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IMO SETS COURSE FOR NET-ZERO EMISSIONS BY (AROUND) 2050

By **Daniel Johnson**

With the main outcomes of the 80th session of Marine Environment Protection Committee (MEPC 80) meeting now announced, it's fair to say that initial reactions to what some were calling the most important climate meeting of 2023 have been somewhat mixed. The IMO's newly adopted revised strategy to reduce greenhouse gas (GHG) emissions from ships has been hailed by the maritime body's secretary general, Kitach Lim, as a "monumental development", while environmental groups have called it "vague", a "wish and a prayer agreement" and a "historic opportunity missed".

There will be much to unpack from the heated talks conducted at the IMO headquarters in London (during a week that ominously saw the world record its hottest ever day three times), but at first glance the final agreement appears to be much stronger than that rumoured from the intersessional working group held the week before, although it still lands short of the most ambitious goals and looks unlikely to fall in line with the targets of the Paris Agreement.

Among the key points agreed under the revised strategy are the inclusion two "indicative checkpoints" which are set to be reviewed every five years. Firstly, the aim is to reduce the total annual GHG emissions from international shipping by at least 20%, "striving for 30%", by 2030, compared with 2008. This will rise to at least 70%, "striving for 80%", by 2040, compared with 2008. The strategy also outlines goals for zero or net-zero GHG emission technologies, fuels and energy sources to make up between 5% and 10% of energy used by international shipping by 2030. In addition, the strategy sets a goal to reach net-zero emissions by "around" 2050 but has allowed some flexibility for countries depending on "different national circumstances".

Attempts to impose a controversial 'carbon-levy' – the proceeds of which would be used to fund emissions reduction and climate adaptation in developing and climate vulnerable nations – was blocked by several high-profile member states, including China, Argentina, Brazil and Saudia Arabia. Although the IMO aims to revisit the subject at a later date, it is now unlikely that any levy could be agreed before 2027 at the earliest, which will delay the potential for developing counties to benefit.

Overall, the shipping industry has welcomed the agreement, with the general consensus being that it offers a clear direction towards decarbonisation. "This marks a new beginning for shipping's energy transition, with clear goals and milestones," noted John Butler, president and CEO of the World Shipping Council, a sentiment echoed by BIMCO president Nikolaus Schües, who stated: "We're grateful to the IMO member states for setting out in clear terms the pathway the shipping industry needs to follow."

TWO-TIME ACADEMY AWARD-WINNING PERFORMER AND FORMER UK SHIPPING MINISTER GLENDA JACKSON. SOURCE: SHUTTERSTOCK

Of the green groups claiming that the measures fall short of what scientists deem necessary for the shipping sector to effectively combat climate change, perhaps the harshest criticism has come from Faïg Abbasov, shipping programme director of European sustainability NGO Transport & Environment. Pulling no punches, he remarked: "Aside from FIFA, it's hard to think of an international organisation more useless than the IMO. This week's climate talks were reminiscent of rearranging the deckchairs on a sinking ship. The IMO had the opportunity to set an unambiguous and clear course towards the 1.5°C temperature goal, but all it came up with is a wishy-washy compromise."

Despite its limitations, the 2023 IMO GHG strategy is a signal for an acceleration in the transition, which will profoundly change the way ships must be built, operated and fuelled. An exciting time to be a naval architect.

It would be remiss of me to not take this opportunity to acknowledge the recent passing of Oscar-winner and politician Glenda Jackson CBE, who has died at the aged 87. A long-term supporter of the UK Labour Party, Jackson walked away from the acting profession in 1992, at the height of her powers, to become MP for the Hampstead and Highgate constituency and under the new Labour government of 1997 brought some rare glitz and glamour to the role of UK shipping minister. It was in this role that she gave a speech at RINA's Annual Dinner in 1998. Jackson was one of few actors to achieve the 'Triple Crown of Acting': having won two Academy Awards, three Emmy Awards, and a Tony Award. She was made Commander of the Order of the British Empire by Queen Elizabeth II in 1978. ■

NEWS

SHIP RECYCLING

HONG KONG CONVENTION TRIGGERED

BANGLADESH AND LIBERIA DEPOSITED THEIR INSTRUMENTS WITH IMO SECRETARY GENERAL KITACK LIM, TRIGGERING THE HONG KONG CONVENTION'S ENTRY INTO FORCE IN JUNE 2025

The Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships (Hong Kong Convention) will enter effect in 2025 after Bangladesh and Liberia became the latest contracting states to the Convention helping meet some key conditions for its entry into force.

The threshold criteria within the Convention's terms require ratification by no fewer than 15 states comprising no less than 40% of the world's merchant shipping gross tonnage with a ship recycling capacity of no less than 3% of the gross tonnage within the states who have ratified the treaty for the Convention to enter into force.

These conditions have now been met with Bangladesh and Liberia separately depositing the instrument of accession with IMO secretary general Kitack Lim on 26 June 2023 at IMO headquarters in London.

This paves the way for the Hong Kong Convention to enter into force on 26 June 2025, according to the IMO.

The contracting parties to the Hong Kong Convention now include Bangladesh, Belgium, Republic of the Congo, Croatia, Denmark, Estonia, France, Germany, Ghana, India, Japan, Liberia, Luxembourg, Malta, the Netherlands, Norway, Panama, Portugal, São Tomé and Príncipe, Serbia, Spain and Turkey.

The 22 contracting states to the Convention represent approximately 45.81% of the gross tonnage of the world's merchant shipping. The combined annual ship recycling volume of the contracting states during the preceding 10 years amounts to 23,848,453gt, equivalent to 3.31% of the required recycling volume.

Bangladesh is one of the world's largest ship recycling countries by capacity while Liberia is one of the world's largest flag states by tonnage.

The Hong Kong Convention was adopted at a diplomatic conference held in Hong Kong, China, in 2009.

DECARBONISATION

MOL AND CHEVRON PARTNER TO CUT CARBON INTENSITY OF MARINE FUELS

Japan's Mitsui O.S.K. Lines (MOL) and energy company Chevron Singapore have signed a memorandum of understanding (MoU) for a strategic alliance aimed at reducing the carbon intensity of marine fuels, as well as other decarbonisation technologies in shipping.

The partnership will see joint studies carried out on next-generation fuels in various regions around the world including safety measures and legislation for lower-carbon efforts in the marine fuels sector.

Mark Ross, president of Chevron Shipping Company, says: "Chevron aims to lead in lower carbon intensity oil, products and natural gas and at the same time advance new products and solutions that reduce the carbon intensity of major industries. This is another way Chevron is working to advance energy progress."

As part of its decarbonisation goals, MOL has been exploring a number of alternative fuel projects, including ammonia, hydrogen and methanol, while also developing its own hard sails and going after less conventional forms of energy, such as converting microplastics it picks up from the sea into energy resources similar to wood pellets and most recently liquefied bio-methane derived from cattle manure.

MOL senior managing executive officer Nobuo Shiotsu says: "MOL is honoured to have the opportunity to jointly study GHG emission reductions through this MoU with Chevron. First, we will study and implement all possible means, including the use of next-generation fuels and the introduction of new decarbonisation technologies such as wind power and electricity, in tankers that have been chartered for a long period of time."

BULK CARRIERS

AMMONIA-POWERED BULK CARRIER DESIGN GETS APPROVAL

Classification society DNV has awarded Viridis Bulk Carriers an approval in principle (AiP) for an ammonia-fuelled short-sea bulk carrier design.

The bulk carrier design, developed by Kongsberg Maritime, is for 5,000dwt short-sea vessels that offer a 3,000nm range and safety levels equivalent to conventionally fuelled vessels.

"We are delighted with yet another milestone for our ammonia-powered short-sea bulk vessel," according to André Risholm, Board member of Viridis Bulk Carriers. "During the AiP process we have had a good constructive process and excellent co-operation with DNV. This is a clear testament to the hard work completed and are important for moving closer to the newbuilding phase.

"Considering the heightened emission reduction targets set by the EU and IMO, our Viridis vessels will fully adhere to these standards. This will empower charterers to benefit from exceptional greenhouse gas reductions throughout their logistical value chain."

"We are extremely proud to announce the successful grant of the approval in principle for Viridis Bulk Carriers' groundbreaking project," adds Tuva Flagstad-Andersen, regional manager of Region North Europe at DNV.

For the AiP, DNV has reviewed the design of the vessel for compliance with the 2023 revision of the rules for the DNV Gas Fuelled Ammonia class notation.

According to Flagstad-Andersen, DNV introduced the Gas Fuelled Ammonia notation "to enable the industry to foster innovation and drive sustainable solutions in line with the most advanced industry standards".

TUVA FLAGSTAD-ANDERSEN OF DNV PRESENTS THE AIP CERTIFICATE TO VIRIDIS BULK CARRIERS' ANDRÉ RISHOLM

IN BRIEF

CARBON CAPTURE & STORAGE

KNCC AND PILOT PARTNER TO STORE CO_2

Knutsen NYK Carbon Carriers (KNCC) and Australian oil and gas company Pilot Energy have signed a memorandum of understanding to develop an integrated solution for marine transportation and offshore injection of CO_2 at the Cliff Head CCS Project off Australia. The two companies will work on solutions to enable large-scale industrial emitters to transport via ship ambient temperature LCO_2 and inject and permanently store CO_2 at the Cliff Head CCS project, which is an integral component of the Mid-West Clean Energy project.

CRUISE SHIPS

ICON OF THE SEAS STARTS SEA TRIALS

Royal Caribbean's *Icon of the Seas*, set to be the largest cruise ship in the world when it launches in 2024, has successfully completed its first set of sea trials in the Baltic Sea. According to shipyard Meyer Turku, more than 450 workers onboard carried out preliminary assessments of the vessel's main engines, hull, lifeboats and thrusters, among other systems and equipment. Further sea trials are expected to follow over the summer and into the autumn prior to the 5,610-passenger ship's fourth-quarter delivery to Royal Caribbean.

CLASSIFICATION SOCIETIES

DNV STRENGTHENS CYBERSECURITY OFFERING

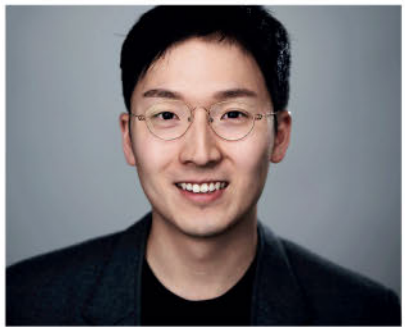
DNV has acquired Helsinki-listed cybersecurity firm Nixu in a deal valued at €98 million. The classification society plans to delist Nixu and combine it with its own cybersecurity team to create Europe's "fastest growing cybersecurity business". The combined business will include more than 500 cybersecurity experts and improve safeguarding of IT systems across all of DNV's business lines, including maritime and energy, according to a spokesperson.

ALTERNATIVE FUELS

AMOGY LAUNCHES SINGAPORE OPERATIONS

Amogy, the US-headquartered ammonia power solutions company, has opened operations in Singapore in a move to expand to its maritime and power generation business in Asia.

"With our sights set on reducing overall global carbon emissions, we're thrilled to expand our presence in Asia," says Seonghoon Woo, CEO and co-founder of Amogy. "Singapore is a major player in the international shipping industry, and we're excited to be more closely involved in the progress being made around clean energy adoption here."



AMOGY CEO AND CO-FOUNDER SEONGHOON WOO

Last year Maritime & Port Authority of Singapore (MPA) and the Singapore Energy Market Authority (EMA) launched an Expression of Interest (EOI) process to build, own and operate low- or zero-carbon power generation and bunkering projects on Jurong Island in the city state, noting that they saw ammonia power as a "promising pathway" to decarbonisation. Singapore has also committed to achieving net-zero emissions by 2050.

“We're encouraged by recent regulatory efforts in Singapore and the exploration of ammonia as a source of power," says Oeiestad. "We share the MPA and EMA's belief in ammonia as an efficient hydrogen carrier and look forward to partnering with the government and private sector in order to make clean ammonia power a reality for maritime shipping and power generation."

Amogy also has a memorandum of understanding with Singapore-listed offshore wind vessel owner and operator Marco Polo Marine to install its ammonia-to-power system on the company's offshore wind vessels.

CRUISE SHIPS

FOUR SEASONS ORDERS SECOND ULTRA-LUXURY CRUISE SHIP

Fincantieri has signed a contract with Marc-Henry Cruise Holdings, joint owner/operator of Four Seasons Yachts, for the construction of a second ultra-luxury Four Seasons vessel.

This second vessel's order is worth more than €400 million, and the ship will be delivered in 2026.

Fincantieri landed the order for the first 207m-long, 27m-wide, 180-guest ship of the class in September 2022. It will be delivered in Q4 2025.

Larry Pimentel, president and CEO of Marc-Henry Cruise Holdings, says: “The signing of our second vessel contract with Fincantieri is another milestone in the development of Four Seasons Yachts. Our partnership with Fincantieri and Four Seasons creates a powerful triumvirate of expertise that is committed to delivering a ‘category of one’ luxury lifestyle yacht experience. I am proud of the talented team and collaboration behind this stunning enterprise project.”

Pierroberto Folgiero, CEO of Fincantieri, adds: “The confirmation of trust from a prestigious brand like Marc-Henry Cruise Holdings who are responsible for marine and technical and sales and marketing of Four Seasons Yachts, is a great satisfaction for us and a further proof of the validity of a unique entrepreneurial project destined to change the world of cruises in terms of design, technology and sustainability.

“It also bears witness to the start of the orders recovery for the sector, at the same time reinforcing Fincantieri’s leadership in the new extra-luxury segment based on haute hôtellerie.”

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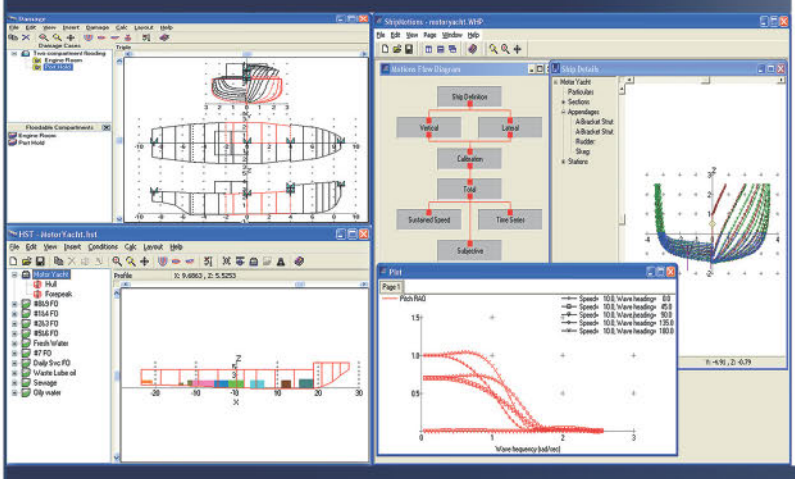

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NEWS ANALYSIS

MEPC, METHANOL AND DECOMMISSIONING HOG THE HEADLINES

By **Malcolm Latarche**, Correspondent

Shipping's march to decarbonisation was a major theme throughout June. Beginning at Nor-Shipping in Oslo when all three of the award winners – Next Generation Ship, Ocean Solutions and Young Entrepreneur – had some connection with wind power and most of the seminars and conferences had sessions dedicated to decarbonisation, all thoughts were very much on what July's MEPC 80 might bring.

Both at Nor-Shipping and elsewhere, the talk was on what the IMO should or, in the opinion of many, must do at MEPC. The current target to reduce CO_2 emissions per transport work, as an average across international shipping, by at least 40% by 2030, pursuing efforts towards 70% by 2050 and that total annual GHG emissions from international shipping should be reduced by at least 50% by 2050 compared to 2008 are considered too unambitious by many outside and within the shipping industry. The resulting strategy adopted at the IMO has been a compromise.

Methanol as a future fuel has had a quite auspicious month with several developments. At the start of the month Japanese builder Tsuneishi announced a strategy that will see it producing only dual-fuel vessels by 2035 with methanol – for which the maker has already secured orders for 13 Kamsarmaxes – being its fuel of choice.

The Nor-Shipping Next Generation Ship award winner, Terntank's new series of hybrid and wind assisted vessels are planned to be operated on e-methanol when such a fuel becomes available. Nor-Shipping was also chosen as the venue for engine builder ABC to show off its new range of dual-fuel methanol engines and for Korean Register to announce its approval in principle for a methanol-fuelled MR tanker design by K Shipbuilding. Not to be outdone, Ulstein Design & Solutions released details of a two-ship twin X-Stern contract for SX126 CSOVs for Acta Marine to be built in Turkey by Tersan Shipyard. Other methanol-related announcements included an AiP from ABS to KSOE for a methanol low-flashpoint fuel supply system.

Later in the month came several announcements around Maersk's commitment to methanol. Firstly EU Commision President Ursula von der Leyen was confirmed as godmother for the first of Maersk's 2,100TEU feeder vessels due to be christened in September. *Laura Maersk* was delivered in June after undergoing sea trials and Maersk said it had successfully secured green methanol from Dutch producer OCI Global for the maiden voyage.

A statement by MAN Energy Solutions in late June said its PrimeServ division had secured a contract for modifying the main engines aboard 11 container vessels equipped with MAN B&W 8G95ME-C9.5 to dual-fuel MAN B&W 8G95ME-LGIM10.5 types capable of operation on methanol. The first vessel will be retrofitted in mid-2024. That news was followed by the shipowner announcing a new six-ship series of 9,000TEU methanol-fuelled vessels to be built by Yangzijiang Shipbuilding Group for delivery in 2026 and 2027. Maersk said that by replacing vessels in a similar size segment, the new vessels will reduce Maersk's annual greenhouse gas emissions by about 450,000 tonnes CO_2e per year on a fuel lifecycle basis when operating on green methanol.

Decommissioning of end-of-life vessels has long been a stain on shipping's reputation especially since most end their lives being scrapped on Asian beaches. Efforts by the IMO to address the problem resulted in the Hong Kong Convention adopted in 2009. However, the convention lacked sufficient signatures for it to become effective.

With Bangladesh, one of the main decommissioning nations, and Liberia, a top three flag, both ratifying the convention in June (see page 6) it is now poised to come into effect on 26 June 2025. After that date, ships heading for scrap must carry an Inventory of Hazardous Materials and authorised ship recycling facilities will need to provide a specific Ship Recycling Plan for each ship. Governments will be responsible for ensuring that recycling facilities within their jurisdiction comply with the Convention. ■

MAERSK HAS FURTHER STRENGTHENED ITS COMMITMENT TO METHANOL

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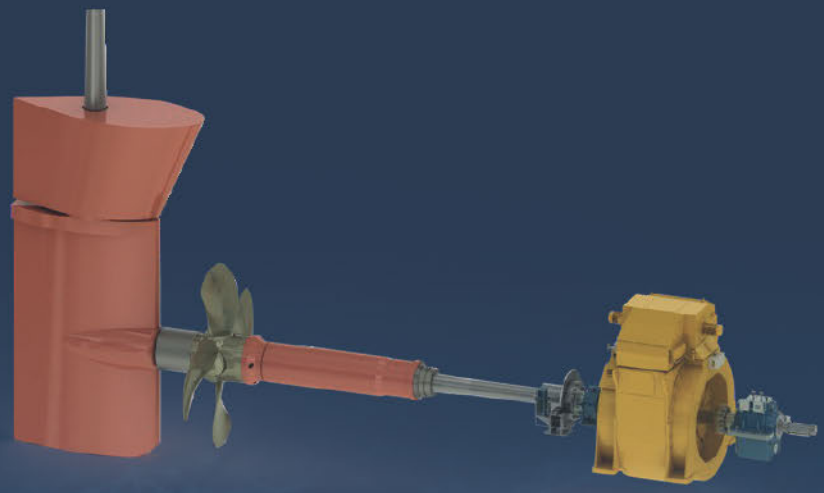

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NEWS EQUIPMENT

WIND PROPULSION

WINDWINGS WIN DNV TYPE APPROVAL

BAR Technologies (BARTech) has been awarded a full Type Approval Design Certificate (TADC) for its wind propulsion technology – BAR Technologies WindWings by Yara Marine Technologies (WindWings) – from classification society DNV.

Since being awarded an approval in principle (AiP) for WindWings in 2021, inventor and designer BARTech and industrialisation partner Yara Marine Technologies (YMT) have focused on progressing the WindWings design through to the next level of DNV certification. This has involved validating WindWings design compliance with full detail on construction, loading analysis, the use of materials and the supporting technical systems and their redundancy.

THE CERTIFICATION FOLLOWS ON FROM AN AIP THAT WAS AWARDED IN 2021

With TADC now granted for WindWings, there is a clear route forward for the technology to be installed on any DNV-classed vessel, either as a retrofit or on newbuilds.

"Securing TADC is a key milestone for the evolution of WindWings technology, as we move towards installation on the vessel *Pxyis Ocean*," says Lauren Eatwell, head of WindWings, BAR Technologies. "Working closely with our project partners and DNV has ensured that while it's been a long journey to TADC, our patented technology is now in a position for rapid roll out to support fleet emissions reduction."

The installation on *Pxyis Ocean*, an 81,000dwt Kamsarmax owned by MC Shipping and chartered by Cargill, will be closely followed by installation on the *Berge Olympus*, a 211,200dwt Newcastlemax owned by Berge Bulk, according to Eatwell.

"These vessels will be the first of many to enjoy fuel savings of approximately 1.5tonnes of fuel per WindWing per day on an average worldwide route, and therefore reduced CO_2 emissions of some 4.65tonnes per WindWing per day," she says.

TANKERS

OCIMF BEGINS ROLL OUT OF NEW TANKER INSPECTION SOFTWARE

The Oil Companies International Marine Forum (OCIMF) has announced that it has begun to roll out its new digital tanker inspection programme, SIRE 2.0. The upgrade will replace the existing software used to assess a vessel's condition and operational standards.

SIRE 2.0 is being introduced in four phases. Phase 1, the initial testing stage, is currently in progress and showing successful results, according to OCIMF.

SIRE 2.0 is an overhaul of the way checks are carried out. The new system includes tablet-based inspections, increased focus on the human element, and enhanced policies and procedures. It can be easily updated to bring it in line with new regulations and technology to future-proof the inspection process. The software upgrade brings significant changes to how tankers of all sizes are assessed by inspectors.

Aaron Cooper, OCIMF's programmes director, says: "The commencement of Phase 1 of the new SIRE 2.0 tanker inspection programme represents a significant step forward for all involved in tanker vetting. The phased roll-out was adopted in response to feedback from all stakeholders and ensures the readiness of the programme and its users. I am delighted to report that feedback from Phase 1 so far has been positive."

The first testing phase will continue for one month or until all the success criteria are met. OCIMF will then activate Phase 2 of the roll-out plan allowing participants to take the necessary steps to ensure their readiness for a SIRE 2.0 transition inspection. Following this, the new software will be more broadly rolled out to enable the system to go live in Phase 4 of the roll out.

BOILERS

ALFA LAVAL LAUNCHES FIRST METHANOL-FIRED BOILER SOLUTIONS

Alfa Laval has expanded its portfolio of alternative fuel solutions with the introduction of methanol-fired Aalborg boiler systems, which can use a wide range of fuel types including methanol.

According to the company, the new solutions are specifically designed with decarbonisation and fuel transition in mind. Besides operating on today's fuels, including low-sulphur fuels, biofuels and liquefied natural gas (LNG), the boiler systems are designed for compatibility with methanol and other emission-reducing fuels.

TESTING OF BOILER OPERATIONS WITH METHANOL AT THE ALFA LAVAL TEST & TRAINING CENTRE IN AALBORG

"Our boiler solutions are designed to meet the growing demand for sustainable shipping and ensure readiness for today's and tomorrow's emission-reducing fuels, including methanol," says Jeppe Jacobsen, head of global sales for heat and gas systems at Alfa Laval.

"Having been pioneers in delivering steam boilers for LNG, we are pleased to be the first to support our customers in their fuel transition with our methanol-fired boilers."

The methanol-fired boiler solutions will be installed, for the first time, on newbuild container vessels and more deliveries are in the pipeline for cruise ships and tankers. Deliveries of the methanol boilers are scheduled to commence in late 2023.

Alfa Laval has tested boiler operations with methanol at the Alfa Laval Test & Training Centre in Aalborg, Denmark, since early 2021. In November 2021, the American Bureau of Shipping (ABS) granted Alfa Laval the first marine approval in principle for operating boilers on methanol.

CONNECTIVITY

INMARSAT ANNOUNCES NEW HIGH-SPEED MARITIME CONNECTIVITY SERVICE

Inmarsat Maritime has introduced its new Fleet Reach coastal LTE service for maritime connectivity that will enable "uninterrupted access to high-speed connections, even when docked in ports".

INMARSAT MARITIME PRESIDENT BEN PALMER

The new service, which is optimised by Fleet Xpress, forms part of Inmarsat ORCHESTRA, the satellite company's 'network of networks' which uses multiple technologies in multiple orbits to deliver connectivity wherever and whenever it is needed.

This will enable faster speeds and increased signal strength when sailing near coasts or docked in port. Meaning that seafarers can enjoy consistent connectivity wherever the vessel is, with the service seamlessly switching between technologies to ensure an always-on connection.

Fleet Reach also comes with security credentials which are better than the existing method of using dongles for connectivity when in-port. This means customers can maintain security standards and policies company-wide, without increased risk of cybersecurity threats.

Ben Palmer, president, Inmarsat Maritime, says: "The power of Inmarsat's multi-technology, multi-orbit ORCHESTRA platform is the backbone behind this seismic change in coastal connectivity, taking advantage of our world-class GX constellation as well as terrestrial technologies.

"Five more Global Xpress satellite payloads and the three recently announced Inmarsat-8 L-band satellites are set to enter service over the coming years to bolster this connectivity and the certainty it brings even further. We look forward to seeing the maritime sector reap the rewards of this consistent, reliable connectivity."

Fleet Reach is available on regional plans for vessels operating in one region, or multi-regional plans for those sailing around the world.

COMMUNICATIONS

STORMGEO AIMS TO OFFER MORE THAN JUST WEATHER ROUTING AS COMPANY CELEBRATES 25TH ANNIVERSARY

By **Tom Barlow-Brown**

STORMGEO CEO SOREN ANDERSSEN

Ship logbooks have long been an ubiquitous feature on the bridge of all vessels big and small. These tomes have always been kept judiciously to include any and all-important events that a ship should run into. It's generally been accepted that a captain and crew will keep this up to the best of their ability so that this can be reported back once they reach port. For many years there has been little reason to change this process.

Nevertheless, a rapidly changing climate and increasing pressure on shipowners and operators to modernise reporting systems, particularly in regard to new CII regulations, means that a more up to date process is needed. Gone are the days when ships can go for days on a trans-ocean voyage without communications with shore. Now it is necessary for a more streamlined system of interaction between crew and land-based support teams to exist. However, current solutions rely on ship operators installing multiple different technology packages.

StormGeo, a well-established company in the field of weather routing, hopes to provide a fully integrated system. The organisation, which recently celebrated its 25th anniversary, has been rapidly expanding what it can offer to customers to include an integrated solution for logbook reporting, weather forecasting and environmental compliance. The company's s-Suite, which was launched in 2020, incorporates several different features that allow a ship's crew to monitor vessel performance and rapidly communicate with shore. s-Suite is made up of several modules which can be installed together or individually alongside third-party software.

"We help ships navigate and be safe and efficient at the same time. We can work with really with any source that's available," says Soren Anderssen, CEO of StormGeo, speaking to *TNA* at Nor-Shipping 2023. "Ten years ago, those data sources were almost all noon reports from the crew. They're reporting a lot of things that the owner or the operator of the ship wants, a lot of manual data. Today that's still a significance share. The way it's reported though, is intelligent. It's not just a random email," he continues.

Rapid verification

s-Suite is a reporting tool that enables rapid verification of the information coming into it meaning crews and shore personnel have access to correct data. Up until now most of this has still been manual. However, as connectivity costs are decreasing a much larger proportion has been high-frequency automated data. This means systems need to be more streamlined and efficient as a result. Currently the company has 13,000 ships using the s-Suite platform. Coupled with 10,000 daily users in support roles on land.

The field of digital logbook collection and noon reporting has been rapidly growing in recent years with several other companies taking steps to build their own systems. Recently, NYK Group announced that it would be launching its own logbook system, the EL-100. Ferry company Finnlines, based in the Baltic, has signed an agreement with NAPA, the maritime software and data solutions provider, for the use of the latter's electronic logbooks technology.

Rewiring the machine

Despite the growing competition StormGeo believes it benefits from many years of experience in the field of vessel data reporting. As a result, the company says it can draw from a greater level of experience than many of its rivals. "We were born before big data was really a thing. Nowadays, it's all about big data and algorithms, and we've matured with that," says Anderssen. "We are rewiring the machine and making it more efficient.

I think my competitors are spending a lot of time on actually building the knowledge that's required because it's not a simple thing."

In 12 months StormGeo has expanded its s-Suite of reporting technology to include tools for CII data collection and validation. This allows shipowners access to data that will recommend how they can improve their vessels' CII rating and forecast upcoming data in following months. An increase in the variety of fuels also presents a challenge for the industry which the company has placed itself in the running to cater for. "This changes the optimal way to operate the ship. So things are going to get a lot more complex for the industry, and that means that our tools need to be a lot better so we can cater for all these different kind of scenarios," states Anderssen.

An increase in high-frequency data collection due to lower connectivity costs will be the next big challenge for vessel reporting. This presents a question of how this data can be used which will likely mean fewer crew onboard to monitor and maintain the vessel. As a result, teams on shore will need more specialised support and more efficient communication technology. Communicating and educating seafarers in this rapidly changing world is also key.

"There's a whole huge task in front of us in educating our seafarers because they need now to be generalists, in a sense, guided by the shore. They're going to be facing a lot more variation as well when it comes to fuel. So we need to consider how do we do that? It will take some years [to find a solution] but fortunately I think that the products are entering the market and the satellites are there to an increasing extent so all the right moves are being made," notes Anderssen.

Future expansion

Providing a future-proof system is core to StormGeo's strategy for expansion in the face of a rapidly changing market. StormGeo is currently working on a road map for future expansion based on the data it is already receiving from its new systems. "Part of this is maintenance," says Anderssen, "making sure that the system is solid, that cybersecurity is high. That's a constant prioritisation that we are doing. Do we launch the next big product now, or do we spend more time on maintaining what we have already?"

Anderssen is optimistic about prospects for the industry going forward. Recent IMO regulations will ultimately drive new technological advances, and StormGeo aims to help collaborate with smaller startups. "Even though the tool is imperfect, it drives the right behaviour, and that I can see is creating innovation. The partnerships will happen by themselves. We just need the impetus, the push to go," he adds. ■

SENSOR CONNECTIVITY NEEDN'T BE A HASSLE, SAYS SCANREACH CEO

By **Richard Halfhide**

One of the persistent challenges in creating effective communications systems onboard large vessels, particularly when adapting them to the modern demands for Internet of Things (IoT) connectivity, is the steel structure itself. The hull and bulkheads can create electromagnetic interference and frequently there are either too few wireless access points or too many, resulting in noise.

In the case of older vessels this can create problems when attempting to retrieve data from sensors, which in turn can cause problems with regard to emissions reporting or tracking crew to ensure their safety. Needless to say, a wired solution would often necessitate costly retrofitting.

In January 2021, *The Naval Architect* spoke to Sven Brooks, then KVH's senior director for IoT business development, about the difficulties this poses in creating an effective IoT network. But technology has moved on and the development of low-bandwidth mesh networks has emerged as an ideal solution for sending data from those hard-to-reach places. Earlier this year, Brooks was announced as CEO and CCO of Bergen-based firm Scanreach, a specialist in providing onboard wireless connectivity.

"The reason I joined Scanreach was when I joined KVH for ship-shore connectivity the primary challenge for shipowners was to get to the data that really matters to them," Brooks explained to *The Naval Architect* during June's Nor-Shipping trade show in Norway. "While ship-shore connectivity is still in some areas a challenge it's being adequately addressed by the providers such as KVH, Marlink and Inmarsat. But none of that connectivity matters if you don't get the sensor data that you need."

Founded in 2015 with the idea of improving safety and sustainability at sea, Scanreach spent five years developing its proprietary protocol, developed specifically for the maritime industry using a sub-GHz frequency ideal for travelling along steel.

SCANREACH'S COMPACT MESH NODES. A WEARABLE VARIANT IS ALSO AVAILABLE

Brooks says: "You can actually get signals out of a tank and confined steel structures. There are limitations; it has a lower bandwidth that's good enough for any kind of machine real-time data, but we wouldn't be able to push movies through it. However, it's purely an OT network, not an IT network. Human users cannot engage with this; there's no USB port, the network is not detectable and the data is encrypted so it is designed to be cyber secure at the same time."

Scanreach has taken a pragmatic approach to digitalisation. It found maritime was lagging behind other sectors, such as land transportation and warehousing, which are often using industrial sensors. However, when it comes to the actual sensors the company acts like an agnostic consultancy and working with the sensor manufacturers to identify the right sensors for any given job.

Its own hardware is a simple 'fit and forget' technology easily deployable by the crew and owned outright by the owner, rather than any service-based model. An owner purely interested in collecting fuel data from flow meters might simply install six to 10 nodes to relay the data from the bowels of the vessel up to the bridge, where the gateway server might be located. A wearable version of the same technology could require many more nodes to monitor everyone onboard the vessel. Brooks stresses it is entirely GDPR compliant.

"This is about making sure people are secure during their working hours, the wearables have a distress button and we make the embarkation and disembarkation of crew members easier," he says. "They check in and out so you know when a crew member or technician has moved from shore to onboard the vessel."

One interesting aspect is the gamification element it introduces to otherwise mundane activities. "You're constantly competing against yourself and your past 12- to 24-hour profile or perhaps the previous crew to try and beat your score," explains Brookes. "Articles in the media suggest it could translate to an additional 5% in savings, but even if that's just marketing we've had very positive feedback. At a time when we're introducing decarbonisation methods, CII rating and SEM plans, what's better than behavioural change?"

Needless to say the potential applications of the technology are almost infinite and shipping's ongoing evolution is presenting new opportunities, such as monitoring electric vehicles onboard car carriers and ferries. Brooks notes the emerging alternative fuels will also demand fresh solutions. "We have clients asking for ammonia sensors. Once you have a wireless network why not utilise it for exactly that purpose? It's easy to mount another five or 10 ammonia sensors, without having a technician onboard and avoiding all the integration issues." ■

TELENOR MARITIME SMOOTHS PATH TO IMPROVED DATA MANAGEMENT

By **Alan Johnstone**, Correspondent

COLOR LINE'S SUPERSPEED 1 FAST RO-PAX FERRY. SOURCE: ANDERS MARTINSEN

Norway's Telenor Maritime is at the forefront when it comes to global maritime communications and has recently pioneered a novel way of providing digitalisation as a service onboard vessels with the roll out its Unified Hosting Service (UHS) across Color Line's fleet of ferries in northern Europe.

"This is a completely new way of thinking to anything you have seen or heard of before," says Telenor Maritime's chief technology innovation officer, Knut Fjellheim, referring to the ideas that brought the company's unique UHS to reality and fully operational onboard Color Line's vessels operating on routes between Norway, Denmark, Sweden and Germany.

Fjellheim adds: "The shipping industry today has been told they have to collect data and transfer that data to the cloud. But that is not sustainable according to the green shift, and not sustainable in the long run. Just collecting raw data does not give value for the shipowner."

"We are making a digital ecosystem, we are bringing the cloud down to each individual ship as part of a new digitalisation as a service platform," he explains. "You need to take care of the data gathered from around the ship on the ship first."

Efficient and secure

Suppliers and third-party vendors are increasingly adding to the demands on shipowners as more and more raw data is being gathered onboard. This data is mostly collected as silos of information that must be sent to shore separately for processing, analysis and storage.

This current method is loading an unsustainable demand on shipowners as there will not be enough space for each vendor to put their own server onboard, plus there are demands for more and more bandwidth. There are also serious security issues with so much data circulating across multiple remote access lines involving potentially several different third-party vendors.

Lars Erik Lunøe, Telenor Maritime's chief executive officer, points to the fact that many shipowners are currently concerned they have no control over what stakeholders onboard their vessels are doing when it comes to digitalisation.

"Shipowners are simply pushed to install a solution per system, they have no control, so they are worried about cybersecurity," he explains.

He adds: "Remote access is a top topic today and questions from shipowners include who is connecting to my vessel right now. Shipowners and captains have a big concern. Everyone knows we need to go in the direction of digitalisation, but how to do it?

"We have done the opposite of traditional mobile networks at Telenor Maritime, so the ship becomes the station, and then the harbour is roaming into the ship's private network instead of the other way around. So the processing and analysing of data can be done onboard, rather than onshore."

Cutting-edge applications

Telenor Maritime's UHS is designed to enable remote operations and it eases compliance with environmental

TELENOR MARITIME CHIEF EXECUTIVE LARS ERIK LUNØE

regulations. Its edge-processing set-up, where it standardises and aligns data in a new common language, saves energy by reducing the amount of data that needs to be transmitted and stored.

It is also vendor neutral, which means it can act as an easy-to-access platform onboard any vessel – the equivalent of an iPhone able to host third-party apps – and it can talk to any other system in one common language. "We are encouraging third parties to adapt and to adopt digitisation, but this system also makes it far easier for companies to find a digital path," says Lunøe.

The data hosting platform enables crew and shoreside staff to access the system through one interface, removing the current systems where each third-party application operates in its own silo. The UHS platform can unite all applications, signals, sensor data and systems, providing better situational awareness in real-time onboard.

Data can also be collated onboard and sent directly through one secure transfer tunnel to a classification society for compliance approval. This is a large time and resource saving by moving from manual to digital checklists as Monitoring, Reporting & Verification (MRV) data sets are required to be registered for each journey to meet EU and IMO regulations.

Seizing the opportunity

This is something that attracted Color Line to install the UHS platform across its fleet of ferries as part of its digitalisation and sustainability strategy, according to Fjellheim.

"We take real-time sensor data, for example at Color Line from fuel meters, and we push this data into a live digital checklist that can then be checked for accuracy by the captain or the chief engineer," he says. "In a further example, we are able to qualify the data onboard from third-party applications that are producing emission reports for every leg being sailed. That data can then be re-used onboard for other purposes.

"So we make a data warehouse onboard, which also gives Color Line the ability to own the data. Some data does need to be transferred to shore, but our idea is that the more analysis and use of data done onboard, the better."

5G networks, but not as you knew them

The platform is going to be certified according to IEC 62443 standards, which is essential for cybersecurity, and Telenor Maritime has been working closely with classification society DNV to enhance compliance. "This kind of architecture will also be compliant with the coming regulations for autonomous vessels," adds Fjellheim.

Norway is taking a lead when it comes to the development and operations of autonomous vessels, such as with the *Yara Birkeland*, and Telenor Maritime is already closely involved with several projects in this sector.

"We are using the same platform to enable a private 5G network, which is going to revolutionise security, because we can deploy a local 5G network to each individual vessel using our platform, completely isolated from land-based systems," Fjellheim says.

"We can also run an application called push-to-talk, which can enable calls in the same way many businesses use Microsoft Teams today. There is also push-to-video. Using our system means this can all be done locally, and it has to be local as this is an at sea environment.

"This enables a far higher level of security, which is the big difference, as we can operate a private 5G network as an application on the same Unified Hosting Service ecosystem."

The ease with which the platform can enable systems on top means it is easy to combine a 4G network alongside 5G. IoT and wireless sensors do not comply with 5G yet, so there is still a need to deploy 4G within the service.

Lunøe adds: "We can have a local private 5G network because of the frequency regime and this new system means it is possible for us to apply on behalf of the shipowner to install and run a small private 5G network.

"We are probably the first operator in the world to have accomplished this, as we have been granted approval by the Norwegian communication authorities for a 5G network licence for a moving object, such as a ferry." ■

TELENOR MARITIME CHIEF TECHNOLOGY INNOVATION OFFICER KNUT FJELLHEIM

CONTAINER SHIPS

NEW INITIATIVE AIMS TO TACKLE FIRES ONBOARD CONTAINER VESSELS

By **Tom Barlow Brown**

Fires onboard ships are a major problem facing the maritime industry. A small blaze can quickly spread out of control and engulf a whole vessel without proper firefighting and detection. For shipping enterprises, a fire has the potential to destroy large quantities of cargo in a short space of time, leading to huge insurance costs.

According to EMSA, container ship fires have become an increasingly noticeable trend in recent years. Cargo fire safety onboard container vessels is a subject with two key elements. The first is related to the ship systems for detection and response to fires, and the second on the carriage, handling, declaration and segregation of dangerous goods (DGs).

THE RISK OF FIRES ERUPTING INSIDE CONTAINERS AT SEA CONTINUES TO GROW. SOURCE: US COAST GUARD

A recent initiative by SafetyTech Accelerator, an organsation established by Lloyd's Register, hopes to tackle this problem head on by engaging with major industry players. Cargo Fire and Loss Innovation Initiative (CFLII), launched in February 2023, aims to engage with technology suppliers from outside the maritime industry to tackle to the problem of container ship fires. The CFLII is broad in terms of scope, aiming to gather as much information as possible from different researchers and stakeholders. The aim is to let partner organisations decide where the focus will be.

Novel solutions

The CFLII aims to encourage third parties to engage with the problem SafetyTech aims to find novel solutions by providing answers not previously considered. SafetyTech also aims to work with clients, including Maersk and Evergreen, to look for safety and risk challenges. The overarching aim of the CFLII is to use evidence to change the way that regulatory bodies look at uses of new technology.

In terms of fire detection and prevention the maritime industry is often behind other sectors in terms of performance. Cargo misdeclaration or non-declaration is also a common problem in the supply chain and improperly labelled cargo is often a cause of fire. Undeclared cargo can quickly become hazardous and cause a fire onboard a vessel. This can have catastrophic consequences.

While the size of container ships has grown and the volume of cargo they carry has increased, firefighting technology has not kept pace with these developments. Systems in place largely exist to ensure the safety of the crew to comply with International Convention for the Safety of Life at Sea (SOLAS) requirements.

As a result, firefighting methods for dealing with a blaze started amongst cargo are not adequate. Some methods do exist to extinguish fires rapidly, for example the use of CO_2. However, this is not always reliable as it can be inefficient. Particularly, if cargo is packed densely meaning that CO_2 released will not be able to work properly.

Fire detection systems on deck are not currently required under current regulations. However, some regulations regarding the handling of cargo, such as the IMO's 1972 Convention for Safe Containers (CSC 1972). The CFLII aims to change this, allowing for the installation of more innovative methods of fire detection. Current methods are not capable of detecting changes in temperature which can fluctuate during a voyage. Other environmental issues, such as the generation of heat by refrigerated containers, also pose a problem.

Collaboration seen as key

By working in a non-profit environment, the organisation also hopes to promote the work of smaller startups who are working on solutions to the problem. While SafetyTech currently works primarily with the container sector it also aims to research fires onboard PCTCs which are facing increasing pressure to tackle the problem of lithium-ion battery combustion.

SafetyTech and its research partners have considered various technological solutions, such as the use of thermal imaging cameras used in large-scale forest fire detection. Ultimately, the aim is to find cost effective solutions that are robust enough to withstand the strain of oceangoing voyages and last between vessel services.

By working with various partner organisations SafetyTech aims to provide the answers to containership fires and harness a range of different voices to do so. ■

KONGSBERG MARITIME LOOKS TO THE FUTURE WITH NEXT-GENERATION FEEDER DESIGN

By **Daniel Johnson**

With nearly a third of the current feeder vessel fleet over 15 years old, and a quarter in excess of 20 years, newbuild contracting by owners will have to increase in the coming years to replace ageing vessels as progressively tighter environmental regulations come into force. However, the huge amount of uncertainty surrounding emissions reduction and the expected transition to zero-carbon fuels is making it difficult for investors to decide how best to spend their money.

It's a complex riddle, notes Oskar Levander, Kongsberg Maritime's senior vice president of business concepts. "There's no silver bullet new fuel, and there's no one-size-fits-all approach or clear timeframe," he tells *The Naval Architect*. "This brings uncertainty for the shipowner. And if there's one thing that shipowners don't like, it's uncertainty. It would be much easier to have everything prescribed... this stage shift to this stage shift... but that isn't there."

KONGSBERG MARITIME'S FEEDER VESSEL DESIGN CAN BE ADAPTED TO FUTURE FUEL TYPES

Levander adds that Kongsberg Maritime has been working on ways to meet the coming needs of the feeder shipping sector for some time, combining existing and new technologies with digital solutions to propose a design for a feeder vessel that shipowners can order today "secure in the knowledge that their investment will still be competitive and relevant for years to come".

The new 2,000TEU Kielmax concept, designed in partnership with Deltamarin and known as Cobalt Blue, features a range of innovative features for the container feeder market, at the heart of which is a modular design that will permit the vessel to be upgraded over time to transition through fuel types during the working life of the ship. The core aim is to offer shipowners a future-proof vessel that delivers efficiencies and sustainability benefits now, while preparing the sector for future developments such as the need to switch to alternative fuels to meet tighter emission requirements.

Last month the design received approval in principle from classification society DNV. "This independent assessment of our design concept has confirmed that the Cobalt Blue, with all its innovative features, is a feasible proposition with no major obstacles to enable it becoming reality," Levander says.

Open-top deck

One fundamental element of the design is an open-top deck, eliminating the need for heavy cargo hatches. "It's not a new thing, but it's not common on container ships and we think the open top is the right approach for this size a vessel, taking into account the future-proof requirement," explains Levander.

He adds: "It's this feature that provides the flexibility for any future installations requiring extra space, such as battery containers or additional tanks for alternative fuels. By lifting the cargo up, these can be located below the container stacks without losing valuable cargo space, which wouldn't be the case on vessels with hatches."

Any stability issues caused by raising the cargo height are addressed by the vessel's increased beam, which is slightly wider than a typical vessel of this size but still allows the ship to navigate the Kiel Canal. Stability can be further enhanced with Kongsberg Maritime's optional container loss safety system, which combines active stabilisers with intelligent weather routing and steering to minimise the risk of cargo loss.

A forward deckhouse will help protect the cargo against green water coming into the ship, with tarpaulins to provide further protection for the containers, which slot between tall cell guides. "These partitions are watertight below the main deck and mesh above," says Levander. "The cell guides will speed up the loading and unloading process, because the containers don't need to be lashed so much – on more conventional ships, they'd normally need to be tied down to each other."

Time is also saved by not having to open and close hatch covers, Lavender adds. "By making vessels which are efficient at port operations, we can facilitate fast turnarounds with fewer crew members," he says.

Perhaps the most pressing dilemma for shipowners is fuel choice. Kongsberg's approach is to start with LNG, which, according to Levander, gives a solid basis for conversion to most of the alternative future

fuels currently being suggested. "There is already an infrastructure for LNG... we can use it now," he explains. "In time, shipowners can easily switch to liquid biogas or synthetic LNG, using the same engine whenever that fuel becomes available at an attractive cost, because it's essentially the same fuel. Basically, LNG is methane, biogas is methane and synthetic LNG is methane: it's the same molecule, it's just produced in different ways.

"In addition, through using dual-fuel engines, vessels can also operate on diesel or renewable options such as HVO. Operation with ammonia will be possible via a conversion, which we will make as simple and cost-effective as possible. With multiple current and potential future fuels applicable to their vessels, shipowners can be confident they are safeguarded and ready for the next steps."

Fuel storage

Fuel storage is one of the most likely areas to demand significant change to the vessel, especially for high-volume fuels such as ammonia. The two pre-installed C-type LNG tanks onboard Cobalt Blue – giving a range of around 3,000nm – have been designed to be ammonia-ready, and the vessel's open-top, modular design makes installing further storage fairly straight forward with the option to add extra tanks below the cargo.

Machinery wise, the 183m vessel comes with a two-stroke MAN 6G60MEC10.5-GI+HPSCR dual-fuel engine, two DF gensets, one diesel genset and a hybrid shaft generator that enables both power take-off (PTO) and power take-in (PTI) functions. According to Levander, the PTO will supply almost all electric power needed onboard, with the gensets only used when manoeuvring and as back-up. This delivers fuel savings together with lower emissions of up to 15% and is especially beneficial in reducing methane slip by minimising use of the four-stroke auxiliary engines, he says.

Adding batteries takes this a step further. The PTO can be used to charge batteries and stored power can then be used for a range of purposes including blackout reserve, spinning reserve, peak shaving and to power the unit as a PTI for zero-emission propulsion and cargo transfer operations.

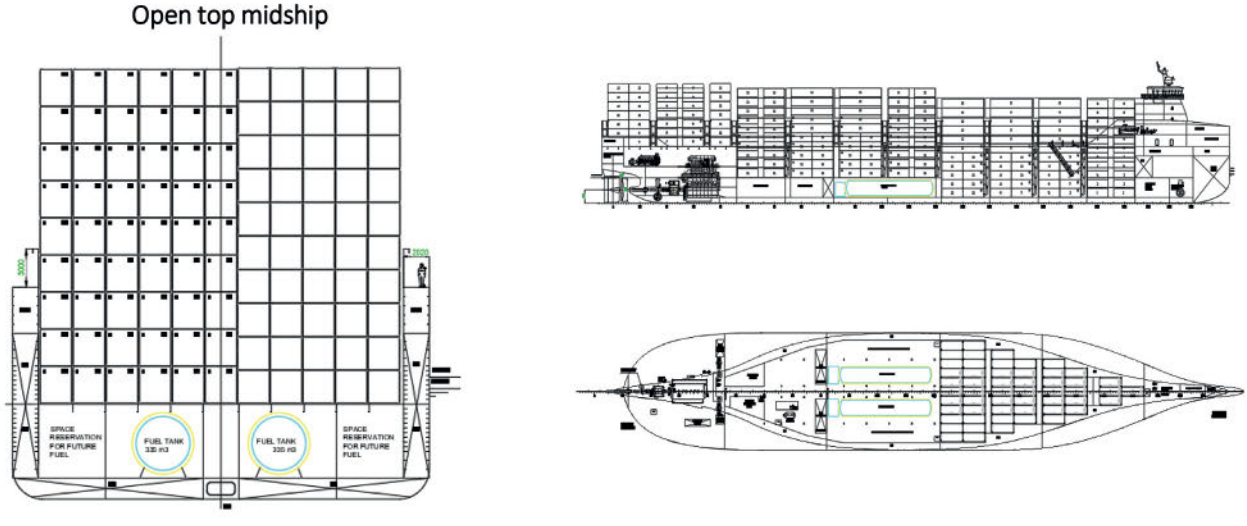
Fitted as standard is Kongsberg Maritime's combined Promas rudder and propeller solution, which is estimated to deliver efficiency improvements between 3% and 6%. The system's controllable pitch (CP) propeller will also allow easy adoption of auxiliary wind power as it offers more flexibility to work with power sources which deliver large variations of thrust, says Levander, adding that a single-screw configuration has been selected over a twin-screw option because it benefits from lower hydrodynamic resistance and lower investment costs.

For wind power, Kongsberg Maritime calculates that two optional tilting Norsepower rotor sails – a choice which facilitates port operations and reduce resistance in headwinds – will offer an annual fuel saving of around 8% on a typical North European route.

CII and emissions

The Cobalt Blue concept is estimated to have a CII value 34% below the target line, which should allow shipowners to maintain a CII A-rating for at least 10 years. Taking a holistic view from well to wake, adoption of a novel design with LNG, PTO and wind technologies results in a total decrease in emissions of 36% compared with a conventional MGO-fuelled vessel, of which 12% is attributable to LNG use, 15% PTO operation and 5% wind and remaining improvement to the new ship design, according to Kongsberg Maritime.

Many of these savings are associated with lower fuel use and maintenance costs, leading to an estimated reduction in opex of between 15% and 23%. "Of course, capex is increased owing to machinery costs, but we estimate these are paid off in a period of around five or six years depending on estimated fuel price developments," concludes Levander. ■



THE OPEN-TOP DESIGN ENABLES SPACE RESERVATION FOR ALTERNATIVE FUELS. SOURCE: KONGSBERG MARITIME

CONTAINER FREIGHT RATES CONTINUE TO PLUMMET

Long-term ocean freight rates fall again, with almost 50% drop in key pricing benchmark across last three months

The beleaguered carrier industry took another major hit in June, with the latest data from Xeneta's Shipping Index (XSI) showing a decline of 9.4% in global long-term shipping rates. Following on the heels of a 27.5% collapse in May, and a 10.3% fall in April, contracted rates have now shed 47.2% of their value in the last three months alone, and 51.7% over the course of 2023.

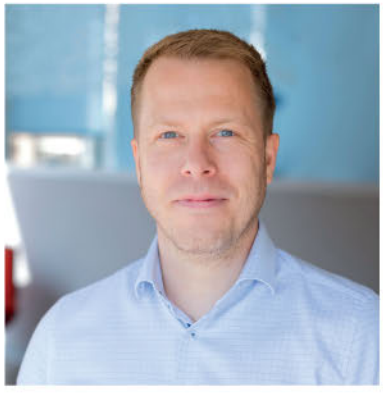
Xeneta's real-time data, crowd-sourced from leading global shippers, shows falls in the prices of valid long-term contracts across all key trading corridors. The uniform declines have now pushed the XSI to a 23-month low, with, as Xeneta CEO Patrik Berglund points out, little hope of a turnaround on the industry horizon.

He notes: "The fall from the peaks of last year have almost been as dramatic as the rates explosion which gave carriers such a profitable 2022. Those higher rates now appear to be a distant memory, while 2023 is becoming quite challenging. A fall of almost 50% in contracted prices in just three months on the XSI is highly unusual.

"Furthermore, with on-going weak demand, continuing macroeconomic and geopolitical uncertainty, and a growing excess of capacity, it's difficult to see how the industry can turn this current trend around – at least in the short-term."

Xeneta's data demonstrates a case of 'the bigger they are, the harder they fall', with huge declines for the year to date on the main container corridors. The Far East export benchmark, a key link in the global supply chain, has, Berglund remarks, steeply declined since December 2022, shedding 65.3% of its value. Meanwhile, the US import sub-index is down 56.3% for the year, with the European import benchmark declining 46.2%. The opposing European export figure fared only slightly better, down 38.3%.

XENETA CEO PATRIK BERGLUND



Dramatic drops

"If we sift through those headline figures and look at individual trades, we see some eye-catching reversals in fortune over the first six months of the year," says Berglund. "For example, China to North Europe and Indian West Coast and Pakistan to North Europe are two trades that have racked up total declines of more than 70% since the end of last year. Taiwan to the Mediterranean and Taiwan to North Europe have also plummeted from the heights of 2022, with falls of 65.5% for 2023 to date.

"There really are very few bright spots with the only exception this month being the trade lane from South America East Coast to China, which is up by 11% month-on-month. Hardly enough to lift the hopes of anyone within the carrier community."

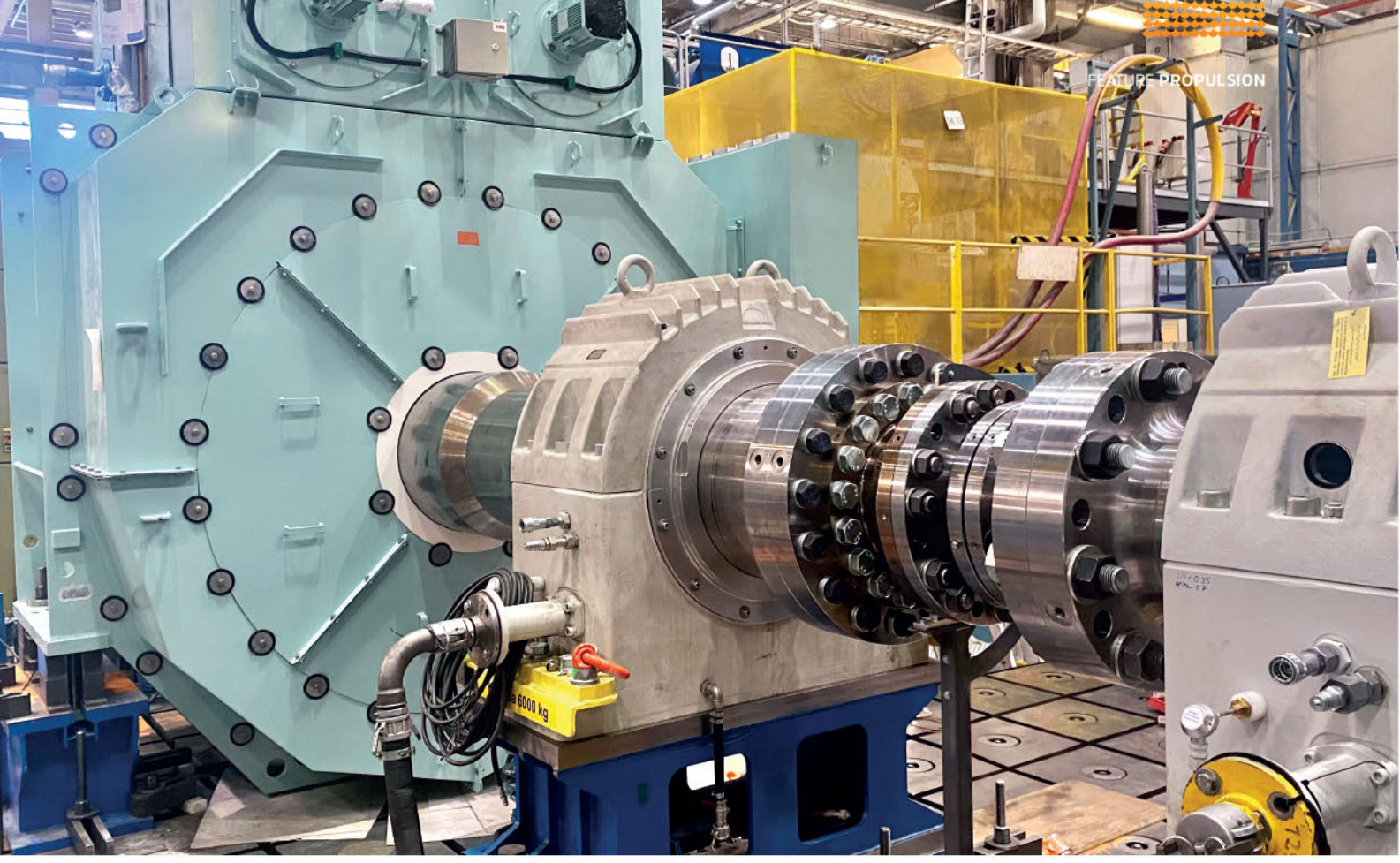
Xeneta's analysis shows a decline in all import and export benchmark figures for all regions. In Europe, the import sub-index hit a 24-month low point, falling 9.4% since May, while the export figure dropped for the third consecutive month, declining 5.1%. The XSI for Far East exports lost 13.9% of its value in June and has now slumped by 69.5% since its peak last year. The back-haul regional import trade has experienced a more muted decline, with a fall of 6.7% in June and 35.4% for the year to date.

The story continues on the US sub-indexes, with an 11% drop on the import benchmark pushing it to an 18-month low. The export back-haul figure recorded a 4.3% fall.

The big picture

"One is left wondering where this will all end," Berglund concludes. "If we look at volumes, there are some figures that suggest things might not be as bad as they first appear – with US container exports actually increasing for the for the first four months of the year, by 1.8% year-on-year, while inbound container demand for Europe 'only' declined by 1.1% for the same period. But again, those figures have to be seen against a wider backdrop of declining global demand, easing port congestion and increased capacity – all factors that exert downward pressure on rates.

"It's perhaps more telling to consider the recent development of the key Far East XSI export index. Here we see single-digit month-on-month declines from February to April, accelerating to double-digit drops for the last two months. This is a clear indication of weakening demand from essential Western markets and a worrying omen for the major players in this fast-paced, always evolving shipping segment." ■



PROPULSION

PERMANENT MAGNET SHAFT GENERATORS: ENABLING MORE EFFICIENT, COST-EFFECTIVE AND SUSTAINABLE VESSELS

By **Juha-Pekka Kivioja**, global product manager for large motors and generators, ABB

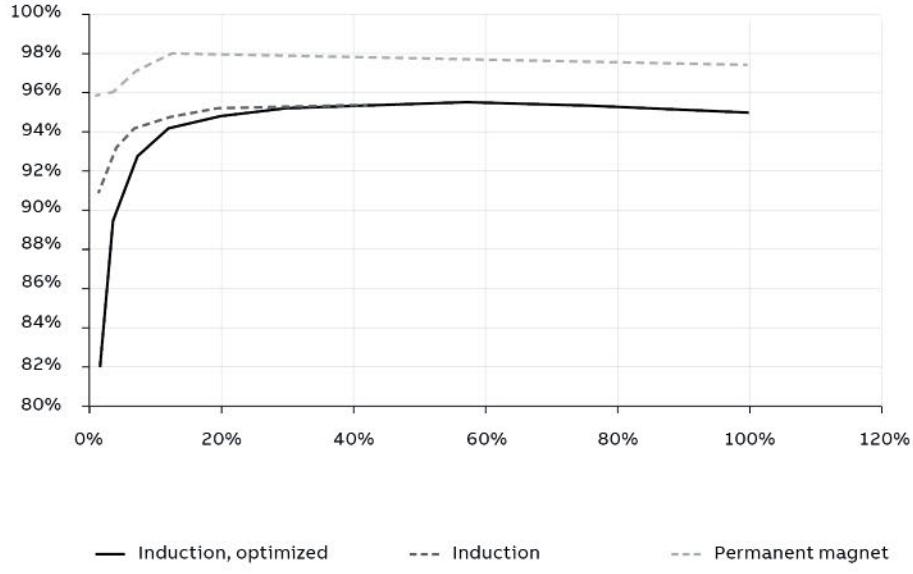
Greater energy efficiency is essential to the future of shipping. With the total volume of goods transported by sea expected to triple by 2030, the status quo cannot continue. Today, shipping accounts for almost 3% of all greenhouse gas (GHG) emissions, according to the Organisation for Economic Cooperation and Development (OECD) – and these emissions would also triple if the sector doesn't make changes.

There are new initiatives to encourage greater efficiency. At the beginning of this year, for example, the International Maritime Organization (IMO) launched the Energy Efficiency Existing Ship Index (EEXI). Vessels are also required to report their annual Carbon Intensity Indicator (CII) rating.

A straightforward way to improve a vessel's energy efficiency is through the selection of the right generator technology. It is understood that generating electrical power from a vessel's main propulsion engine is more efficient than using auxiliary gensets. This is achieved by mounting a generator directly onto the vessel's propulsion shaft.

JUHA-PEKKA KIVIOJA, ABB'S GLOBAL PRODUCT MANAGER FOR LARGE MOTORS AND GENERATORS

Traditionally, shaft generators have used rotor winding arrangements. However, solutions that use permanent magnets (PMs) are smaller, lighter, simpler to install and – most importantly – more efficient. This makes them an appealing option for shipbuilders and those looking to retrofit existing vessels, as well as operators, who benefit from fuel savings and more straightforward maintenance.



PERMANENT MAGNET GENERATORS ARE MORE EFFICIENT THAN INDUCTION GENERATORS AT ALL POWER LEVELS

Smaller, lighter and more efficient

With vessel emissions under increasing scrutiny, every possible reduction matters. Switching from a coil winding shaft generator to a PM solution immediately cuts fuel use by approximately 3-4%. Even greater savings are possible by optimising the engine's operations, with the potential to cut fuel use by 10% at partial load.

In addition to greatly improving the generator's efficiency, PM solutions offer a range of other benefits compared with induction solutions. For example, permanent magnet shaft generators (PMSGs) achieve a greater power-to-weight ratio. They require 20% less space than an equivalent induction or electrically excited synchronous generator, and are as much as 30% lighter.

PMSGs are also simpler to service, as the winding-free rotor has fewer components. The fact that the design doesn't require carbon brushes removes one of the most common maintenance requirements. Their robustness has led to PMSGs gaining popularity in demanding applications such as offshore wind. Manufacturers are also designing modern PMSGs as plug-and-play systems, further simplifying their installation in both new and existing vessels.

The use of an efficient PMSG eliminates the need for auxiliary gensets, resulting in significant capital expense (capex) savings. The increased efficiency, meanwhile, results in lower fuel costs, contributing to ongoing operational expense (opex) savings.

Enabling flexibility with variable speed drives

Traditionally, the only way shaft generators have been able to deliver a fixed frequency to the vessel's electrical network is by running the main engine at a constant speed. This is an inefficient approach at partial loads, which is where vessels spend a significant portion of their operating time. The reason is that the propeller and engine are both less efficient when operating at high rpm and low loads.

To overcome this limitation, the shaft generator can be fitted with a variable speed drive (VSD). A VSD enables the generator to operate at any shaft speed, so the vessel can always use the most efficient combination of speed and propeller pitch. Running the system at the ideal operating point enables fuel savings of as much as 40% over fixed or direct-on-line running. This also results in lower CO_2 and nitrogen oxide (NOx) emissions.

When specifying a PMSG for this use case, operators must be sure to select an option that is designed for operating at low speeds. These solutions are engineered to account for minor magnetisation losses, ensuring that they maintain high efficiency at low speeds and partial loads.

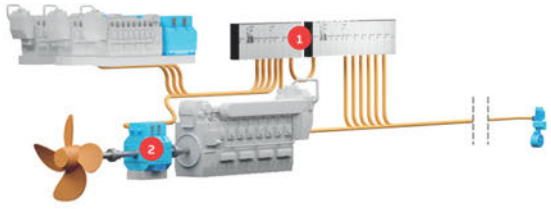
PMSGS are suitable for various operating modes

Permanent magnet shaft generators are available that work efficiently across all three standard operating modes:

- Power take-off (PTO), where the generator uses the main motor to produce power.
- Power take-in (PTI), for peak power in challenging circumstances such as heavy weather.
- Power take-home (PTH), which is used for redundancy and in emergencies. Vessels designed with PTH capability often use battery power to operate in an all-electric mode while in ports or zones with emission or noise limits.

Permanent magnet technology in action

Bermuda-based operator Himalaya Shipping is aiming to increase the efficiency of its 12 dual-fuelled bulk



1 Variable Speed Drives (VSD)

2 Permanent Magnet Shaft Generator

THE MAIN ELEMENTS OF A PERMANENT MAGNET SHAFT GENERATOR SYSTEM

carriers with 210,000dwt and identified PMSGs as a solution. The operator has selected the latest generation PMSG, ABB's AMZ 1400, which includes ABB ACS880 VSDs that enable consistent operation across a range of speeds, weights and loads.

The generators include a built-in water jacket and heat exchanger. This enables optimal cooling and further reduces the size needed to deliver the required power. Since the vessels operate in a tropical climate, this also makes the working environment cooler and more pleasant for crew and reduces the need for ventilation and air conditioning.

Selecting permanent magnet shaft generators just makes sense

PMSGs are significantly more efficient than the common rotor winding design. Because of this, motors can operate at a lower speed to achieve the same power output, resulting in fuel savings. This enables operators to improve their CII rating.

PMSGs are also smaller and lighter, making them easier to work with, and modern models are designed to be plug-and-play, further streamlining the installation process. The lower number of components and other design features also make PMSGs far more robust and – when required – far easier to maintain.

The various advantages of PMSGs over existing rotor winding solutions make a clear case for shipbuilders and operators, whether they are commissioning new vessels or upgrading existing ones. PM solutions bring us one step closer to achieving the International Maritime Organisation's target of reaching net-zero GHG emissions from shipping by 2050. ■

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BERG PROPULSION RIDES THE WINDS OF CHANGE

By **Richard Halfhide**

After nearly a decade in development, the announcement in January that French shipowner Neoline Armateur has signed a contract with a Turkish shipyard, RMK Marine, for the construction of the world's first large sail-powered commercial cargo ship has been heralded as a landmark moment in the renaissance of wind propulsion.

But while much of the focus surrounding the 136m ro-ro car carrier, due for delivery in 2025, has inevitably been drawn towards its SolidSail rigging system, expected to account for as much as 80% of its propulsion needs, beneath the waterline it will benefit from an equally innovative auxiliary propulsion system developed by Swedish specialists Berg.

THE INAUGURAL NEOLINER IS SCHEDULED FOR LAUNCH IN 2025. SOURCE: NEOLINE

"The Neoliner is a hybrid in the sense that you have sail as the primary propulsion but you also have a conventional propulsion system," explains Jonas Nyberg, Berg Propulsion's managing director for the western hemisphere. "Around 15 years ago we developed propellers that allow you to do full feathering, so when the weather conditions are favourable you can completely turn them off.

Under the agreement with RMK Marine, Berg will supply a MPP850F controllable pitch propeller for the Neoliner together with a shafting system, gearbox and control system, and 3xMTT113FP tunnel thrusters. However it's the patented feathering system – whereby the propeller blades can be set parallel to the water flow to minimise drag – which makes it ideally suited to fully exploit the benefits of wind power. According to Nyberg while other propulsion solution providers offering feathering essentially limit the pitch of the propeller to offset it, they are unable to offer full reverse.

Complementing this will be Berg's Dynamic Drive software, a propulsion optimisation solution integrated into its control system that's said to work especially well with an auxiliary power source such as a sail.

"When wind is your primary power source, but you need a bit of propeller to make your speed, the running condition of that propeller becomes completely different because it's nowhere near as heavy. The dynamic drive system will make sure you move the operational point to the right place. It's something neglected with sailing vessels because sometimes you don't consider the difference compared to a motor vessel," says Nyberg.

Although the Neoliner is Berg's most high-profile wind project to date, and a niche market the company is keen to capitalise upon as the appetite for wind grows, it's by no means their first. Around 10 years ago it collaborated in equipping an old two-masted Icelandic schooner, *Opal*, with a propeller that could double as a turbine and charge a battery, thereby allowing the vessel to manoeuvre using electrical power when it came into port. "That was our first encounter with a propeller that has completely new sets of operating conditions – propeller, feathering and generator," notes Nyberg.

Retrofit opportunities

Although newbuilding projects grab the headlines, retrofits form a substantial part of Berg's business, implementation of CII is driving awareness among shipowners of the manifold possibilities for improving the efficiency of their vessels.

Berg's dedicated Energy Efficiency department works exclusively with retrofitting; upgrading a ship's propulsion system, changing propeller blades (even those of rival manufacturers) based on operational profile and introducing power electronics and frequency drives to the shaft alternators which facilitates power limitation. "When you put these together you get close to what a new vessel would have been," comments Nyberg.

In certain instances the benefits of such a propulsive overhaul can be quite dramatic and perhaps instructive to those inclined to think the emphasis should be on improving engine efficiency. "With container feeder vessels the difference we can make is massive, we're talking 20% range in fuel consumption reduction," says Nyberg. "Vessels that are traditionally built for a very high speed then reduce that quite considerably you can make really massive efficiency improvements.

"In 2021, we did a project for [Dutch shipowner] Vroon for the 1,160TEU vessel *Indian Express* where we achieved documented saving of 21%, just by changing blades. It wasn't even our propeller blades to start with but we have the technology, methodology and skills to change the blades on competitor products as well. It's a new field, and one where it's perhaps surprising that you can achieve such big changes." ■

RESEARCH VESSELS

UK OCEAN RESEARCH CELEBRATES 100 YEARS OF DISCOVERY

By **Daniel Johnson**

This year the UK's leading ocean research institution, the National Oceanography Centre (NOC), is celebrating the 100th anniversary of its scientific research ship RRS *Discovery*'s predecessor being designated as a Royal Research Ship (RRS) while the modern RRS *Discovery* has become the first research vessel to be refitted at Babcock International's Rosyth facility, a mere 35 miles away from the birthplace of the original vessel in Dundee.

To mark the 100th anniversary, in early June the current RRS *Discovery* joined its ancestral inspiration in Dundee, where for a few days the past and present stood in each other's presence, serving as a reminder of the UK's world leading ocean research capabilities and long-term commitment to scientific ocean research.

RRS *DISCOVERY* IN DRYDOCK. SOURCE: NERC/NOC

Birth of an icon

Launched in 1901 at the Dundee Shipbuilders Company, the original RRS *Discovery* was the first vessel to be constructed specifically for scientific research and one of the last wooden three-masted, barque rigged sailing ships to be built in Britain. With a design drawing heavily on the robust great Dundee whalers, the ship's first mission was the British National Antarctic Expedition, carrying Scott and Shackleton on their first, and highly successful, journey to the unforgiving Antarctic, known as the Discovery Expedition. The vessel was taken into the service of the British government in 1923 to carry out scientific research in the Southern Ocean, becoming the first Royal Research Ship.

Following a stint as a static training ship that lasted from the 1930s into the 1980s, in 1992 the vessel made its final journey home to the Scottish city that had built her, since when the ship has become an iconic fixture of Dundee's cityscape, permanently berthed at Discovery Point.

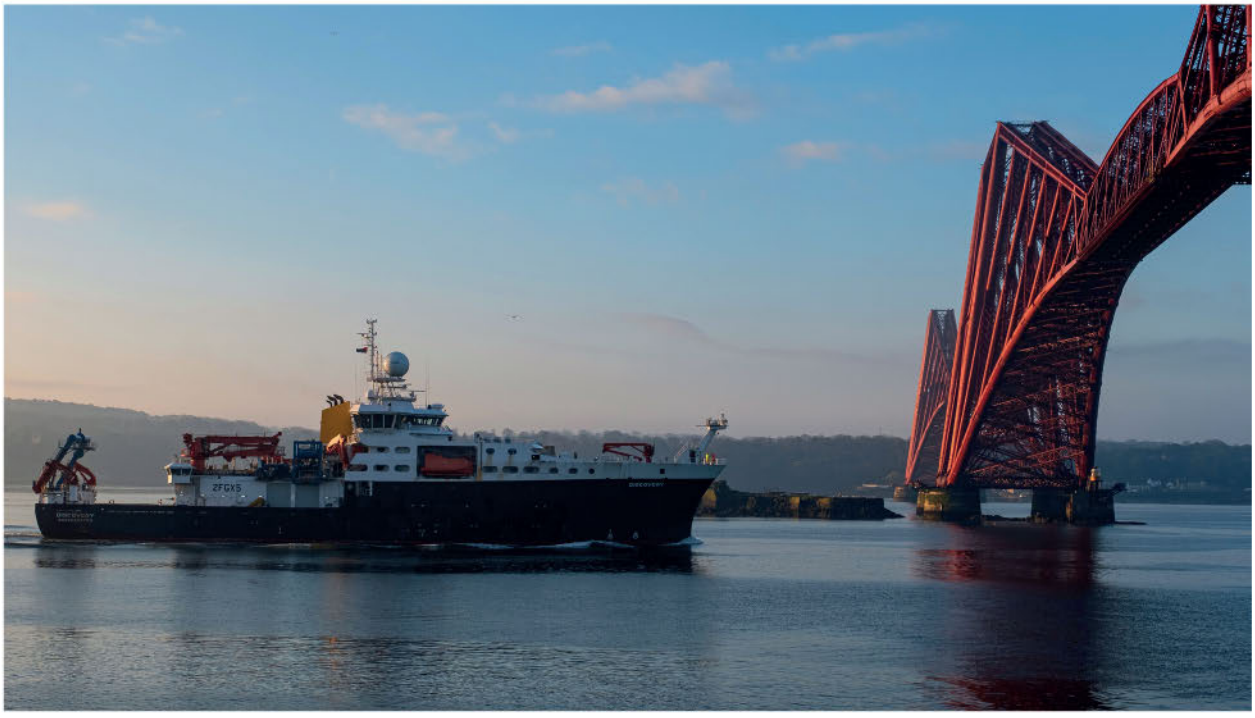
There have been three subsequent royal research ships named *Discovery*. The second, RRS *Discovery II* (1929), and third, RRS *Discovery* (1962), subsequently left service. The fourth ship is the current RRS *Discovery*, a multidisciplinary ship, specifically designed for the challenges of 21st century oceanography.

Oceanic exploration around the world

"*Discovery* is what we describe as an ocean-class research vessel which means we can work anywhere in the world, north to south, any ocean, deep water and shallow water, so she's a fully capable modern research vessel," explains the ship's captain, Antonio Gatti.

"We're capable of working with different groups of scientists and disciplines. Geology, chemistry, biology, oceanography, we can adapt the ship to whatever the science wants and where they want to go," he adds.

Designed in Norway by Skipsteknisk and built in Spain by Freire Shipyard (C.N.P. Freire), RRS *Discovery*'s latest iteration was delivered to NOC in July 2013. The 100m-long, 18m-wide vessel is powered by four eight-cylinder inline Wärtsilä 8L20 diesel electric generating sets, has two DC motors, each of 2,200kW capacity, and is configured with two azimuth thrusters with five-



THE RRS *DISCOVERY* ARRIVING IN ROSYTH FOR REFIT. SOURCE: BRIAN DONOVAN

bladed fixed-pitch propellers, one retractable azimuth thruster and one water-jet thruster.

The ship comes with sub-bottom profiling and multibeam equipment for mapping the seabed, while its dynamic positioning capability means that remotely operated vehicles can be used. A wide range of cranes and over-side gantries, with associated winches and wires, allow many different types of equipment to be deployed from the ship.

A total of 24 crew members and 28 scientists can be accommodated, with facilities including a bar-lounge, a library, a video room, a fitness centre and a hospital onboard.

During its 10 years on the sea, the research vessel has travelled more than 228,000nm, taking part in 56 expeditions, and partnered with multiple organisations worldwide.

To help continue to support the science undertaken by the RRS *Discovery*, Babcock's Rosyth shipyard was awarded £45 million late last year by the National Environment Research Council (NERC), the UK's main environmental research organisation, to maintain the UK's fleet of scientific research vessels – including the RRS *Discovery* and RRS *James Cook*, both operated by NOC, and the RRS *Sir David Attenborough*, operated by the British Antarctic Survey (BAS). The investment has been heralded as a vital boost for UK shipbuilding that will support highly skilled jobs and suppliers in Scotland and across the UK and is a key component of the UK government's National Shipbuilding Strategy.

As part of the three-year contract, which has an additional two-year option, the RRS *Discovery* was the first vessel to undergo a refit at the Rosyth facility in April. The vessel was put in drydock during the six-week project to allow the maintenance team access to clean the hull and propulsion equipment, which will help to lower fuel usage and increase overall speed making her more efficient for future expeditions. Safety checks were also conducted by a Lloyd's of London surveyor to ensure the vessel is safe to operate for another year.

"This was a 10-year special docking for *Discovery*," says Kevin Williams, NOC's head of research ship engineering, "which starts at least a couple of years prior to the docking because you want to make sure of the availability of the parts and services.

"It takes time getting the contractors. For pretty much every piece of equipment we use OEMs and with that comes their own team. We've organised in excess of 35 subcontractors, excluding those employed by Babcock, so it's quite a bit of co-ordination."

Targeting net zero

RRS *Discovery*'s refit comes at a key time for the maritime community as it transitions towards becoming more sustainable in its operations. NOC is committed to working with NERC to reduce the carbon impact of the research fleet and to be net zero by 2040. The refit, says Williams, will help meet that target by ensuring that RRS *Discovery* will be able to run more sustainably when on expeditions.

He adds that in the near-term NOC will be trialling hydrotreated vegetable oil (HVO) on the RRS *James Cook* in the coming months, and possibly on the RRS *Discovery* before the end of the year. "HVO is a drop-in fuel which will help bridge the gap between future shipping," Williams notes. "But we're also doing some energy efficiency monitoring onboard the *Discovery* at

THE ORIGINAL RRS *DISCOVERY*, NOW THE CENTREPIECE OF DUNDEE'S VISITOR ATTRACTION DISCOVERY POINT. SOURCE: DUNDEE HERITAGE TRUST

the moment which will give us a better understanding of where we reduce and save fuel.

"We also have plans to look into hybrid battery solutions. It's an ongoing process, but one thing leads into another and hopefully by the end of 2025 we will hit our 40% carbon reduction goal and then go on to full net-zero shipping by 2040."

The RRS *James Cook* and the RRS *Sir David Attenborough* are both scheduled for upcoming maintenance work in Scotland.

Fresh from its refit and a few days of post-refit sea trials, the RRS *Discovery* dropped anchor at Discovery Point over the weekend of 2-4 June with scientists, staff and the captain and crew operating on the ship onboard, allowing members of the public to explore the vessel.

Full year ahead

Having returned to its home port outside the NOC in Southampton, the RRS *Discovery* spent late June carrying out autonomous underwater vehicle trials at Whittard Canyon, off the coast of southwest Ireland. "Looking ahead into the rest of the year, we're looking at an expedition up towards Norway in the Barents Sea, and then it's across the Atlantic to Canada, so we've a full year ahead," says Gatti.

He adds the refit in Scotland will ensure that the vessel is ready to take on these and further expeditions in order to help humankind further understand some of the most pressing international environmental issues and provide scientists around the globe the ability to understand the ocean in a way that those onboard the original RRS *Discovery* could only ever dream of. ■

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REGULATION & CLASSIFICATION

BLENDING SUSTAINABLE BIOFUEL WITH CONVENTIONAL MARINE FUEL SHOWN TO DRAMATICALLY IMPROVE CII RATINGS

By **Panos Koutsourakis**, vice president of global sustainability, ABS

With reporting of data in compliance with the IMO's Carbon Intensity Indicator (CII) regulation well underway, shipowners and operators are focused on how to optimise their operations and gain improvement in CII ratings. The options include optimisation of vessel efficiency using energy efficiency technologies and the use of alternative and low-carbon fuels. Full adoption of cleaner fuels is some years away but options exist for the transition period.

Analysis by ABS has concluded that drop-in biofuels have the potential to make a substantial improvement to a vessel's Carbon Intensity Indicator (CII) rating. The research concludes that blending with biofuels could improve a vessel's CII performance regardless of whether the vessel is powered by diesel, methanol or LNG.

The CII establishes a downward trajectory measurement of a ship's carbon intensity, which is the amount of carbon emissions generated by a unit of transport work, equivalent to one nominal tonne of cargo carried over a nautical mile. The CII assigns an 'energy efficiency' rating to all ships (from A to E), based on the calculated carbon intensity.

Vessels in the D and E categories will have to demonstrate continuous improvement, moving progressively towards category C. Ships that spend three consecutive years in category D, or one year in category E will be subject to a mandatory review of the Ship Energy Efficiency Management Plan (SEEMP) and a plan of corrective actions must be made to achieve the Required Annual Operational CII.

Calculation methods

The 2022 guidelines on operational carbon intensity indicators and the calculation methods provided the possibility for the CO_2 Emission Conversion Factor (Cf) to be obtained from the fuel oil supplier, supported by documentary evidence, in case the type of the fuel oil is not covered by the relevant guidelines. However, the current regime has been measuring carbon emissions tank-to-wake but there are discussions underway to change this to well-to-wake, accounting for the full lifecycle of emissions.

In the July meeting of the Marine Environment Protection Committee (MEPC 80) the Marine Fuel Life Cycle GHG Guidelines (LCA Guidelines) were officially adopted and a work programme for further enhancement of the guidelines was agreed upon.

ABS VICE PRESIDENT OF GLOBAL SUSTAINABILITY PANOS KOUTSOURAKIS

To facilitate the uptake and establish a common approach among flag administrations regarding the assignment of a carbon factor for biofuels and thus ensuring a level playing field, pending the development of policy instruments for the use of LCA Guidelines, the Committee also adopted Interim Guidance on the Use of Biofuels. This suggests that, under certain provisions, biofuels that have been certified as sustainable by an international certification scheme may be assigned a carbon factor equal to the value of the well-to-wake GHG emission of the fuel, based on the certificate.

Blending the biofuel from biogenic sources with diesel and other fuels up to 30% would thus improve the overall carbon intensity and thus a ship's CII rating.

The commonly used biofuel products for shipping are the biodiesel blends, which contain 20-30% of pure biodiesel and offer 15-20% carbon emission reduction on a well-to-wake basis. ABS analysis concluded that a container vessel propelled by traditional low-sulphur fuel could see its rating improved from E to C in 2023 with the adoption of a 30% blend of biodiesel. The advantage of biofuels to decarbonisation extends to the supply chain and the bunkering infrastructure required for fuelling. Since biofuels are simple fuels of the same molecular structure, their cost is confined to the fuel itself rather than in any additional treatment, meaning they represent a compelling option once supply and regulatory questions are addressed.

Availability

The next issue for owners – common to all alternative fuels – is availability in sufficient quality to support CII compliance and ultimately a net-zero carbon shipping

AVAILABILITY OF BIOFUELS IS INCREASING AT THE WORLD'S BIG BUNKERING HUBS AND IS EXPECTED TO INCREASE FURTHER OVER TIME. SOURCE: SHUTTERSTOCK

industry. ABS expects there to be sufficient biofuel supply to meet current demand since the majority of energy majors have invested in producing sustainable biofuels.

Availability is increasing at the world's big bunkering hubs and is expected to increase further over time, especially after the decisions of MEPC 80, as demand signals from shipowners grow. However, the shipping industry must be in no doubt that it will experience competition, principally from the aviation industry, which is also eyeing the use of sustainable biofuels to lower its carbon emissions.

Nevertheless, drop-in biofuels are a powerful tool for shipowners and operators to accelerate fleet decarbonisation and improve their CII trajectory today. ABS is involved in pilot projects on the application of biofuels that have shown us the significant potential of these fuels to contribute to reducing a vessel's well-to-wake carbon intensity and transform its rating.

ABS has published a series of sustainability whitepapers focused on alternative fuels, breaking down the available options including their challenges and advantages, as well as other factors to take into consideration during the decision-making process. The whitepaper 'Biofuels as Marine Fuel' focuses specifically on drop-in biofuels and can be downloaded from the ABS website. ■

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CLASSNK'S ZETA GIVES OWNERS A CLEARER PICTURE WITH CII

By **Richard Halfhide**

More than half a year into the inaugural data reporting for IMO's Carbon Intensity Indicator (CII) many shipowners still seem a little uncertain exactly what the new regulations will mean for them, according to Japanese classification society ClassNK.

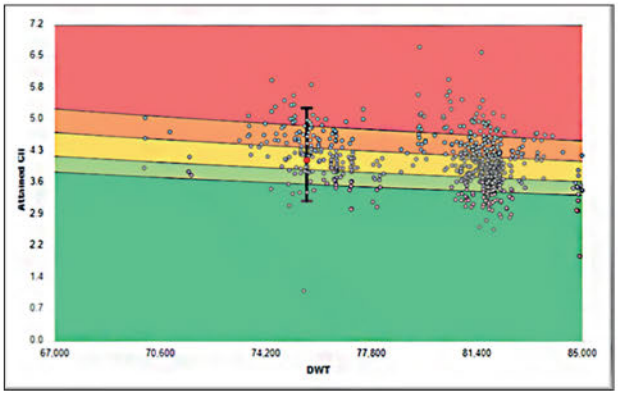
"We tried to arrange interviews with the shipowners but most didn't take it seriously because the company next door doesn't do anything," says Hiroshi Shibako, general manager of CLassNK's technical solutions and marine GHG certification departments. "Maybe the time will come when they start to rush and take it seriously, perhaps when the operator suddenly requests their fuel consumption. But at the moment it's only the front-runners."

Historically class societies have taken a back seat with regard to the economics of shipping, but decarbonisation has muddied the waters. Fuel consumption demands new insight.

That's particularly true of CII, which sets a rising bar with regard to compliance. A vessel that attains an acceptable rating today could within a few years find itself slipping towards the undesirable E rating without remedial action to curb its carbon emissions.

Equally the cost of doing so might be so prohibitive the only viable option is scrapping the ship. While energy saving devices such as wind-assisted propulsion have gained some traction the far more popular choices remain engine power limitation and voyage optimisation.

To help owners develop a better understanding of GHG emissions for not only individual vessels but their entire fleet, last year ClassNK launched its Zero Emission Transition Accelerator (ZETA) tool. Linked to the pre-existing ClassNK MRV Portal – a support tool for MRV IMO-DCS and EU-MRV – ZETA visualises CO_2 emissions and simulates CII ratings based on fuel consumption data.



ZETA ALLOWS USERS TO SIMULATE HOW A CII RATING OF A SHIP MIGHT CHANGE WITH DIFFERENCES IN SPEED AND OTHER PARAMETERS

Currently some 5,000 ships operated by 2,000 different companies are already using the service.

"Not only ClassK but also ships using other class societies can use our service," explains Shibako. "We want to expand this service to as many of our clients as possible."

Beyond its use providing the CII rating for individual vessels, ZETA is also a benchmarking tool since anonymised data is also openly accessible. Although available as a free service, ClassNK is also interfacing and augmenting it with data from other providers. In one recent example, ClassNK's Finnish subsidiary NAPA wished to integrate the ZETA data with its own commercial voyage optimisation solution to provide owners with performance data.

Given the Japanese government's strategy to transition towards a hydrogen-based economy in the coming decades it's understandable that ClassNK anticipates ammonia and hydrogen are the leading candidates among alternative fuels. Shibako notes that much depends on the success of the new engine technologies being developed by the likes of MAN, Wärtsilä and some Japanese engine makers, which should come to fruition within the next two years. By 2030 it is anticipated that a trend towards hydrogen-fuelled engines will begin in earnest.

For its part ClassNK is keen that the guidelines it previously published for ammonia, methanol and LPG inform the ongoing development of industry-wide guidelines at IMO, a process which commenced the eighth session of the Carriage of Cargoes and Containers subcommittee (CCC8) last September. "Once IMO establishes reliable guidelines we will feed back into our own guidelines, which will then be fixed as class rules. Then we can use this rule to provide feedback to designers."

Perhaps not surprisingly though a growing number of ClassNK's clients are attracted by the nascent potential in carbon capture and storage (CCS) technologies that might negate any need for a switch from conventional fuel. In April, it published its 'Guidelines for Shipboard CO_2 Capture and Storage Systems', which incorporates experience gained from ClassNK's involvement with the Carbon Capture on the Ocean (CC-Ocean) project, the first time a marine-based CO_2 capture system was used on an actual voyage.

"We are happy because a CO_2 capture manufacturer has already started to use our guidelines. They recently made a presentation and introduction of their product referring to them," says Shibako.

However, while cautiously optimistic he is concerned that the additional power required to run CCS equipment, not to mention the significant onboard space required to accommodate it, is likely to prove prohibitive for the foreseeable future. ■

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Published in March 2023, Significant Ships of 2022 brings together around 35 notable newbuildings delivered during the previous year. As ever, the publication will feature general arrangements, concise descriptions, in-depth particular details and photographs of each vessel. Vessel types include:

- Cruise ships
- Ro-pax and ro-ros
- LNG tankers
- Container ships
- Product tankers

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SIGNIFICANT SHIPS OF 2023

The 34th edition of our annual Significant Ships series, *Significant Ships of 2023*, will be published in March 2024. As in previous editions we shall be including up to 50 of the most innovative and interesting commercial ship designs (of mostly 100m length and above) which will be delivered during the forthcoming year.

The Editor invites shipbuilders, designers and owners to submit details of vessels for possible inclusion in *Significant Ships of 2023*. Presentation will follow on the established two-page format, with a colour photograph, descriptive text and tabular details (including major equipment suppliers) on the first page, followed by a full page of technical general arrangement plans. Initial potential entries should comprise a short technical description (100 words) of the proposed vessel highlighting the special features and the delivery date.

All entries should be addressed to:

Editor, Significant Ships of 2023,
Email: editorial@rina.org.uk
Tel: +44 (0) 20 7235 4622 Fax: +44 (0) 20 7245 6959

METHANE SLIP NO SHOW STOPPER FOR LNG AS FUEL

By **Richard Halfhide**

Despite a surge in orders for methanol-ready vessels during the past year it's LNG that continues to have the competitive edge over other alternative fuels, according to Lloyd's Register's (LR) principal gas expert.

Panos Mitrou, global gas segment director for LR, tells *TNA* that the characteristics of LNG remain a competitive challenge for LNG – and could yet drive it out the market – he doesn't think the enduring problem of methane emissions will prove a "show stopper", pointing to the emerging technologies currently being explored to address this.

He explains: "On an absolute well-to-tank basis we can trace and measure the exact methane footprint of producing LNG and can further improve this in the years to come. With methane slip side engine combustion is the only area that we can't put our hands on."

While huge progress has been made in reducing methane slip from high-pressure gas injection two-stroke engines in recent years there has been less success with four-stroke and low-pressure two-stroke engines using Otto combustion, negating a substantial part of LNG's cleaner benefits. Mitrou points to increased usage of shaft generators as an alternative to auxiliaries for electrical loads as a notable solution.

For those owners who would still prefer four-stroke engines, ongoing developments with oxidation catalysts may prove the answer. Another possible option he highlights is the use of plasma-assisted oxidation of methane, however these technologies have yet to be validated in a marinised environment. In September 2022, LR became a founding partner in the Methane Abatement in Maritime Innovation Initiative (MAMII) which is now undertaking a range of pilot projects, starting with an at-sea assessment of a plasma reactor.

Bio-LNG and carbon capture

While running a vessel on LNG today effectively guarantees attainment of nearer-term decarbonisation targets it also buys time for the carbon value chain to augment. One important factor is likely to be the availability of bio-LNG, sourced from sustainable feedstocks. Mitrou notes last year's independent study commissioned by industry coalition SEA-LNG gave a credible indication of the potential of meeting demand, although he cautions it's important that shipping seizes the initiative to claim its share from the biomass pile.

PANOS MITROU

Onboard carbon capture and storage (CCS) is a solution that he believes "works perfectly" with LNG. However, the technologies remain years from maturity. Even then, CCS's viability will depend on whether these solutions are competitively priced compared to the cost of alternative fuels and any attendant vessel conversion.

During the last year, LR has granted approvals in principle to two CCS concepts. Dutch company Value Maritime's Filtree system is said to capture up to 40% of CO_2 emissions via a chemical medium that will be trialled on two MR tankers. Norway's Rotoboost employs a completely different process of thermocatalytic decomposition which creates graphite as a byproduct and can potentially achieve 100% CO_2 capture.

LR officially adopts an agnostic perspective, nevertheless Mitrou advocates a risk-based approach to decision making. "With LNG the risk profile of the fuel is that you win more now with carbon regulations compared to conventional fuel and are not exposed to a technology risk.

"Keep in mind that by going to LNG, with the right application, you save 24-25% from day one of a ship's delivery... when we're talking about a strategy during the transition, momentum is very important. Having 10 years to decide your next move, especially if that is CCS, is going to be a huge luxury."

A further means of reducing emissions from LNG, one which Mitrou suggests has been overlooked by regulators, is what he calls 'clean LNG'. Closer control and abatement of methane emissions from well to tank, particularly around the liquefaction process, could be achieved through the use of renewable green energy that minimises the carbon footprint.

"There is another 10-12% [in carbon reduction], something like 50% of what we win today, given the overall gain when using LNG for a high-pressure engine is approximately 24%. If you add on top of that bio- or synthetic LNG and CCS and you reach the compliance point you want," says Mitrou.

"In the future, today's LNG fuel user will have a portfolio of alternatives to work on, with methane abatement a must-have, and then play between clean fuel blends, cleaner LNG and CCS. Using all of them in a different manner, on a strategy basis, so that you pick at any time or place in the world the one that is cheaper and more efficient," he concludes. ■

RINA PUBLICATIONS

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INTERNATIONAL JOURNAL OF MARITIME ENGINEERING (IJME)

Now published by and only available to purchase through The University of Buckingham Press:
(https://www.scienceopen.com/collection/UBP_IJME)

Published in March, June, September and December, the IJME provides a forum for the reporting and discussion of technical and scientific issues associated with the design, construction and operation of marine vessels & offshore structures.

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RINA event
London, UK

NOVEMBER 28-29, 2023
HISTORIC SHIPS 2023
RINA conference
London, UK

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JULY 31 – AUGUST 4, 2023
SUB-COMMITTEE ON IMPLEMENTATION OF IMO INSTRUMENTS (III)
IMO meeting
London, UK/Online
www.imo.org

AUGUST 23-25, 2023
INAMARINE 2023
International exhibition
Jakarta, Indonesia
https://inamarine-exhibition.net

AUGUST 28-30, 2023
8TH HULL PERFORMANCE & INSIGHT CONFERENCE
International conference
Pontignano, Italy
email: volker@vb-conferences.com

AUGUST 28 – SEPTEMBER 1, 2023
IWSH 2023
International symposium
Aalto University, Espoo, Finland
https://iwsh2023.com

SEPTEMBER 5-8, 2023
OFFSHORE EUROPE 2023
International conference
Aberdeen, UK
www.offshore-europe.co.uk

SEPTEMBER 11-15, 2023
LONDON INTERNATIONAL SHIPPING WEEK (LISW)
International maritime event
London, UK
https://londoninternationalshippingweek.com

SEPTEMBER 12-13, 2023
INTERNATIONAL ANTIFOULING CONFERENCE 2023
International conference
Gothenburg, Sweden
https://antifouling-conference-2023.confetti.events

SEPTEMBER 18-20, 2023
15TH HIPER SYMPOSIUM INTERNATIONAL SYMPOSIUM
Bernried, Germany
email: volker@vb-conferences.com

SEPTEMBER 20-29, 2023
SUB-COMMITTEE ON CARRIAGE OF CARGOES AND CONTAINERS (CCC)
IMO Meeting
London, UK/Online
www.imo.org

OCTOBER 15-18, 2023
25TH NUMERICAL TOWING TANK SYMPOSIUM
International symposium
Ericeira, Portugal
https://blueoasis.pt/nutts-2023

NOVEMBER 7-9, 2023
INTERNATIONAL MARITIME CONFERENCE 2023
International conference
Sydney, Australia
www.indopacificexpo.com.au

NOVEMBER 23-24, 2023
IMO COUNCIL
International forum
London, UK/Online
www.imo.org

DECEMBER 5-8, 2023
MARINTEC CHINA
International conference
Shanghai, China
www.marintecchina.com

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ClassNK CHARTING THE FUTURE

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