what drew you to a life on the ocean waves?

It was during the SA National Flying Fifteen Champs – sailed offshore Durban when I was 15 that I met a Dutch Master Mariner from the Nedlloyd Fleet, who was on a six-month leave period and sailing for a local skipper. Once I found out that there was a possible life at sea that would still allow me to have enough time to sail yachts – so I was hooked on either a career in wildlife or the sea... I think this offered me both!



Q3. What challenges did you face when transferring into a salvage role?

Initially the Safmarine Group did not focus on junior officers in the salvage division and I had to literally threaten to resign from Safmarine if I was not sent to the salvage tugs, the John Ross (JR) and the Wolraad Woltemade (WW). I managed to convince the then MD that I was destined for a life in his salvage division – (I had qualified as a diver and welder, and loved small craft handling) - and on the basis that I was demoted back to 3rd Officer and forfeited any remaining leave, I would be considered. Whilst I was sailing the Mainstay Week Regatta offshore Durban, I finally got the call to fly out the next day and I joined the WW in Salvador.



Q4. I understand your first exposure to the Lloyds Open Form LOF was on the VLCC Castello Del Belver tanker disaster off the Cape in 1983. Please tell me something about LOF and your abiding memories of your first foray into the salvage environment.

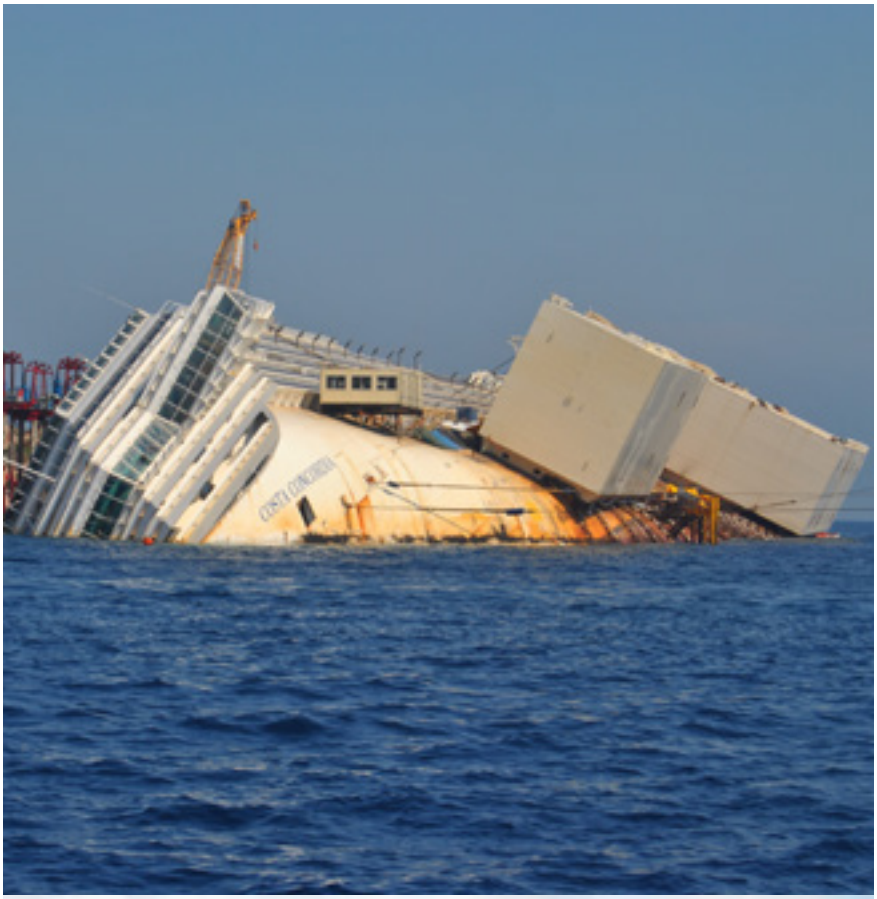
I was waiting for my next assignment and went into the Cape Town office of Safmarine to try to force the issue as there were not many "berths" available in the fleet due to the global economic slowdown. Whilst I was in the office I was asked if I could assist for a week or two on a large tanker fire, the Castella del Belver. I asked how we would get out to the casualty as the John Ross was already on location and when they mentioned by helicopter, well, it was an easy decision, and I hopped on.

After a six-week operation on the Castella del Belver – the after section had sunk and we had towed the bow section offshore some 200 NM, blew the buoyancy out of the bow, and allowed the bow-section to sink; so, a complete loss of ship and 272,000T of crude oil. On arrival back at port I found out that as were on a "LOF – No Cure - No Pay" contract basis and the realty of LOF hit home. Obviously, this was just after special compensation was considered for environmental protection, but well before the 1989 International Salvage Convention, and the option of an Article 14 claim for environmental protection, and also well before the evolution of the SCOPIC Clause that came into effect in 2000. My last three years in the International Salvage Union (ISU), I was a part of the working groups with both Lloyds and BIMCO on the 2023 WreckHire Contract and the 2024 LOF form – so just over 40 years from my first exposure to LOF in 1983!

In 1985 SAF-Tug and Land & Marine joined forces to form PENTOW Marine and then I was exposed to offshore pipeline installation projects, SBM installations and management, and started working with larger dive teams, which allowed me to better understand the diver challenges and then ensure that we took these lessons learnt into the salvage and wreck-removal sector of the company.

Q5. Whilst I am sure each salvage operation is different, what are the key challenges facing a salvor and what skills are required for a successful outcome?

A successful salvage team is one where each person knows what their particular skill-set is in the team, where each is encouraged to carry out their scope of operations independently; but that the target of the salvage team in achieving a successful outcome, whether a refloat or emergency response operation, that requires a critical team collaboration approach. So, an ideal salvage team makeup is mariners, marine engineers, Naval Architects , divers (with firefighting or trade backgrounds) and then the specialists like marine chemists and fire consultants to match the challenges of each operation. I have had the pleasure to work with some great salvors around the world – and learn a little bit from each of them – to take forward into the next salvage operation.



Q6. I have heard you speak at length about the incredible and unique operation to lift the Costa Concordia under your management and direction. Tell me something about that extraordinary project.

When I first received a text from Rich Habib (MD Titan Salvage), it stated "do you want to lend me a hand on a large wreck removal" – it was only once I was in Italy that I found out I was going to be running the project. I think that my background in offshore projects like the pipeline-shore-crossings and SBM installations, as well as start-up project manager for the Caspian Pipeline Consortium in Novorossiysk for the Chevron led project, gave me a lot of project related skills to bring into the Costa Concordia recovery project. Liaising with six different engineering companies, driving the critical path schedule as being sacrosanct for each party involved, and then the commercial and cost-control side of the large project was a big task.

We had five shipyards, seven fabrication facilities and over 150 sub-contractors, as well as a team of just over 500 persons on location each day. This meant that I could not afford to micro-manage each part of the project, but to rely on and empower the other team-leaders. Constant communication was required with a 36 person meeting every evening at 18:00hrs to update each team's project schedule and then the project global critical-path, and how to solve challenges and improve on any performances.

This was also a dive-critical project with over 22,000 individual dives carried out over the project, with an average of 130 dives per day. This meant that the 12 separate dive teams would be set action-points and goals for each shift, then incorporating these into the dive critical path. We had a 13th dive team – a mobile one – that could be allocated to any operations that needed extra support and to get back off the critical path.

I would also say that the belief of the team needed to be reinforced almost daily that the project would be a success. This was challenging as various other companies had stated publicly that it could not be achieved, and one even published a power-point presentational in Italian to highlight their beliefs that we were on a course leading to disaster.

I believe that in a prolonged operation like the Costa Concordia, you have to celebrate each and every milestone to provide positive news to everyone on the project. the authorities, and of course the client.

Q7. You served a term as President of the ISU (International Salvage Union) until relatively recently. What are the key issues facing the salvage industry at this time that the Union seeks to address?

Two major milestones for the ISU were the BIMCO Wreck-Stage agreement which took 3 ½ years of collaboration with BIMCO, the International Group (IG) consulting lawyers from the market and BIMCO to reach agreement of a new fit-for-purpose Wreck-Stage 2023. Then the Lloyds led review of the LOF contract format to make it more attractive to all users with the result of the LOF 2024 being released.

Other major focus of the ISU is the TRUST relationship with the P&I Clubs, Property Interests, including Cargo, to ensure that we have greater transparency and communication with the parties involved.

Q8. Many areas of the marine industry are casting around for new talent, concerned where the next generation of experts is coming from. How easy is it to attract new talent?

Challenges are the retention of good team members of a salvage team. The modern pressures on the younger salvors include constant communication with their loved ones at home, social media boycotts and the long time away from their families and partners. There does not appear to be a problem attracting younger salvors to the industry but the retention of these salvors is the challenge, especially when marriage and young families are involved and the constant time-away from home.

Q9. Over the years I am certain you will have worked alongside a number of marine surveyors. How does a salvor view the marine surveying profession?

The relationship with the marine surveyor is one that always poses a challenge. This is due to the salvage teams' priorities sometimes being seen to be in conflict with the surveyor's perception of the priorities, and their background. There are many great surveyors out there, some with no background in salvage but certainly a knowledge of the marine/offshore industry, and the surveyor builds a relationship with the salvage team. Unfortunately, there are surveyors who do not try to understand the challenges of the team and maintain their distance from the team itself – rather focused on reporting their perceptions and cost-control functions than to really add value to the project.

I believe that if both the surveyor and salvage master appreciate that they both represent parties with the success of the project as the target then half the challenges are overcome. A good surveyor can certainly add value and support the salvage operation!

Q10. On longer salvage operations, there must be some essentials that accompany you. A good book, laptop and access to music perhaps? What is on your list of essentials.

I love reading books – and not on kindle, but a physical book. Music is freely available nowadays so having some of your favourite music that I can listen to or share is always important. Most projects – I like to interact with the salvors – as on their off-time, that is when you can build a relationship, find out what makes each tick, and then see how you can support them in their own way. It is amazing to see the differences in differing cultures and what is important to each of them. No one hat fits all.

Q11. I recall you have a keen interest in red wine. Do you have a favourite label or vineyard to recommend?

Yes, I am very proud and keen on South African wines but also love trying out local wines from around the world. Some of my favourites would be:

New Zealand white wines. We had a container of wine from the winery Astrolab Estate – called "The Voyage" – on the RENA casualty. I took a bottle to visit the estate and gave them the bottle back.

Italy white wine. The "Sante Oh" ansonica from Isola del Giglio - red wines (Chianti Classico Reserve / Tignanello / Brunello di Montalcino / Gaya).

Spain – Rioja.

Portugal – reds – Douro / Alentego - and of course great Ports!

Chile – a lot of great reds – Carmenere / Almaviva - but "Cabo de Hornos" has a special place after my sail around the "Horn" on the tall ship Europa.

Argentina – red - some wonderful Malbecs.

Q12. As a resident of South Africa, which part of the that fascinating and diverse country draws you back time and time again?

The Cape winelands stretch over 400 km, so a lot of fantastic sceneries and wine states to visit and some excellent food to be had too!

The Cape Peninsular offers a fantastic drive around the cliffs and coastline of Cape Town to Cape Agulhas.

The Garden Route drive – about 400 km up the coast from Cape Town to George with some wonderful stops and beautiful settings.

The beaches of KZN - both north and south of Durban are some great beaches with warmer waters and good fishing too.

The Drakensburg Mountains offer fantastic hiking and scenery – definitely worth a stop on your trip around South Africa.

Safaris, whether it be the Kruger Park / Sabi-Sands area, or another safari camp – there is nothing like the sound of the wild whilst you are sleeping and an early morning game-drive to witness these amazing animals at dawn. That is hard to beat and shall provide lasting memories I can promise you.

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Available as:

- A new section in our MyWellness e-learning app - thanks to support from Baltic Exchange Charitable Foundation
- A one-hour Sea Ready training session delivered by Sailors' Society

Sea Ready gives an overview of how to look after yourself and others on board.

This ensures everyone arrives on your vessel with a basic toolkit to help them thrive at sea, knowing where to go if they need support and how to spot signs of deteriorating mental health in themselves and their crew mates.

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