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News from OCIMF

OCIMF news from May, June and July included a new chair, a review of tanker shore power developments, plans for cybersecurity in TMSA and SIRE, reviewing Track Guidance Assistant devices, promoting "allyship", meetings in South America and Asia

On July 31, Nick Potter of Shell stepped down as chair of OCIMF's executive committee. Lambros Klaoudatos, senior vice president of BP Shipping, was appointed as the new chair.

On leaving, Mr Potter said, "Through the dedication of our secretariat, committees and workgroups, we have achieved a huge amount. SIRE 2.0 will go live shortly. We have produced best practices and responded to multiple security incidents, increased our environmental focus and grown our cross-industry advocacy, collaboration and thought leadership. "

"There remains much to do in our mission of safety, security and the environment."

Mr Klaoudatos said, "As we move forward during this time of change, OCIMF's priorities remain clear and consistent. Promoting the safety of our industry and the maritime environment within which we operate is paramount. OCIMF will continue to advocate for, and uphold, the highest safety standards by implementing SIRE 2.0 and promoting best practices for tankers, barges, terminals and offshore installations.

"We are committed to fostering a culture of inclusion, taking meaningful steps on our ongoing journey towards a better, more equitable environment for everyone at sea. "

"OCIMF is dedicated to strengthening and supporting our industry efforts towards a net zero shipping future."

SIRE 2.0

OCIMF SIRE 2.0 Secretariat members along with the Vessel Inspection Protocol (VIP) Steering Group met on 12–13 June in London for a workshop to review the progress of Phase 3 of the SIRE 2.0 transition.

The workshop included a review of all critical success factors related to training and accreditation, hardware, software, inspections, procurement and logistics, industry advocacy, quality and communications. Further communications related to SIRE 2.0 go-live will be communicated to industry shortly.

Decarbonisation and safety

OCIMF's Shore Power Working Group visited the new build, dual fuel chemical tanker, Fure Vanguard, which has recently completed her maiden voyage in Rotterdam. The vessel is equipped to connect to a shore power station, which means it can carry out operations like discharging cargo, tank cleaning and cargo heating using electricity.

OCIMF joined the Green Award Board of Experts 55th meeting in Rotterdam on 8 May.

Discussions included a review of the zero-emission platinum label requirement for inland shipping, environmentally friendly cargo sampling measures, requirements for ethane and ethylene carriers, the importance of environmental aspects in voyage planning, and a progress report on work being undertaken on shore power for tankers.

OCIMF revised its 'position paper' on Reduction of Greenhouse Gas Emissions and Air Pollution. The position paper, first published in February 2023, was reviewed by the Environment Committee (EC) following the launch of the IMO's Revised GHG Strategy.

The EC refined the key principles of OCIMF's position and added additional

Lambros Klaoudatos, senior vice president of BP Shipping, is appointed as the new chair of OCIMF

context to demonstrate how OCIMF's vision and mission align with its commitment to support the IMO Strategy.

OCIMF signed a memorandum of understanding with upstream marine safety organisation Safer Together. The organisations agreed to work closer together in their work on HSSE. They will develop best practices in safe deck operations and lifeboat safety.

OCIMF held a meeting in Copenhagen with the Mærsk Mc-Kinney Møller Center for Zero Carbon Shipping to explore efforts and objectives about decarbonisation. They discussed safety protocols and operational guidelines for alternative fuels such as methanol and ammonia, and implementing onshore power supply systems.

OCIMF was invited to a Port Call Optimisation workshop organised by the

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port of Rotterdam in July. They discussed standardising terminology, and the difference between operational, nautical and administrative data in the context of maritime operations. They discussed data exchange between terminals and ports, digital identity standards, and getting regulators involved.

OCIMF participated in the Society for Gas as a Marine Fuel (SGMF) Methanol Bunkering Working Group in Copenhagen. They discussed technical elements of a forthcoming publication titled 'Methanol as a Marine Fuel – Safety and Operational Guidelines – Bunkering', set to be released in October 2024.

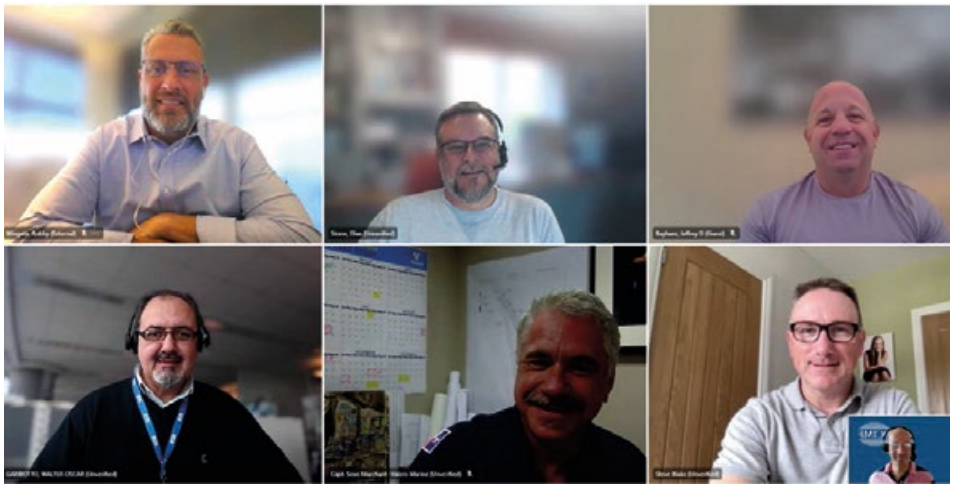
OCIMF published an information paper, "Compliance with EEXI Regulation: Risks associated with Power Limitation". It provides best practice guidance for managing the risks associated with the implementation and operation of Overridable Power Limitation (OPL) on existing ships.

The Ship to Shore Expert Group reviewed the current edition of the OCIMF information paper "Manning at Conventional Marine Terminals" written in 2008 and decided to revise it. Topics for consideration include berth operator minimum onboarding requirements; improvements/advancements in technology; human factors – conducting walkabouts, interactions with people and equipment; Digitisation, Artificial Intelligence and emerging technologies; New cargoes/new fuels – requirement of additional awareness training for berth operators and management.

Technology

The Innovation and Technology Expert Group (ITEG) met in April. It is preparing the scope of a OCIMF Programmes cybersecurity assessment to be carried out in 2025 by an independent third party. ITEG supports the inclusion of cybersecurity in the tanker management self-assessment frameworks and has proposed the inclusion of cyber elements in the inspection questionnaires.

OCIMF's EU Working Group on Smart Shipping discussed use and implementation of Track Guidance Assistant devices for Inland Navigation (TGAIN). They agreed the content of an upcoming information paper on the safe implementation and use of these devices on board. In Europe there are currently around 1,500 barges equipped with these devices, expected to rise to 2,000 by the end of 2024.



OCIMF's ship to shore expert group

OCIMF visited Seafar, a Marine Autonomous Surface Shipping Remote Operations Centre (MASS ROC) in Antwerp, Belgium, in July. IMO discussions about MASS continue to gather momentum, OCIMF said. These include identification and addressing of all risks associated with MASS operations, reliability of communications and network governance, training requirements for MASS operators, and safety management aspects of ROCs.

The Innovation and Technology Expert Group (ITEG) meeting in July discussed revisions to the group's terms of reference. They now cover cybersecurity, identification and use of emerging technologies, and data integrity and quality.

Women

The Women's International Shipping and Trading Association UK (WISTA UK), Trinity House and OCIMF hosted a discussion in May in London It focused on "allyship", defined as the actions, behaviours and practices to support, amplify and advocate for others.

There was a call to action to prioritise allyship, foster a culture of inclusion, and actively work towards gender diversity in shipping.

" I am proud of the increasing involvement and impact women are having in this traditionally male-dominated field," said Karen Davis, director of OCIMF . "Together we must speak up about and solve challenges, break barriers, encourage women in Science, Technology, Engineering, Mathematics (STEM), and steer towards an accessible, safe and sustainable industry. "

South America

Over 200 guests attended OCIMF Day in Rio, Brazil, in May, including senior representatives of industry and the Brazilian Navy.

During the trip, OCIMF and its regional members were invited to the offices of the Brazilian Petroleum and Gas Institute (IBP) in Rio. They discussed ship to barge transfers and closed loading operations.

OCIMF and regional member representatives visited the Peruvian coastguard

OCIMF participated in this year's International Lessons Learned Workshop in Santiago, Chile, organised by the Society of Marine Oil Terminals and Monobuoy Operators (SLOM) in June.

Asia

OCIMF was invited to the annual Tanker Operators' Safety Conference held in Shenzhen, China, in May, hosted by Associated Maritime Company (Hong Kong) Limited.

OCIMF was invited to present at a seminar focused on SIRE 2.0 hosted by the Petroleum Industry Marine Association of Japan (PIMA).

An OCIMF delegation visited Delhi and Mumbai in June to discuss key maritime issues including safety, its inspection programmes OVID and SIRE, the energy transition and security matters.

OCIMF was hosted by the Government of India and met with Shri Shyam Jaganathan, the Director General (DG) Shipping; Shri T K Ramachandra, First Secretary, Ministry of Shipping, Ports and Waterways; and Capt Sachin Singh, Director Information Fusion Centre-Indian Ocean Region (IFC-IOR).

The OCIMF team also visited the IFC-IOR offices, where they were presented with an overview of its role, how it is supporting the Indian Navy and the joint allied forces operation Prosperity Guardian to ensure safety for seafarers transiting the volatile Red Sea.

OCIMF visited the Anglo Eastern Maritime Training Academy in Karjit. OCIMF met with the Chairman of Mumbai Port, Shri Anup Jalota, to discuss OCIMF's terminal safety programmes and the role India can play in support of clean energy marine (CEM) hubs and Green Corridors to aid maritime decarbonisation in line with IMO's Greenhouse Gas strategy.

Piracy – increasing violence

The International Chamber of Commerce (ICC) International Maritime Bureau (IMB) is calling for sustained vigilance to protect seafarers amid increasing violence despite an overall drop in the number of incidents reported, OCIMF said.

IMB's mid-year report for 2024, released on 11 July, showed a total of 60 incidents of piracy and armed robbery against ships recorded in the first half of 2024, a decrease from 65 incidents for the same period in 2023.

Of the 60 incidents reported, 46 vessels were boarded, eight reported attempted attacks, four were hijacked and two were fired upon. Perpetrators successfully boarded 84% of targeted vessels. Violence towards crew continues, with 85 taken hostage compared to 36 in the same period last year. TO

Collision because no-one does anything in time

A collision between a tanker and bulk carrier in west India near the border with Pakistan occurred because both vessels failed to take action early enough, an investigation found

A Hong Kong registered oil/chemical tanker collided with a bulk carrier in the Deep Water Route through the Traffic Separation Scheme of the Gulf of Kachchh, West India, near the border with Pakistan. The bulk carrier was declared as constructive total loss after the accident and the tanker suffered serious hull damage.

The date of the incident was not disclosed but the investigation report by the Marine Department of the government of Hong Kong was issued on June 3 2024.

The weather was fine with clear sky, good visibility and calm sea conditions.

Both vessels were in sight of each other and under the supervision of the local Vessel Traffic Service.

The bulk carrier was inbound southeasterly, the tanker was outbound southwesterly.

When both vessels were approaching each other and would likely meet in the Deep Water Route, the officers of the watch (OOWs) of both vessels discovered the other vessel through radar and ECDIS.

But neither took positive action in enough time to avoid the collision.

The tanker could have altered course earlier towards northwest, but did not because fishing nets had been observed on its starboard side.

As the collision became imminent, the master of the bulk carrier put the rudder hard to starboard and the officer of the watch on the tanker ordered to put the rudder hard to port.

But the collision was not avoided, the tanker's stem (most forward part of the bow) hit the bulk carrier's port side.

This resulted in serious structural damage to the bulk carrier. It was subsequently declared a constructive total loss.

The tanker received significant structural damage to its stem and bulbous bow, but resumed operation after repair.

Not following COLREGS

The investigation identified that the bulk carrier's officer of the watch did not use all available means to assess the risk of collision, including using the Automatic Radar Plotting Aid (ARPA), and its master did not take positive action in ample time, as required under collision regulations.

Also, the tanker's officer of the watch did not maintain a proper look-out "by hearing", and failed to acknowledge a transmission from the local vessel traffic service. Its OOW also did not make use of all available means, including ARPA, to assess the risk of collision with the bulk carrier. The OOW also did not notify the master until a collision with the bulk carrier was imminent, and did not take action in ample time. These are all violations of the collision regulations.

The investigation also found that the masters of both vessels "failed to supervise their respective OOWs effectively. Also both vessels failed to make a sound signal when they were approaching each other, as required under the collision regulations. TO

SOKANA - a more efficient commercial model for tankers

Commercial vessel owner and operator SOKANA is finding better ways for cargo management, technical management and vessel ownership to integrate better, generating efficiency for all

The most commercially efficient way to run tankers is to keep them loaded with the highest-paying freight for as much of their lives as possible.

The objective is to achieve a mechanical harmony with freight operation and the vessels integrated together, working like a well-oiled machine.

However, bringing together separate entities, operating under different commercial banners, takes a lot of teamwork.

SOKANA aims to do this. It is commercial manager to a fleet of 35 chemical and product tankers. It is part of the Interunity Group, a service provider to the maritime industry controlling 52 vessels.

At the core, according to George Mangos, co-founder, is "one of the great trading teams in the industry."

George Mangos, co-founder of SOKANA

The process starts with a very agile and thoughtful approach to fixing cargo and post-fixing. This is backed by working very hard to integrate teamwork between cargo, vessel management, and the ownership.

The experience of its trading team means that the company can be comfortable with its ability to assess risks and operate in a volatile market, says Mr Mangos.

Background

SOKANA, in its initial incarnation, was founded by Lars Ebbesen and Arne Blystad and was sold to Eitzen in 2006 for $1.3 billion (with Ebbesen becoming president of Eitzen Chemical for a year).

The company was relaunched and joined with Navig8 as a joint venture to become Navig8 Chemical in 2012. Other partners include George's brother Christos Mangos, who is CEO of Interunity Group; Steen Eriksen, the former head of Maersk Tankers Singapore and then USA; and Matt Ferguson, Chartering Director.

George Mangos describes Interunity Group as "in essence a family company that has evolved into a large-scale partner for institutional partnerships and family office equity in shipping."

Interunity Group, through its work in vessel debt portfolios, built up a substantial fleet across a number of asset classes, peaking at 86 vessels in 2020. It has since sold the dry bulk vessels, multi-purpose product vessels, and container vessels it controlled, but continues with chemical and product tankers, "where we think the market has legs," Mr Mangos says.

"We were able to draw from the best of all worlds," he says. "We put together a topflight management team, a very well capitalised system, and substantial assets under management."

On the cargo side, the company has deep relations with a large number of clients, oil and chemical companies. While SOKANA has maintained a fairly low profile, it remains a very well-recognised brand within the chemical and product tanker industry and is particularly well-known in northern Europe, owing to its Nordic roots.

Being more efficient

With product and chemical cargoes shipments, SOKANA looks carefully at all of the individual parcels in its cargo program to work out optimal configuration to move them around the world.

Re-arrangements can be done post fixture. "We're always looking at the tank configuration and how we can optimise the total earnings of the vessel," says Mr Mangos.

"We've had situations in the past where, albeit rare, it's made commercial sense to move parcels from one ship to another ship."

Even if a vessel is in operation carrying a cargo, it may be possible to change something to achieve efficiency or cost savings. It draws on high levels of both human expertise and digital technology. "Hard work lies at the bottom of it," he says.

"The focus is not on metrics like utilisation or on sequentially fixing ships. The focus is on the bottom line [earnings] of the vessels across the fleet and capturing value at all points of the cycle. That's quite a different way of approaching the market."

A typical commercial manager will "fix the vessel at the top of the tonnage list, then park it and move to the next ship."

Aligning incentives

SOKANA's focus is on "breaking the barriers down and having everybody working together, sharing information, maximising efficiencies, having a common interest and operating the system as close to the vertical as possible."

The differing incentives and objectives of different parties can make it very difficult to get everybody working together.

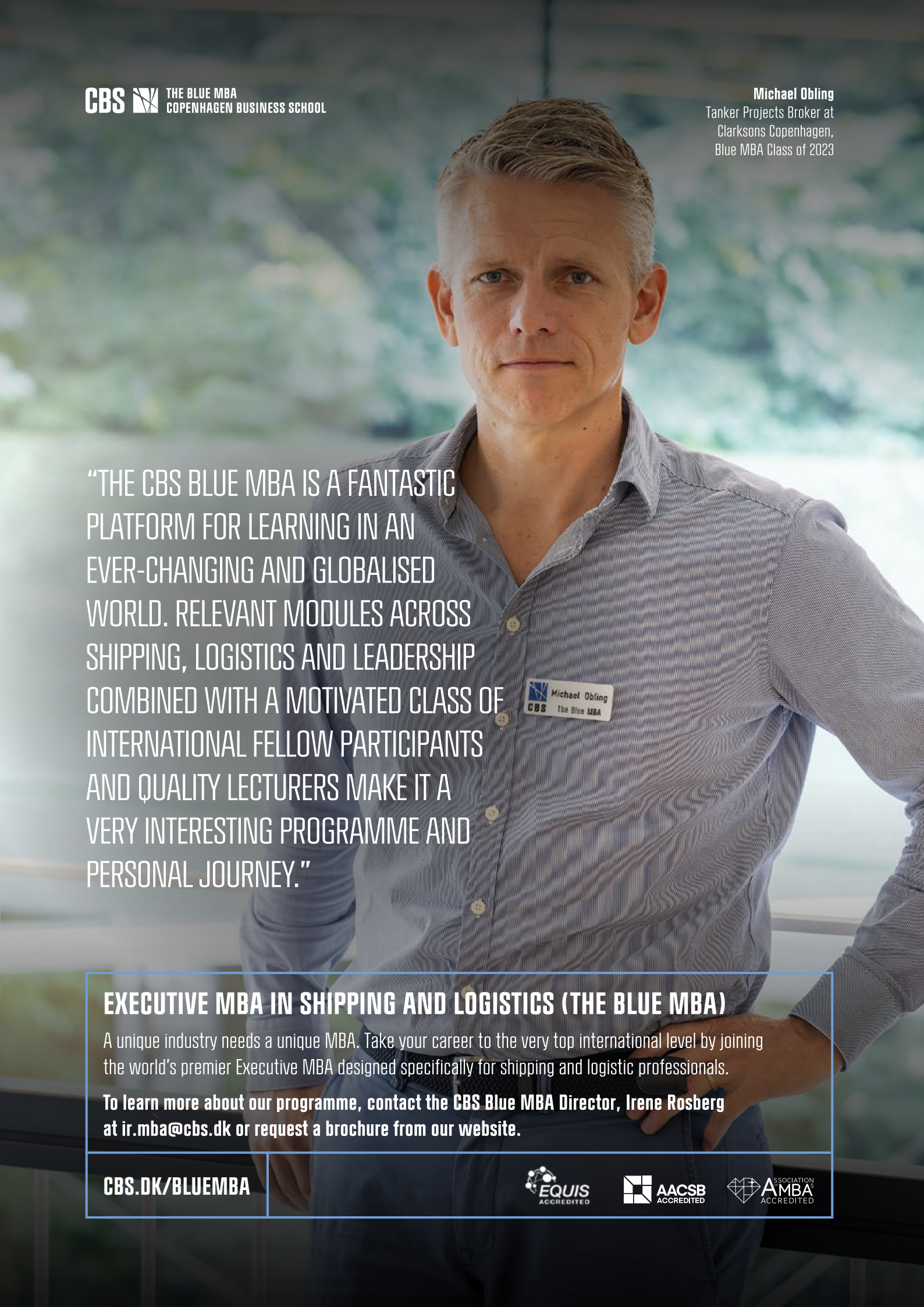
For example, driven by intense competition, the key objective measure of success for technical managers is minimising costs; but for SOKANA's purposes, maximising vessel availability and operating flexibility is key. So, spending more on ship management yields dividends.

Mr Mangos sees the effort to get people in different roles working together as analogous to coaching a sports team, where people are playing in different positions but work together to get the best overall result.

Digital

Continuing the sports team analogy, Mr Mangos sees digital tools as things which are there to support people to make better decisions, not something to make decisions in themselves. "To say we will replace the 'driver' with machine learning, I do not see that," he says.

TO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Clarksons – how UK CO2 tanker market may evolve

The UK's carbon capture and storage industry may require 40 CO2 carrier vessels by 2030, and it won't have them. Shipbroker Clarksons analysed the situation

By Elwin Taylor, consultant, CO2 and green ammonia, Clarksons

A recent report by the Carbon Capture and Storage Association (CCSA) and Zero Emissions Partnership (ZEP) estimates that up to 40 CO2 vessels will be needed to service UK North Sea CCS projects by 2030.

Even if not all these projects come on stream within this timeframe, 2030 is now less than six years off.

So while this requirement may not be impossible to meet, it does represent a challenge.

By way of comparison, it took ten years, from 1951, to get 45 very small LPG carriers on the water in Europe at the same time.

And the LPG fleet grew incrementally in line with a steady growth in LPG production and demand. Liquefied CO2 shipping is expected to start at something much closer to scale – at least so far as industrial and power emissions are concerned.

No need to wait for the emitting plants to be constructed – they already exist.

Which is why the start-up of so much projected CCS activity is congested into the 2027-2030 period.

Ignoring issues of potential shipyard bottlenecks (a factor that did not apply in the 1950s with a substantial European shipbuilding base and quicker construction times), the question is: where are these ships going to come from?

Will there be enough CO2 carriers? Image courtesy MOL

Contract or speculation?

There are two basic supply scenarios.

The first sees ships built for long-term charter (say 15 years) against specific projects. In this set-up, the ships could be built for one or more of the project partners. Or they could be built for the account of a third-party shipowner and time chartered to the project.

In the second scenario, ships would be built on speculation by shipowners anticipating future demand.

Today we see examples of both these models.

On the one hand, four 7,500 m3 medium-pressure ships have been ordered as components of the Northern Lights project.

At the same time, Capital Maritime has ordered four 22,000 m3 low pressure ships on speculation.

Assuming that the Capital ships are employed in the North Sea, these orders go some way to addressing anticipated vessel demand. However, a significant theoretical delta remains.

Will this shortfall be made up by further speculative orders? If not, CCS projects will not be able to pick up ships off the market as and when they need them.

And in that case, projects will have to take a much more proactive approach to securing tonnage ahead of start-up.

Analysing CO2 risks

Risk is always easier to manage in an established market, especially if new vessels are as future-proofed as possible.

Where there are well-forecast patterns of supply growth (today's Very Large Gas Carrier market would be a good example), speculative building decisions are more easily taken.

Construction and financing costs loom large in the equation, as will analyses of the order book and growth in LPG supply. There is an underlying assumption that supply growth will be absorbed. This is important because demand is less easy to forecast and involves assumptions about GDP.

When comparing CO2 to a normal traded commodity, everything is back to front.

The suppliers pay the receivers. Consequently, the equivalent to an analysis of supply would be an analysis of sink capacity.

These projects are well known. An analysis of the volume of emissions seeking storage is less straightforward.

Will it materialise, or will the underlying industrial activity be shut down? Or relocated?

How far will volumes need to be transported? That will depend not only on the distance to the possible sink locations, but also on the cost of storage, which is today a largely unknown factor.

When it comes to waste grade liquid CO2 shipping, an actual market does not yet exist.

1970s LPG comparison

It is worth looking at the past experiences of gas shipowners ordering vessels speculatively for projected markets.

There are several examples to choose from, and one seems particularly instructive.

In the mid-1970s, an idea took hold that gripped the imagination of traders and shipowners alike: significant LPG import demand would develop in the USA, sometime around 1980.

Everyone agreed. Consultants, brokers, in-house studies, all projections intersected in a pot of gold at the end of the rainbow.

There were seemingly good reasons behind this belief. The US energy shortage was brought

into focus by the 1973-74 oil embargo and price shock. At the same time, the global supply of LPG was growing. US demand for peak-shaving, synthetic natural gas and petrochemical feedstock usage was taken for granted.

All that was missing was adequate terminal and storage infrastructure – and the ships.

The owners duly obliged, with a major construction programme of large and very large fully-refrigerated units.

But the producers and consumers let them down.

The LPG producers were, of course, the same as the oil producers. They did not see a compelling need to undercut their core business with what they viewed as a valuable product in its own right.

Volatile and eccentric pricing policies made things worse.

Consumers saw no compelling reason to pay premium prices for an unpredictable new energy source/feedstock.

Then recession struck, demand remained static, Canadian pipeline volumes picked up, and terminal projects were cancelled. Deregulation of natural gas delivered the coup de grâce.

Even for those ships which did fit into the existing terminals, seaborne imports into the US were far less than forecast.

What about the speculatively ordered ships? Well, they didn't do nothing, although some experienced periods of layup.

A level of alternative LPG employment was found, but Japan was already well served by Japanese tonnage. Low paying clean petroleum products were an option.

For the smaller ships there was ammonia, then as now, at a freight discount to LPG.

On the positive side, some of these ships also found work in higher-paying petrochemical gases, but in fierce competition with even smaller semi-refrigerated units.

In the end, none of it related to the base case on which several ship orders had been predicated, and for long periods hire levels did not cover operating costs.

What could go wrong with CO2?

So what could go wrong with projections for CO2 demand?

Firstly, the activity is mandated by government policies. What if these change? What if net zero 2050 becomes 2060? What if de-industrialization is the de facto answer to carbon emissions? Or producing plants are relocated to more sympathetic territories? What if the carbon price stays low and it makes more economic sense just to pay the tax?

Don't forget, this is a sub-zero value material, with no direct commercial rationale that the owners can fall in behind.

And then there are some technical factors particular to CO2.

The most important is the lack of certainty as to which containment system to commit to.

Will the market call for medium-pressure ships? Or will the low-pressure type find favour? Or the elevated-pressure design?

From a commercial perspective, each has its own strengths and weaknesses. But until there is a far greater degree of definition coming out of the projects, the choice of containment system represents a further layer of speculation.

If low-pressure CO2 ships are future-proofed to carry fully-refrigerated cargoes (e.g. LPG, ammonia, or even ethylene), they will be more costly than the non- CO2 ships competing in the same trades.

That was not the case with the 1970s gas carriers built against the US LPG import story.

As for medium-pressure ships, they would represent fully-pressurised/partly-refrigerated LPG carriers. From a commercial point of view, there is a very limited role for ships of this type larger than 11,000 m3.

None of these elements may come into play. But they must still form part of an owner's evaluation.

Not every shipowner sits in the same place on the risk spectrum. The fact that some speculative orders have occurred is proof of that.

Yet although there are many owners seeking to enter the world of CO2 shipping, the existing owners/operators of semi-refrigerated ships (technically speaking these are the closest to low- and medium-pressure CO2 designs) have yet to show interest in speculative construction. They are not without experience of illiquid, and at times over-built, markets.

Charterer's perspective

From a charterer's point of view, a decision to wait for owners to go ahead and build ships is a speculation of the reverse kind.

There are three possible outcomes.

The first is over-construction. That would yield a very happy result for the projects. Apart from freight competition there would be the possibility to reduce the period of commitment.

The second is that just enough ships are built speculatively to ensure a good balance of supply and demand. Not the worst result, taken all in all.

The worst possible outcome for projects is the third, which is that not enough ships are built. That will mean dramatically elevated freight rates, damaging the cost model, and with the few owners who have built on speculation being handsomely rewarded.

Still worse would be the inability to ship product at all, with the investment in costly and now redundant capture and sink facilities potentially wasted.

And by then it will be 'rien ne vas plus' - too late to wish that you had placed a different bet.

Safety at Ardmore Shipping

Ardmore Shipping's marine manager Abhijit Ghosh explained the company's tool for rating crewmembers on safety performance, its safety champion program, how it learns from incidents and its perspective on SIRE 2.0

Ardmore Shipping, a company based in Cork, Ireland, which manages about twenty-two product and chemical tankers, has interesting projects to support its safety performance, including a tool where seafarers can rate others on their safety performance, a safety champion program, and making 3D animations to help people in the company learn from incidents.

Abhijit Ghosh, Ardmore's Marine Manager, told Tanker Operator what the company is doing. He also shared Ardmore's perspective on OCIMF's SIRE 2.0 and Starlink satellite communications.

Mr Ghosh has been with Ardmore since July 2017, and works in its office in Cork, Ireland. He worked at sea for 15 years on a range of tankers, reaching the rank of master, and has worked ashore since 2006.

Rate your colleagues

Ardmore provides crewmembers with an app where they can anonymously 'rate' the safety performance of their colleagues. It is now running on all vessels.

Every crewmember is able to assign a safety rating to any other crew member, including the master.

The rating is on a scale of 1 to 5, with one being 'not satisfactory' and five being 'exceptional'

The criteria are not just about technical skills and behaviour. It is also about soft skills, safety awareness, leadership, and ability to accept and learn from mistakes. Ratings are submitted separately for different skills.

Ardmore uses the data "to know our crew better, their behaviour, their level of performance, the soft skills, the weaknesses," Mr Ghosh said.

The objective is about supporting the development of skills, not just to assess them. It is a way for the company to get a better understanding of crew and improve safety culture onboard.

The company can assign people to training if it believes it will fix something.

Abhijit Ghosh, Marine Manager, Ardmore Shipping

The system has now been running for a "couple of years." Crew have given it a good response, he said. While most of the ratings are good, there are some poor ones, which can be looked into further.

Grudge ratings?

It is possible that one crewmember may give another a low rating, due to personal friction between the individuals.

Ardmore is aware that personal friction may be a reason behind a low rating but believes that its investigations will make this clear. Ardmore investigates any time someone receives a low rating, to try to understand the cause behind it, Mr Ghosh said.

It may start with a private discussion with the master, who could be aware of a personal friction.

Another way to determine any 'grudge rating' is by comparing it to other ratings. Any individual may have 30-40 ratings over 2 years. Ardmore staff can remove certain ratings from the calculation of the average if they believe it should not be included. And if it is included, one bad rating would not make much difference to the average.

Ship staff do not have direct access to the platform, so do not know directly if they are given a low grade.

"The majority of the responses are positive, people are taking it in the right spirit," Mr Ghosh emphasised. "Over a period of time it becomes a very good tool."

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Safety Champion

Ardmore has been running a "Safety Champion" program for a number of years, where every quarter each vessel is asked to nominate their "safety person of the quarter," based on a person's initiatives and contribution to safety drills and meetings.

The company's office staff review the nominees and choose a winner for the whole company, who receives an iPad.

"This has been a hugely successful program for us," he said. "It motivates our crew; it also gives recognition to the crew."

"We see a lot of good contributions, brilliant ideas coming from the ships, even from junior ranks."

3D animations

To ensure that the crew learn as much as possible from any major incident, Ardmore aims to create a 3D animated video showing what happened, "as close as possible to the actual incident," he said.

Thorough written reports are created after any incident, but a video can convey what happened in a way which is easier to absorb, he said.

SIRE 2.0

Mr Ghosh sees SIRE 2.0 as "a step in the positive direction."

"The objective is very good," he said.

"It is something very positive happening in the tanker industry

the industry was waiting for this."

"It is definitely going to help us to increase safety in a proactive manner, to have a better culture onboard, better performance, better safety record," he said.

SIRE 2.0 "is going to focus a lot on the human element," he said. "That gives us a very good foundation to develop the human element side of [operations].

Ardmore has participated in the SIRE 2.0 trials and has staff on the INTERTANKO vetting committee.

"The best training we can have for the crew is if they go through the trial inspections of SIRE 2.0," he said. "We had two trial inspections last year, this year we had one, there will be a few more trial inspections on our ships."

"The inspection process is entirely different from the existing inspection process. There is some amount of office administrative work involved. We are looking into how to get things organised."

"There's going to be a lot of interaction between the inspector and the crew onboard," he said. "One of our biggest challenges is to train the crew and prepare the crew in that direction."

Its joint venture partner company Anglo-Ardmore Ship management Ltd has developed training modules for ship staff.

Based on the feedback on the SIRE 2.0 trial inspections so far, there is an expectation in the industry that the number of observations is going to rise across the Industry, he said.

"The average observations at this moment with existing SIRE in the industry is around 2.5 observations per inspection. With SIRE 2.0 it could be in the region 5 to 7. That's going to happen across the industry, not just any single company," he said.

The main reason being, one deficiency or non-compliance can lead to one or more than one observation under three sub-categories, relating to hardware, process, or human element.

Starlink

Ardmore is installing Starlink communications systems across its fleet. As a high speed and lower cost communication system, this makes it viable to do high quality video communications between the office and crew.

"Starlink is really helping us to connect better with the crew," he said.

"It is very easy to connect with the ships. We can jump into a meeting at very short notice. That is really helping us." TO

How Norwegian Shipowners' Association members are decarbonising

Members of the Norwegian Shipowners' Association plan to only order zero emission technology vessels from 2030. Staff from the association, and from members Odfjell, Klaveness and Wallenius Wilhelmsen, explained further

Members of the Norwegian Shipowners' Association have announced that they will only order zero emission technology vessels from 2030, said Helene Tofte, Executive Director, International Cooperation and Climate, Norwegian Shipowners' Association.

Prominent tanker operators in the association include Altera Infrastructure, Westfal Larsen, Odfjell and Torvald Klaveness. Frontline is not a member. The members are about half in 'traditional' shipping and half in offshore (oil and gas or wind).

The association's climate 'strategy' has evolved over 2020 to 2024 from an ambition to a 'streamlined position,' she said.

59 per cent of members believe that their entire company will be climate neutral by 2050. Asked which fuels they thought they would be using, 55 per cent said biofuel, 53 per cent ammonia, 52 per cent electricity hybrid, 50 per cent methanol. Companies were able to pick multiple options.

The largest barrier to decarbonisation is still access to alternative fuel, said 68 per cent of members.

In 2024, the Association published scope 1 and 2 emission figures for its members' fleet for the first time. It found that members' global emissions added up to 24m tonnes a year, equivalent to more than half of all emissions made in Norway. Members also account for 3 per cent of global shipping emissions.

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Only 1.2m tonnes of member emissions were in Norwegian waters. (most member emissions were made outside Norway). Members' emission intensity (emissions per weight of cargo carried) reduced 25 percent since 2008.

Norway is part of the EU Emission Trading Scheme, so cargo owners pay for the emissions they make in the EU. However, members are not finding their customers particularly willing to pay extra for lower emitting vessels, she said. "Members have to finance it themselves."

Odfjell

While carbon intensity has gone down from shipping (emissions per transport work), the actual emissions has not gone down so far, noted Øistein Jensen, chief sustainability officer of chemical tanker operator Odfjell.

We should not take too much comfort from the reduction in carbon intensity, since the climate is affected by the actual emissions, not the intensity of them. Intensity can be reduced simply by switching to a bigger vessel, but that means more emissions overall, he noted.

Odfjell is based in Bergen and operates 80 vessels.

Odfjell hired a yacht so it could teach its crews the basics of sailing, before installing suction sails on a chemical tanker

The company has already seen impacts of climate change, including its Houston office being closed because of a tornado, the shortage of water in the Panama Canal restricting transits, and extremely high temperatures in the Philippines having an impact on staff, he said.

Decarbonisation from this point forward "is going to get tougher," he said, such as with incoming European Union rules.

Mr Jensen foresees that Fuel EU Maritime will have "significantly more impact than the Emission Trading Scheme." It will force the use of lower carbon fuel, rather than simply adding a cost to emissions. Companies have complex options to consider, such as whether to place the vessel in a Fuel EU Maritime 'pool'.

Mr Jensen would like to see revenues from

Øistein Jensen, chief sustainability officer of chemical tanker operator Odfjell

EU ETS going back to the shipping industry. For example, "it can't go to agriculture in Bulgaria," he said.

Biofuel "will not solve the problem in the long term," he said. And shipping companies cannot rely only on new fuels for decarbonisation.

What is available right now is decarbonisation through retrofits and operational improvements. Mr Jensen estimates that emissions can be reduced 5 to 20 per cent through more efficient machinery, and by 5-15 per cent through thinking more carefully about hydrodynamics. Odfjell is currently testing air lubrication, using Alfa Laval's OceanGlide, with a 4.5mm air layer under the hull.

Odfjell plans to test suction sails on a chemical tanker late in 2024 or early 2025. The deck of a chemical tanker is "quite complex" with a large amount of pipework, which makes it hard to fit sails, he said.

In preparation, it has started training the vessel's crew in the basics of sailing, using a yacht (see image).

So far, customers have not shown much willingness to pay extra for low carbon transport, he said. "We asked customers if they were willing to pay more for biofuel - they didn't reply to our emails. "

Odfjell has prepared a framework for sustainable finance, where the financing is related to achievement of climate targets. 69 per cent of its total debt is linked to climate in this way, he said.

"This opened up for new investors, and we have seen positive effects through reduced rates and ability to access financing with good terms."

Klaveness

Ernst Meyer, CEO of combination carrier operator Torvald Klaveness of Oslo warns that the drive to decarbonise shipping has a negative impact on the resilience of the industry in many ways.

Decarbonisation requirements are adding three months to the typical time taken to build a ship, because of the added complexity of building a lower carbon ship. Owners are discouraged from ordering new vessels, since they don't yet know which vessels will be most profitable in a low carbon business environment. Slow steaming means that fewer vessels are available.

The industry could be much more efficient, he believes. "The co-ordination in the industry is close to zero. The contractual regimes were designed in the 60s and 70s. The problem is too many stakeholders benefit from inefficiencies."

To get to net zero, another fuel will be needed, he said. While low carbon fuels are more expensive, it will hardly make any difference to the total cost of the product plus transport, such as the cost of making a loaf of bread from grain transported with low carbon fuels.

Wallenius Wilhelmsen

Ro-ro and vehicle logistics company Wallenius Wilhelmsen has an ambition to be net zero by 2040. "That's a huge challenge [but] we strongly believe this is possible," said Jon Tarjei Kråkenes, head of its "Orcelle Accelerator" decarbonisation project.

Also, by 2027 "we want to be able to provide a net zero end to end service as a showcase," he said.

It has ordered 12 'shaper' vessels able to run on methanol, and 'ready' to be converted to ammonia, for delivery from 3Q 2028.

The company's customers, car manufacturers, take more interest in vessel performance than customers in other shipping segments, probably because they are close to the final customer of the product. This is not the case for example for steel and oil traders.

Buyers of EV cars in particular take an interest in how they are shipped, he said.

The company is using 10 per cent biofuel. It is able to issue its customers with "CO2 equivalent reduction declaration certificates," so its customers can reduce their own Scope 3 emissions.

Slow steaming is not seen as much of a solution, since it reduces the amount of cargo which can be carried in a year and may not be acceptable to customers.

The company is installing increasing numbers of sensors to gather data about performance. "Voyage optimisation is something we are really focussing on," he said. "What's the right speed, how to sail around storms. Reducing speed without sacrificing transit times."

It is looking at low carbon fuels. In future there will be a "much more complex fuel market than we see today," he said.

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Furetank's sustainability report

Tanker operator Furetank of Sweden released its 2023 sustainability report in May showing its progress with high performance vessels, overall decarbonisation, training, and employee wellbeing

Furetank, an oil and chemical tanker operator based in Gothenburg, Sweden, released its 2023 Sustainability Report in May 2024, showing admirable progress with high performance vessels and decarbonisation, crew training, low carbon fuels, female crew, and crew wellbeing.

Furetank operates twenty tankers sized between 15,000 and 19,000 dwt, with another twelve vessels on order from the China Merchants Jinling Shipyard in Yangzhou for delivery between 2024 and 2026.

Of the twenty vessels in operation, 9 are its high performance "VINGA" vessels. All twelve on order are "VINGA" vessels.

Furetank's FURE VINGA

While new tankers of this size are required to get a EEDI score of below 8.38 since 2020, the FURE VINGA received a score of 4.64. This is "the best result achieved in the size segment so far," said Lars Höglund, managing director of Furetank, in his introduction to the report.

"We feel that our decision back in 2015 to develop an advanced and extensive environmental vessel technology has proven to be right. This is the direction in which society, politics and people want us to move."

"Every single system has been improved into a unique combination of interacting, energy-saving technical solutions."

The VINGA vessels were designed by Furetank and FKAB Marine Design in collaboration with Wartsila.

Mr Höglund said he had seen a growing interest among young people to start their career working at Furetank, "which we believe is connected to our green ambitions and state-of-the-art technology."

Lars Höglund, managing director of Furetank

Norwegian energy company Equinor agreed time charters until 2029 for two VINGA vessels during 2023, he said.

Also, during 2023, Sweden's minister of infrastructure Andreas Carlson visited the FURE VINGA vessel and opened up a politics and industry dialogue, he said. It may help Sweden as a nation to give more recognition to its merchant fleet.

Technologies

The VINGA vessels have batteries to temporarily store surplus power generated, reducing use of auxiliary engines; they have a ducted propeller to reduce the power requirement; and they have an improved hull shape to minimise drag.

There is a shaft generator on the main engine, so surplus engine power can be used to generate electricity.

The electricity supply can run at variable frequency, so its consumption by rotating devices such as pumps can be adjusted.

The vessels can run on LNG fuel. The plan is to gradually replace it with by liquefied biogas (LBG).

The vessels can also run on shore power. FURE VINGA was the first tanker in Europe to operate its cargo pumps on shore power, supplied at 6.6 kV. All further VINGA vessels will have this capability. The shore power solution is being developed in collaboration with the ports of Gothenburg, Rotterdam and Gävle.

Port emissions can be up to 20 per cent of total emissions, Furetank said, so this can have a major impact on overall vessel emissions.

Quantifying the benefits

Furetank asked the Swedish Environmental Research Institute (ivl) to perform an environmental assessment of the measures, comparing emissions from a new vessel with earlier generations of ships in the same market segment running on MGO.

It found that CO2 emissions were reduced by 55% when running on LNG.

This means the VINGA vessels have already passed IMO's emission target for 2030 to reduce emissions per transport work by 40 per cent.

The Environmental Ship Index (ESI), founded by the International Association of Ports and Harbors (IAPH), identifies vessels that perform better in reducing air emissions. It grades vessels from 1-100. The VINGA vessels were graded between 97 and 100.

The Clean Shipping Index (CSI) [from Swedish Environmental Research Institute] is a labelling system of vessels' environmental performance. The scale spans from 1-5 and all VINGA vessels received a five.

Vessels were operated on diesel rather than LNG at some periods during 2023 due to lack of availability, and this increased emissions.

Noise

The VINGA vessels achieve noise reduction by using low noise electric cargo pumps, low noise compressors and engine room fans whose power can be adjusted using the variable frequency drive. They also have noise reducing silencers.

Noise on the bow was measured at 63 dB compared to 80 dB on conventional vessels; noise on mid deck was 64 dB compared to 84 dB on conventional vessels; and noise at the stern was 72 dB compared to 83 dB on conventional vessels.

Crews say the difference is most noticeable in ports when discharging or manoeuvring, when there is both less noise and less engine vibration.

"People can rest better on board. It is a big change and a clear difference from all previous vessels that I worked on," said chief officer Rico Charles Lim.

There was a particular reduction in lower frequency noise, which is particularly noticeable to the human ear.

The study also found that the VINGA vessels emitted less noise in the water. Underwater noise was reduced with the help of the ducted propellers, and a lower than usual design speed.

Reducing methane slip

Furetank together with Wartsila is testing two technologies onboard with potential to halve the methane slip.

A "greenhouse gas reduction package" controls the engine more closely in demanding conditions like manoeuvring, harsh sea conditions or varying fuel quality, to optimise combustion.

A "low load optimization" package reduces the methane slip at low engine loads, for example during loading and discharging, by balancing the loading of each engine cylinder.

Tests both in the laboratory and sea showed methane slip reduced by 45-50 per cent, it said.

The technologies will be implemented in all new VINGA vessels and retrofitted into existing vessels.

LNG to biogas

Furetank was an early adopter of LNG fuel, converting its vessel FURE WEST to dual fuel LNG propulsion in 2015.

Furetank chose LNG fuel among the various options for lower carbon fuels, because a vessel can have storage capacity for 30 days at sea without bunkering. It is viable today and likely to be a viable fuel for the next 20 years.

There can also be a transition to using liquefied biogas, made from organic waste.

In 2018, its vessel FURE VINGA was the first vessel to bunker biogas in Sweden. In March 2021, it bunkered "CO2 compensated LNG" in Spain.

Use of chemicals

The VINGA vessels only use biodegradable lubricants, which makes them less harmful to the ocean if any accidentally spills.

The vessels do not have sacrificial zinc anodes to prevent the hull from corrosion, as many tankers do in European waters. These release zinc and cadmium into the ocean. Instead, it uses aluminium.

Furetank is trialling an ultrasonic fouling system for onboard cooling systems, which use seawater to cool equipment such as engines. This replaces a standard copper rod anti fouling system, which discharges copper into the sea, Furetank says.

To prevent engine lubricant oil entering the water through the space around the propeller shaft, the vessels use a Wärtsilä Airguard seal. This applies compressed air into a space between two seal rings, at higher pressure than the seawater pressure, so seawater cannot get through. Also, any lubricant oil or seawater which gets into the void space is drained into the vessel. It also sets off an alarm.

Furetank is trialling graphene-based hull and propeller coatings, and copper free anti-fouling.

For ballast water treatment, the vessels use the PureBallast system from Alfa Laval which uses ultra-violet light, with no chemicals required.

Joint venture with Algoma

Furetank has expanded its planned "FureBear" joint tanker operating venture with Algoma Central Corporation of Ontario, Canada, with the number of ships to be in the venture increasing from 8 to 10. The first of these ten, FURE Vanguard, was delivered in February 2024.

The vessels will be entered into the Gothia Tanker Alliance and operated by Furetank.

A factor supporting the decision to expand this joint venture was the growing demand for biofuels and other renewable liquid fuels in Europe, Furetank said. These fuels are suited to being transported in intermediate sized tankers.

A low emitting tanker helps ensure that the emissions from the tanker do not negate the environmental benefits from using a biofuel.

New crew training centre

Also in August 2023, Furetank opened the Donsö Maritime Training Centre (DMTC) in its former office building. This is an advanced ship simulator complex for training, assessment, and certification.

The simulator has 11 x 75 inch (1.9m) displays in portrait orientation,

giving a 240 degree horizontal field of view and good vertical height.

There is a simulated bridge wing, tug simulator and engine room simulator. It can train fourteen students at a time. As well as standard navigation and cargo handling training, it can train students to bunker LNG fuels and work with shore power.

The centre should help expand the number of Swedish students training to be seafarers. Finding competent personnel is one of the greatest challenges in maintaining and expanding operations, Furetank says.

Chartering

Furetank manages chartering in-house. It believes this enables the company to better serve its customers, such as by being able to swap vessels if one is late.

The chartering department also operates vessels owned by Erik Thun AB, Thun Tankers, Älvtank, O. H. Meling, DSD Shipping, CMI, Transport Desgagnés Inc and Furetank's new joint venture with Algoma, named FureBear. As of 2023, it operates 21 tankers sized 15,000 to 18,000 dwt, and they are mainly in northwest Europe.

Its vessels spend only 38 per cent of time in ballast, compared to 53 per cent average for the market for ships of this size. This is achieved through the chartering department's success in finding 'triangulation' voyages, where a vessel can carry cargo for part of its return leg.

As well as reducing costs, this also reduces emissions per tonne of cargo carried.

Male female balance

Furetank has been working to attract skilled female seafarers for many years. Today it has six female senior officers, five female junior officers, and three female ratings.

CEO Lars Höglund believes that gender-balanced crews "bring a more pleasant atmosphere on the vessels."

"As in all industries, a diversified workplace in terms of gender and cultural background is a good thing," he said. "It helps us all grow as people and colleagues. If we are all similar, we can only move in a singular direction."

In 2023 it appointed its first female captain, Therese Boman. "Shipping has traditionally been a strongly male profession, so it is a great thing that more and more women are making their way here," Ms Boman said. "The more females there are in the industry, the more want to join".

Employee well-being

The VINGA vessels have a gym, sauna and "pleasant living quarters" onboard. All employees receive healthcare insurance.

"The ships are modern, spacious and nicely furnished," said Ellinor Brandt, chief officer on a Furetank vessel, in the sustainability report. "I enjoy very much that they offer a lot to do outside work hours and that we are a great team on board. I feel that I can always call people in the office for support."

"Furetank has put effort into recruiting young people, women, and people from different backgrounds. I think that benefits us." TO

The full report is available online at **https://www.furetank.se/about/sustainability-report**

Survey: crew stress from decarbonisation

Decarbonisation requirements are adding to crew workload, stress, fatigue and fear of legal trouble. An ISWAN survey explored

The International Seafarers' Welfare and Assistance Network (ISWAN) conducted a survey of seafarers and shore staff to find out impact of maritime decarbonisation on wellbeing.

The survey followed concerns in daily conversations with seafarers that seafarers' wellbeing is being overlooked in the pressure to decarbonise.

ISWANN wanted to look at the impact that the rapid adoption of new technologies and regulatory regimes is having on crew mental health and job satisfaction.

An interesting insight from the survey is that seafarers on vessels with fixed trading patterns are finding decarbonisation easier, perhaps because they knew what fuels would be available, and had time to get to know the local regulations.

The biggest causes of stress were complicated and mixed regulations, multiple requirements to enter data, and fears of criminalisation from getting something wrong. Crew often feel that technology and systems is being pushed on them before being thoroughly tested, they are not being trained properly to use it, and they are not compensated enough for the extra work that decarbonisation requires.

The survey received 400 responses from seafarers, including crew from 29 different nationalities. The majority were from India (43%) and the Philippines (16%). The largest number of responses were received from engineering officers (43%), followed by deck officers (39%).

38% of respondents worked on oil tankers, 25% on chemical tankers, and 20% on general / bulk carriers. 43% were in engineering, 39% on deck, 8% electrotechnical, and remainder were ratings, cadets or galley.

From shore-based staff, responses were received from 55 staff of 17 nationalities, with the largest number of responses from staff from India (38%), the United Kingdom (13%) and the Philippines (11%)

Results

70% of respondents reported that environmental regulations relating to decarbonisation have a big (44%) or moderate (27%) impact on their work.

Are decarbonisation requirements adding to crew stress? Photo: Bigstockphoto

Just over half of respondents had a positive impression overall of decarbonisation regulations and technologies and said that the efforts to improve them led to a positive effect on their wellbeing. Around a quarter said they felt the overall impact on their wellbeing was negative. Deck officers were more supportive of decarbonisation efforts.

Just over half of respondents said that adapting to new technologies and regulatory regimes had added to their workload; 44 per cent of respondents said that it had led to an increase in stress; 40 per cent said it led to an increase in fatigue.

When asked what were the biggest challenges decarbonisation was likely to pose for their work over the next five years, the most selected answer was increased workload and fatigue, followed by tensions between commercial pressure and regulatory requirements, increased maintenance requirements, difficulties accessing fuels, and complexity of regulatory requirements.

Shore based staff were asked the same question, and the most selected response was managing the complexity of different regulatory requirements, followed by tension between commercial pressure and regulatory requirements, and increasingly complex logistics.

What would help

When asked what ship owners and managers could do to help seafarers' wellbeing through the energy transition, the most selected answer was "Improved technologies, systems and processes."

Seafarers said that the development of a 'no blame culture' would help. Also greater uniformity of regulations.

Some seafarers said they feel that they are

being asked to implement new technologies that have not been adequately tested, and that the additional efforts and work that the zero-carbon transformation demands of them is not appropriately acknowledged.

Seafarers said they are often asked to report the same data multiple times and comply with different overlapping regimes. This also leads to fears of errors and resulting criminalisation.

Deck officers were more likely than engineers to report negative impacts in relation to reporting and crewing considerations, including fulfilling inspection requirements and maintaining up to date training.

Almost a third stated that the raft of change brought about by decarbonisation was leading to an increased fear of criminalisation as a result of administrative errors or inadvertently contravening one of the overlapping environmental regulatory regimes.

Fixed trading patterns

Decarbonisation was proving easier for seafarers working on vessels with fixed trading patterns, perhaps because they have a better idea of what fuels will be available along their route, and they get to know the inspection regimes and applicable rules.

47% of crew on vessels with partially fixed trading patterns said that the effort of having to use multiple grades of fuel was having a negative impact on their work. This compared to 24% of crew working on vessels with fixed trading patterns, and 34% of crew on vessels with no fixed trading pattern.

Amongst deck officers, the most significant negative impact on their work was fulfilling audit or inspection requirements. 31% of deck officers on vessels with no fixed trading pattern agreed with this, compared to 16% of officers on vessels with a fixed trading pattern.

Seafarer comments

"I am a big supporter of decarbonisation and taking steps to reduce our negative impact on the planet and our surroundings. I just wish it was done in a much better way."

"As [an] egineer, I say this impacts us the most. Whether you install new ballast treatment, or scrubber system, or develop new technology engines to adhere with new regulations, you still add and change equipment which will be additional work to engineers. These are too much already. This will just be minor forms and reports to deck crew."

"I once was on board a ship with 3 different grades of fuel oil: ULSFO, VLSFO and LSMGO. The changeover procedure and its effects on all the other machineries are profound."

"After changes over to MDO [marine diesel oil], machineries start leaking because of its temperature changes and machineries age."

"They impact the safety also. Existing ships' engines are not designed to work with low sulphur fuels."

"Equipment designed for decarbonisation is creating more workload and issues and should be well tested before [being] put in use. Constraints on merchant vessels is much more than refineries ashore. Thus creating [a] much more difficult work environment especially for engineering officers onboard ships."

"[There is] a big risk of making mistakes due to different rules each local authority imposes."

"With failure of new machines, compliance is at stake and there is no leeway for this. Eventually, crew will be put to fault if any finding crops up."

"Extra paperwork and adherence to varying rules leads to fatigue and increases [the] probability of accidents and poor health."

"The ships are brand new, but nobody knows what they're dealing with. Even the manufacturers have themselves designed it for the first time. It's like a pilot project with testing being done on live sailing ships. The crew is having an extreme hard time with no shore assistance."

"No crew will stick with this troublesome thing for long despite the environmental aspects. In the end, more incompetent crew will join which will further degrade the quality, and safety will go for a toss."

"The profession becomes more complex, less attractive and operations are more difficult especially with reduced standards of training. Shipping operators don't give much attention to improvement of onboard operations."

"Seafaring is a long-lost industry now. Only those who have nowhere else to work will remain. The smart people will always find better alternatives to sailing at sea."

"Every port had [a] different set of rules in terms of fuel usage."

"A lot of complicated rules and regulations set by the shipping committee resulting [in] an extra load, thus extra stress and fatigue to the crew onboard."

"Too much pressure for compliance and reporting with no increase of manpower."

"Mentally one is under immense pressure with so much or regular checks."

"Complying to the new local and international regulation (e.g. CII) is additional work. The company is closely monitoring the consumption and small shortcomings means repeating of work."

"Negative effects are both physical and mental. Understanding the scope of change was a challenge because shore staff were also not clear how the change was going to take shape. Then cleaning and preparing the bunker tanks were a physical challenge. Use of different fuels required a lot of training and understanding. Maintaining machinery has added burden to already stressed crew.

"Stress levels are agitating due to demands... a simple fuel switch on every port call will give a big impact on a wellbeing of a person, especially if the port calls are every day."

"Some ports have regulations, some don't have. So, we have to change over to different grades of fuel frequently which is not good for the machinery and of course it affects our rest hours."

"Extra work, with [the] same manpower; frequent changeover affects the routines and frequency of overhauling of purifier, fuel pumps and injectors."

On online training: "that would definitely help inform the crew and reduce the stress of trying to figure out a new requirement or circular while also trying to do all other jobs and activities you have on a daily basis on board. Especially if all of that is coupled with inspections, PSC [Port State Control] and some stressful port operations."

Comments from shore staff

"The major downfall in all these is increased maintenance. But then companies are more focused in reducing the number of engineers and crew onboard. This is leading to excessive pressure on maintenance."

"The number of engine crew were always compromised. There should be regulation on this. Not only the crewing should decide."

"So many new things to implement, but wages and care from company is still the same.

"Why would the crew sacrifice their mental peace for someone else's experiments? Either increase remuneration or increase manpower."

"Prepare your ships well in advance and don't burden with information and queries at the last minute."

"Avoid producing big manuals, nobody reads it."

"Training is the key; no training is being provided for the new technologies coming in".

"Decarbonisation has led to many changes in the industry. Some crew are onboard vessels that used alternative fuels were not trained prior to their embarkation."

How to cut fuel 50% through operational methods

It could be possible to reduce fuel consumption 50 per cent with clever use of wind power and special use of air lubrication, according to Kongsberg / Deltamarin modelling

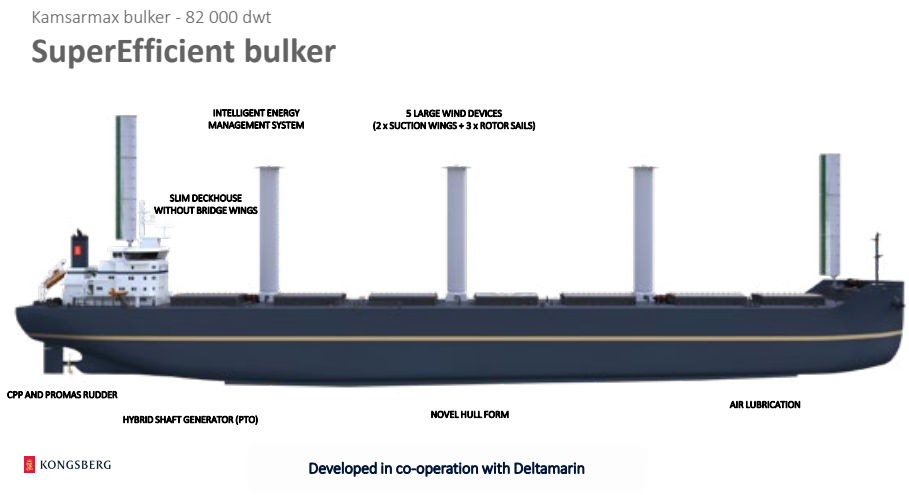
Conventional wind power modelling looks at how much wind power could contribute to a voyage with a specified route and speed. But more use could be made of wind power if the vessel could speed up when it has high winds in a helpful direction. The vessel could then go much slower when using conventional engine power.

A vessel can also do more with wind power if it has a mix of devices onboard. Different devices give their strongest propulsion force in different directions relative to the wind direction. So a mix of devices can take advantage of a wider range of wind directions.

The benefits of air lubrication could be improved if the vessel was sitting on the water with a slope on the bottom of the hull going upwards from stern to bow (so bow having a lesser draft). This could better trap the air under the hull, so less air bubbling would be required.

By using these two methods, alongside slow steaming, a shaft generator, controllable pitch propeller and integrated propulsion and manoeuvring system, it could be possible to reduce fuel use by 44 per cent on typical voyages and 56 per cent on the voyage across Atlantic westwards from Rotterdam to Sept-

Oskar Levander, SVP Business Development, Kongsberg Maritime.



Kongsberg's design for a Kamsarmax bulker with fuel reductions up to 50 per cent

Îles, Quebec.

This would be enough to enable a vessel built today to operate legally for the expected lifetime of the ship without being adjusted to use future zero carbon fuels, says Oskar Levander, SVP Business Development at Kongsberg Maritime.

The calculations are made on the basis that the vessel has a good onboard energy management system, a good hull and a good propeller.

The modelling specifically looked at a 83,000 dwt kamsarmax bulker (the biggest size able to use the port of Kamsar in the Republic of Guinea, 229m length).

The owner wants to ensure that the vessels can comply with CII for at least 15 years, without the cost of low carbon fuels. This would require reducing fuel consumption by 40-50 per cent compared to today.

Wind

The design chosen had five wind devices, of which two were suction wings and three were Flettner rotor sails. The vessel only had deck space for five devices.

By having a mix of devices, it was possible to take advantage of the fact that different sail designs give the most thrust in different directions. Also it was possible to use other advantages specific to certain designs, such as that rotor sails are easier to fold down, giving less wind resistance. This is a factor if you are sailing in any direction other than the wind direction.

Kites were rejected on the basis that they "are expensive and unproven", although could be promising, he said.

The modelling looked at the additional thrust the mix of sails would provide, with different wind speeds and directions, on common voyage routes.

It found that fuel savings from the sails were 20 per cent average sailing around the world. But when crossing the Atlantic ocean westwards, savings in total power usage were 31 per cent, and sailing the Atlantic eastwards to Rotterdam, there could be 38 per cent savings.

Further savings could be achieved if the vessel goes faster at times of high wind, and goes slower at times of low wind – while still arriving at the planned time. So instead of a

The super efficient bulker at sea (computer generated image)

steady 12.5 knots, the speed varies between 9 and 19 knots.

By doing this, the fuel savings increase to 38 per cent going westwards and 48 per cent going east, he said.

Air lubrication

Air lubrication is about having a layer of air beneath the vessels which reduces friction. It is normally done by bubbling air through the front of the bottom of the hull, so the ship sits on the air bubbles.

Kongsberg suggests that if the vessel sits in the water with a lower draft in the bow (so the bow is higher), this will trap air under the hull as the vessel moves forward.

This will mean less air pressure is needed to pump out air under the bow.

Kongsberg calculates that with a conventional hull, with 50 to 150m3 air per minute, there could be 5.2 to 7 per cent fuel saving. But with a wide, sloping hull there could be 9.8 to 11.7 per cent fuel saving. There would be a small energy penalty because this wide hull would have some greater hydrodynamic resistance to the water.

Other factors

"Power take off" technology, where surplus power of the engine is used to generate electricity, would be ideal for wind propulsion and air lubrication, providing power to run their air compressors and electric motors.

If the vessel is using wind power for much of its propulsion force, the load on the engine for propulsion will be lower, and so more engine load will be available to generate electricity, to power the suction sails.

A controllable pitch propeller, has an adjustable blade angle (pitch). This enables the propeller to be more efficient at a range of engine loads and speeds, so is very useful here.

The wind power would also contribute to the company's compliance with FuelEU Maritime, since wind is considered a 'fuel' in this context. Other energy efficiency technologies such as air lubrication do not.

Financially, the wind power and air lubrication would mean 10m euro capital expenditure, which would pay back in five years. "From our point of view it's a fantastic case for a shipowner," he said.

Tugs – better on batteries

The best combination of technologies to reduce emissions will be different for different ships and how they are deployed, he noted.

For storing electricity, batteries can be 80 per cent efficient, based on energy input compared to energy output. This is much better than using electricity to electrolyse water to make hydrogen and make an e-fuel, where the round trip efficiency can be as little as 22 per cent. But of course batteries are not suitable for all maritime applications.

Looking at the example of a tug, they spend a lot of time waiting, so fuel consumption is low compared to other ships. Most of the overall cost is in capital expenditure and crew. There is space for batteries and capacity to charge them.

Kongsberg modelled the relative annual cost (including both CAPEX and OPEX) of different tug propulsion technologies, including conventional mechanical propulsion, conventional plus charging a battery from the engine ('hybrid'), diesel electric drive with a battery, battery drive with onboard generators, pure battery (charged from shore with renewable electricity), an alternative fuel.

The pure battery system worked out at similar cost to the mechanical drive system but much lower emissions.

MAMII – understanding methane emissions in maritime

The Methane Abatement in Maritime Innovation Initiative (MAMII) seeks to better understand methane emissions both upstream of ships and from vessels (known as methane slip). Carnival and MSC shared perspectives

Independent research reports have claimed that large amounts of methane 'slips' through a ship's LNG engine uncombusted ('methane slip'). These emissions were quantified using measuring devices on drones operated by researchers near the vessel exhaust.

These reports also claim that enormous amounts of gas is leaked in the gas production system upstream of the ship ('well to tank'), which can be shown on satellite measurements. The reports say this means that there are very little overall greenhouse gas benefits from using LNG.

This data is now being promoted by people who "strongly oppose the use of LNG in any form," says Bud Dar, Executive Vice President for Maritime Policy and Government Affairs at MSC Group, which has 100 LNG fuelled container ships on order.

The data from ships may be correct, but does not acknowledge that LNG ships sailing today may have installed their engines 10 years ago, when greenhouse gas emissions was not such a priority, and the bigger focus was on reducing SOx and NOx emissions.

Since it has become a priority, there have been big technical advances, he said. Methane slip today from a two-stroke high pressure engine is "really nominal, almost completely gone." On four-stroke medium speed engines, "we are seeing great advancements," he said. This goes also for low-pressure four-stroke engines, "which tend to be the worst performing with regard to methane slip."

As for the upstream well to tank emissions, gas suppliers may claim the emissions are not so bad. The real problem is the lack of trustable data, he said.

Gathering better upstream methane emission data is something "energy providers need to address," if methane will continue to be acceptable as a means of reducing emissions. These emissions are harder to measure, quantify and certify than emissions from a ship.

If it is not addressed, the claims that emissions are very high will gain force. Energy companies "will have a much bigger problem on their hands with solving the rest of society's energy needs."

Methane emissions are still a big concern for shipping companies using LNG fuel. Methane is a more potent greenhouse gas than carbon dioxide per molecule. On the plus side, methane does not stay in the atmosphere for as long as CO2 does.

There are disagreements among scientists about how long methane should be considered to stay in the atmosphere, between 20 and 100 years. But even if you calculate based on 20 years, methane slip can form a significant part of a shipping company's overall emissions, Mr Dar said.

A direct financial concern is the 'weighting' of LNG fuel in the European Union Fuel EU maritime regulations, which require the gradual decarbonisation of fuels. The weighting is based on EU's assessment of the greenhouse gas impact of using methane fuel, considering both upstream emissions and methane slip.

The worse the EU takes LNG's lifecycle emissions to be, the less value LNG has a fuel to comply with FuelEU Maritime. It would be better if the weighting were based on the actual emissions of the LNG purchased and used in each case. But that would require granular data which is not yet available.

MAMII

A project has been set up by Safetytech Accelerator to explore the issues further, called the Methane Abatement in Maritime Innovation Initiative (MAMII). Safetytech Accelerator was established by Lloyd's Register. The objective, says Panos Mitrou, global gas segment director, Lloyd's Register, is to "put science behind our work and claims."

As well as finding out more about the actual emissions, it aims to develop better measurement, reporting and verification schemes, better understand the many technologies available to reduce emissions, and understand the costs involved.

Members of MAMII include Capital Ship Management, Celsius Tankers, Knutsen OAS, TMS Cardiff Gas, Seapeak, MOL, Maran Gas, CoolCo, Carnival Corporation, MSC, Seaspan Corporation, Chevron, Shell, TotalEnergies, Lloyd's Register and UK P+I Club. The website is https://mamii.org/ .

It is le by the Safetytech Accelerator program, which aims to accelerate technology innovation related to safety, solving technology challenges, and shaping technology strategies.

"It's a top priority for the whole industry to set up and establish a universally accepted methane measurement protocol," Mr Mitrou said.

"Without this, crediting performance and improvement will be impossible. Investment [in] and incentivization of technology development will also be impossible."

For the well to tank emissions, "there is, I would say, no excuse for majors and producers of gas to claim that this cannot be measured," he said.

"We have satellite surveillance and sensor technology that can be really sensitive and practically sort out the problem. We see methodologies and certification capabilities being available."

It would be ideal if shipping companies could identify which of their choice of methane suppliers have lower well to tank emissions, so they can preferentially purchase them.

"I feel confident that by the end of this decade we will have many more tools in

addressing the problem than we do today," he said.

Carnival Corporation

Cruise operator Carnival Corporation has 10 LNG fuelled cruise ships as of June 2024.

It started with LNG fuel back in 2015, as a means to reduce SOx and NOx emissions. At the time it was not allowed to carry LNG onboard, said Stuart Carpenter, senior director for LNG implementation at Carnival Corporation. So, it was used as a source for 'shore' power. A barge alongside the cruise ship in port had an LNG driven generator.

After the IGF code came into force in 2017, it developed a fully LNG fuelled cruise ship, the AIDAnova.

Today, LNG is a core part of Carnival's decarbonisation strategy. It is seen as a "framework," with fossil LNG to be gradually replaced by bio-LNG and then synthetic LNG.

Methane slip has always been a concern, he said. Carnival contributed to a study by the Society for Gas as a Marine Fuel (SGMF) in 2018 which showed that even with the methane slip levels at the time, LNG provided "some net benefits" for carbon reduction. But engines are much improved since then.

Data from testing the latest engines is "significantly better than the numbers in Fuel EU Maritime," he said.

The need to develop a consistent, accurate way to measure methane slip was one of the reasons Carnival joined MAMII.

"There are different manufacturers out there providing different types of technology. There was no baseline, no standard," he said.

"MAMII and its accelerator program has been very useful in identifying some of those [manufacturers] who've got technology available, helping them to scale up to really start to tackle the problem."

The shipping industry needs to accurately measure emissions onboard, so it can "challenge some of the data that's being put out by other parties," he said.

It is essential that the maritime industry has an agreed method of how to measure emissions, so it can be done consistently, and emissions measured in the factory are the same as actual emissions at sea, and this data is accepted by all regulators, he said.

In terms of upstream (well to tank) emissions, not all fossil-based LNG is the same, he said. "It is critical that we have an idea of the quality in terms of the carbon of the fuel that is coming on today."

Carnival has always had a strong focus on fugitive (leak) emissions from ships. "Those are minimal, if not near zero already, and that's been the case for the last six years," he said.

Carnival needs to have a good idea of what technologies will be available in the next few years, for newbuilds it is planning now. MAMII may help provide clarity on this, he said.

MSC

MSC Group has one hundred container ships and seven cruise ships on order with LNG as the principal fuel, on top of 20 LNG fuelled ships on the water, which are mainly container ships.

The company operates 830 container ships, and also bulk carriers, car carriers and cruise ships. So, the 100 LNG container ships on order are still a low proportion of the total fleet.

MSC does not believe LNG is the only answer. "We think all the three major molecules [LNG, methanol, ammonia] and potentially some other solutions have potential to help solve this problem," said Bud Dar, Executive Vice President for Maritime Policy and Government Affairs at the MSC Group.

"We're going to need a range of molecules on the table for everyone or there won't be enough," he said. "Also, one size doesn't fit all."

Today, LNG is the only low carbon fuel available at scale, and LNG fuelled vessels can easily switch to bio and synthetic LNG fuel should it become available on a big scale. "It doesn't do us a lot of good to build real life tangible ships that have to run on fuels that don't exist in the marketplace yet," he said.

With methane slip, what is needed is "data-supported science that can be relied upon to paint an accurate picture of what we have," he said.

The shipping business is a business of problem solving. MAMII is "trying to solve what I believe is a solvable problem through proper enthusiasm, resourcing and expertise," he said.

Certification schemes

Greenhouse gas regulations rely on having a certification scheme with integrity and the confidence of governments, Mr Dar said. Otherwise, "you can't ever make it work."

Certification schemes are also necessary for carbon crediting schemes to work. These enable a shipping company to purchase low carbon fuel from wherever it is available, without the low carbon molecules necessarily being supplied to that company's vessels. Until we have worldwide availability of low carbon fuels and associated infrastructure to support it, some kind of crediting scheme will be necessary.

This could be done in a 'mass balance' system, where the purchased low carbon fuel is blended anywhere in the energy infrastructure, but the 'credit' goes to the company purchasing it. Or a 'book and claim' scheme, where the fuel is used by a different company to the one paying for it, but the company paying for it 'claims' the credit.

Even if it is possible to transport the low carbon gas to the customer, that may create more emissions from transportation, so a crediting scheme is better environmentally.

It is important the shipping industry "aggregates its demand signal," in other words shows fuel suppliers that it is ready to buy low carbon fuels to power a large proportion of the total fleet, not just company by company, he said.

Methane slip technologies

Methane slip happens because some of the methane fed into the engine does not combust.

One way to reduce it is to use a catalyst which helps ensure complete combustion. A number of catalysts are being tested. There are concerns they may be impacted by impurities in the gas, said LR's Mr Mitrou.

Some companies are developing plasma-based catalysts. "We see manufacturers working with the two technologies in combination," Mr Mitrou said.

An engine combusts fuel most effectively when it is operating at its design load. Conversely, methane slip can be highest when it is operating at a low load (slow speeds).

To get around this, shipping companies could use a shaft generator, which allows the engine to run at full load all the time, but with surplus power used to charge a battery rather than propel the ship, when the ship is going at slower speeds.

MSC's Bud Dar added that a vessel could have a number of smaller engines rather than a big one. If the vessel does not need much propulsion power it can be better to run some of the engines at high load and switch off the others, rather than run all the engines at low load. It is very important to look at power generation on a ship holistically, he said.

AkzoNobel – testing a VLCC coating for speed loss

Coating manufacturer AkzoNobel predicted that its coating "Intercept 8500LPP" on a VLCC would show a speed loss of 1.4 per cent over 60 months (5 years) due to fouling, better than the 4.6 per cent loss for the industry standard, Self-Polishing Copolymer (SPC) antifouling system. The end results matched this, it says. ***Text provided by AkzoNobel and edited by Tanker Operator***

For a specific VLCC vessel, Intercept 8500LPP was chosen. AkzoNobel's software Intertrac Vision predicted a 1.4% speed loss over a 60-month in-service period with this coating.

AkzoNobel's hull performance team collaborated with the vessel operator to monitor and report any significant performance deviations over the 60 months.

The customer achieved performance and decarbonization objectives, including maintaining a Carbon Intensity Indicator (CII) 'A' grade.

The VLCC was 5 years old, 320k dwt, 330m long, 60m breadth, 23m draft. The surface area is 16,500m2 on the flat bottom, 6,500 m2 on vertical sides below the water line and 8,000m on the boot top (the sides above the water line).

The vessel operator wanted to select the best performing fouling control product for this VLCC to align with their ambition to deliver the best-in-class hull performance.

Selecting the coating

The subject vessel trades worldwide and spends 45 per cent of its time in high to very high fouling risk conditions. It spends 70 per cent of its time active (moving at over 3 knots), with an average (modal) operating speed of 12 knots. Average sea miles per month are 6500, with no significant idle periods.

We knew from the vessel operator that the future operation would mirror the past 60 months.

AkzoNobel's Intertrac system uses Automatic Identification System (AIS) data and biofouling models to build a complete picture of vessel operation and biofouling risk.

To find the best-matched coatings, AkzoNobel maintains a coating performance database. It is searchable by features such as vessel type, geographic operational regions, activity levels, idle periods, and biofouling risk.

This database enables the development of a tiered classification approach based on historical performance statistics. It highlights the best coating options to match the particular vessel and operation.

For the subject ship, a complete underwater hull application of Intercept 8500LPP was chosen. This is a high-performance, low-friction, linear polishing polymer incorporating silyl methacrylate technology.

This linear polishing polymer technology maintains a smoother hull for longer, leading to a lower rate of vessel performance degradation.

Forecasting

The next step is to provide a forecast of the future performance of the vessel following the application of Intercept 8500LPP.

AkzoNobel's tool Intertrac Vision is used to construct a model of the vessel, based on its type/size/operation, underwater hull area blasted to Sa 2 standard, and coating specification to predict the vessel performance.

Intertrac Vision models the contribution of hull coatings to the performance of the vessel and considers only the laden state in its predictions.

A comparison was made of the relative performance expected following the application of Intercept 8500LPP versus an industry standard self-polishing copolymer (SPC) antifouling system.

Over the 60 months (5 years), the SPC antifouling was forecasted to have a speed deviation of 4.6%, compared to1.4% for Intercept 8500LPP. Also a power deviation of 17% compared to 3% for Intercept 8500 LPP. This ultimately led to a 2,721 tonne saving in fuel consumption for Intercept 800 LPP and 8,473 tonne saving in CO2 emission.

For the subject vessel and its operation, we would expect the vessel to experience a speed loss of around 1.4% over the whole in-service period following the application of Intercept 8500LPP.

The operator agreed with AkzoNobel's recommendation and Intercept 8500LPP was specified and applied to the vessel's underwater hull during dry-docking in 2018.

Comparing forecast and measured

Comparing the performance trends from forecasting approaches such as Intertrac Vision with vessel performance data can be challenging.

This is due to many aspects, such as variable data quality and the reliability of filtering and normalising data to minimise the influence of weather.

Applying the coating to a tanker

The forecasted performance is based on theoretical modelling under ideal conditions, which can be hard to replicate with the real vessel datasets.

This type of comparison is only valid when the vessel performance data is consistently high quality, as was the case with the subject vessel.

However, the high-quality maintenance and management of this vessel, regular inspection, and propeller polishing, as well as discussions and in-depth analysis, have led to minimising the effect of other factors possibly influencing vessel performance.

This brings the measured data and analysis closer to the theoretical models used for the prediction.

AkzoNobel visualised the 30-day moving average speed deviation with a 95% confidence band, overlaid with the forecasted speed deviation of Intertrac Vision.

This type of comparison allows us to review the predicted performance versus the range of uncertainty from the measured performance data.

The forecasted performance trend closely aligns with the confidence interval for the 30-day moving average speed deviation. The overall 60 month forecasted and the actual speed loss both equalled 1.4%.

There is sufficient cross-over providing confidence in the reliability and accuracy of Intertrac Vision as a forecasting tool and further validating its use to assist vessel operators in making the right choice for their fleet. TO

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Developments with tank cleaning

Is tank cleaning a cause of unnecessary enclosed space risks – tank cleaning for combination carriers – resistance to change in procedures – new contracts for APC MarineLINE

Ship managers' association InterManager reported there had been 8 enclosed space deaths in seven days in December 2023, three seafarers and five shore workers. (It did not say what type of ships they were).

It also said there were 31 known enclosed space deaths on ships in the 2023 calendar year, and 310 known enclosed space deaths on ships since 1996.

"We have crew members and shore workers placed under unrealistic time pressures to conduct high-risk tasks such as tank cleaning, and we have confusing instructions which vary from ship to ship as to what procedures and protocols must be followed," said Captain Kuba Szymanski, secretary general of InterManager.

"This is an industry-wide issue which everyone in the shipping community must work together to resolve."

"It's not enough to blame the seafarers and offer additional training. Accident investigations must delve deeper into why people make the decisions they do and examine what external pressures impact those decisions.

"Ship architects and builders must work harder to design out these hazardous spaces where possible."

Resistance to change

Guy Johnson, owner of chemical tanker cleaning consultancy L&I Maritime, believes that tank cleaning could be done much more efficiently and safely.

"The mechanics of tank cleaning has not really changed in a long time," he said.

"We are all cleaning to standards that are set by commercial interests who have no real interest or understanding in how the cleaning is done, or whether or not it impacts the environment and crew safety."

"I am still trying to get the industry to eliminate the wall wash inspection, but my arguments, however sound, fall on deaf ears, because cargo quality is far more important than CO2 emissions and multiple confined space entry."

"I recently set a poll on LinkedIn asking whether or not the chemical tanker industry should push IMO to ban wall wash inspections on safety and environmental grounds. Whilst I received a lot of positive comments, and thousands of reads, only 81 people voted .. say no more!"

Combination carriers

Torvald Klaveness of Oslo operates 16 'combination carrier' vessels. These can take both dry and wet cargo, with comprehensive cleaning in between.

A typical operation could be carrying sugar from a bioethanol plant in Brazil to India, then taking diesel from India to Brazil on the return leg. Other Brazilian products consumed in India are grain, soyabeans and caustic soda.

The tank cleaning can take 2-3 days, involving robots and infrared measurements.

A combination carrier has much reduced carbon emissions in comparison to having two vessels which carry cargo to a destination and sail back empty. The carbon benefits are also in shipbuilding, because one vessel replaces two. Combination carriers also reduce the number of crew required, because an empty vessel still needs crew.

The average vessel spends only 30 per cent of its time laden, says Ernst Meyer, CEO of Klaveness.

The company has two types of combination carriers. Its "CLEANBU" vessels are both LR1 tankers and Kamsarmax dry bulk vessels, able to carry all dry bulk products, caustic soda and petroleum products. Its "CABU" vessels service the aluminium industry, carrying caustic soda solution and alumina, as well as other dry bulk commodities.

Combination carriers are not a new idea, but when they were introduced in the past, customers did not care so much about the savings in emissions and crewing costs. "It is a completely different world today," he said.

Mr Meyer estimates combination carriers could be viable for 10 to 15 per cent of today's bulk shipping needs.

MarineLINE coating contracts

Coatings company Advanced Polymer Coatings (APC) has signed a deal with chemical tanker operator Odfjell to recoat

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three of its chemical tankers with its coating MarineLINE, replacing zinc coating with MarineLINE on some of the tanks on each vessel.

MarineLINE gives tanker operators flexibility, because it can be used with many more different cargoes, being much easier to clean, says Stephen Jarvie, customer care manager of MarineLINE.

"Zinc coatings have high absorption characteristics, which can cause some cargo retention and lead to purity issues in subsequent cargoes, limiting backhauling and service.

Also in 2024, the company signed a recoating deal with GULFNAV of Dubai, recoating cargo tanks of two chemical tankers.

"GULFNAV wanted a more robust solution for handling a wide range of aggressive chemicals including methanol," said Onur Yildirim, global marine manager of APC.

In February 2024, APC launched an online platform to help customers better understand how to maintain MarineLINE and the aggressive cargoes it enables them to carry. It gives advice about which chemicals can follow another chemical in a tank. It has details on over 2000 chemicals.

The tool was developed in collaboration with a number of chemical tanker operators including Bahri.

"This is a big area of uncertainty as tank cleaning is complex. However, by maximizing cleaning techniques, shipping lines can more confidently switch between a wide variety of aggressive chemicals. This enables the fleet to be much more versatile and pick up more spot business," Mr Jarvie said.

The portal can also help operators manage data about the history of their coating.

The company wants to have a closer working relationship with its customers after the coating has been installed, helping them monitor and optimise their use of it.

MarineLINE is also doubling the size of its US factory, enabling it to quadruple production capacity and expand research and development. The new production capacity will start operations in Q4 of 2024.

The company hopes to build new international markets, such as in Japan, where owners and yards often prefer stainless steel to using a tank coating like MarineLINE. TO

How ultra-precise navigation can help tankers

Real-Time Kinematic (RTK) positioning technology builds on GPS to enable objects to know their position to centimetre level accuracy. This can be very useful in tanker operations. Trelleborg explained

There are times when it would be very useful for tankers to know their position on the earth to centimetre level accuracy. This includes berthing and ship-to-ship operations, where pipeline systems (manifolds) need to be lined up.

It can also make it easier to approach a berth, managing the tricky task of ensuring the vessel meets the berth with as low speed as possible so there is no risk of damage on contact.

You can monitor if a ship is drifting, when it is supposed to be on the same location.

It can be used for multi-buoy mooring, enabling a ship to moor in the precise position where it is easiest to pick up a hose from another ship later.

Real-Time Kinematic (RTK) positioning technology can be used to do this.

It builds on GPS satellite positioning by measuring the phase in the GPS carrier wave when it reaches the receiver, comparing the phase with the phase in a base station in a known location under 15km away. It also uses data carried in the signal.

Two GPS antennas are installed on the bridge wings of the ship, and they communicate with the navigation unit via wi-fi. The navigation unit also communicates with the base station using cellular or radio communication systems.

The data is received either on a fixed navigation system on the bridge or a portable tablet navigation system carried by a pilot.

Benefits

The existing satellite position and navigation systems on ships are designed for voyage navigation, rather than precise manoeuvring, says Tommy Mikkelsen, Managing Director of the Navigation and Piloting division of Trelleborg Marine and Infrastructure, one of the largest suppliers of pilot navigation systems incorporating this technology.

Until now, precise navigation has been done by looking out of the window or crew communicating by VHF radio. A digital navigation system has the advantage that navigators can get a top-down view of the vessel's position and trajectory, and there is no risk of miscommunication.

"We've seen that this is really a game changer in tanker operations," he says.

More precise navigation can save in both time and fuel. Ships have been known to take 20 minutes getting piping aligned with piping on jetties and other ships, with someone standing by the manifold communicating by radio with a pilot on the bridge.

"If the ships are alongside and the manifolds are not aligned, you would need to pull off again and move one of the ships," he said.

A navigation system using RTK "takes the guess work out of these operations, gives the captain and pilot some aids."

You can think of it like the sensors on your car which help you to park. It isn't required under legislation, but it can be very helpful, even to highly skilled drivers.

So far, the system has proven particularly popular with pilots, who receive the data to a handheld navigation unit provided by Trelleborg. This unit is loaded up with electronic charts, and other information useful to navigation, such as weather.

The systems have also been popular with ship-to-ship transfer operators and terminal operators, he says.

The technology is now required on larger ships transiting the Panama Canal, so they can make sure they do not touch the canal walls.

Panama Canal

There is now a requirement that every large ship going through the Panama Canal must have a system for gathering precise navigation data.

More specifically, the Panama Canal issued an advisory to shipping in October 2022 stating that from October 1, 2023, all vessels with a beam over 109 feet transiting the canal are required to have a non-portable piloting unit with "Real Time Kinematics" capabilities, with accuracy of under 1m.

If the fixed system is not installed, a temporary system can be installed at additional cost, with possible delays and fines.

The system must be able to receive GNSS corrections via UHF radio and cellular data from the Panama Canal Differential Global Navigation Satellite System (DGNSS) base stations and have 5 hours of battery power for use in case of a black-out.

It must be able to communicate with handheld navigation systems utilizing Trelleborg's SafePilot system carried by Panama Canal pilots.

GPS jamming

GPS jamming is where GPS signals are blocked by a stronger signal at the same frequency. This is increasingly being seen in areas of conflict around the world, such as the Black Sea.

Whilst no GPS system can continue functioning in a jamming situation, the GPS systems supplied by Trelleborg are able to detect when jamming is happening.

There are two GPS receivers at different ends of the vessel bridge wing. Normally, the relative position recorded by each of them should reflect their distance apart and the vessel's heading. When GPS is jammed, they will both give the same position.

The Trelleborg systems can also detect if the received GPS signal suddenly becomes stronger, suggesting that it is no longer coming from a satellite.

As a backup, ships can use an inertial motion unit, which can predict the position of the ship using measurements of acceleration. The most advanced sensor can measure acceleration in all three axes. It gradually loses accuracy but can work for a short time.

In any case, the vessel navigators should have skills to manoeuvre a ship without sensors, just as a car driver should be able to reverse park by looking out of the window, Mr Mikkelsen says. "The most important [thing] is to notify them that this is happening so they can take over and look out of the window."

TO

First urea delivery to tanker by barge

Marine Care, a specialists in marine chemicals and cleaning based in Rotterdam, reports that it made the first ever delivery of Urea to a vessel by barge.

The delivery was made in Houston, for customer Odfjell, for its vessel Bow Explorer.

The barge was custom built for urea transport by Marine Care.

Urea is typically delivered to vessels by intermediate bulk containers (IBCs), around one cubic metre portable containers) carried by truck, or in tank trucks.

The barge has pumps with capacity up to 50m3 an hour. Delivering urea this way saves 80 per cent of loading time.

Although the IBCs can be re-used, using a barge means that they do not need to be used at all, so there is saving in plastic, and carbon savings because trucks do not need to be used to transport the cargo.

Urea is used as a fertiliser and feed supplement, and is a starting material for manufacturer of plastics and drugs.

The loading meets IMO's "Tier III" emission requirements.

Urea cannot be delivered via terminals and jetties, as with other liquid cargoes, because there are no urea bulk storage tanks.

TO

MarineShaft replacing liner for propeller shaft in 11 days

MarineShaft of Hirtshals, Northern Denmark, was asked to replace a bronze propeller shaft liner for a 155m long chemical tanker built in 2009.

The propeller shaft liner is a metal coat around the propeller shaft, to prevent water or sand from being able to enter the propeller shaft.

The liner was 3315mm long, 455mm inner diameter and 507 mm outer diameter.

The existing propeller shaft liner was showing some damage due to regular wear from seawater, which was affecting the water lubrication of the propulsion system.

Manufacturing the bronze liner

The chemical tanker was due to dock in Bulgaria (Black Sea).. Before docking, the owner started planning for a replacement liner to be fitted.

Once the tanker arrived at the dock, the propeller shaft was removed and taken to MarineShaft's workshop in Hirtshals, Northern Denmark, by truck.

MarineShaft keeps bronze liner material in stock. It was able to start manufacturing immediately.

The old liner was removed, its surfaces were grinded. The propeller shaft (without the liner) was given a magnetic particle inspection, using a magnetic field to check for anomalies along the surface.

Checking the outer diameter of the liner

The new bronze liner was shrink-fitted to the propeller shaft.

It was then machined to the required outer diameter.

Heating the liner before shrink fitting

The job was completed in 11 days (not including transport) and was fully approved by a LR surveyor. The shaft with the new liner was then trucked to the vessel on the Black Sea.

The shaft with the new liner, ready for delivery to the tanker TO

Managing alarms on BWMS

If alarms on BWMS are not configured carefully, crew will get too many alarms and will have trouble working out what the alarms are for. BMWS manufacturer Ecochlor explains how it can be done better. ***By Pete Thompson, VP of Engineering, Ecochlor***

Picture a borrowed luxury car brimming with cutting-edge features and an intricate user interface, presenting more than 50 different warning lights and icons.

One light signifies a vehicle is too close at the rear. Another alerts about fog conditions, some controlled doors, yet another monitors the engine's status.

The constant barrage of alerts becomes a mental overload. When the car was returned to the owner, the vehicle had an orange warning light on. The light was left unattended because the effort of trying to figure it out was too massive.

This scenario mirrors the daily reality faced by ship operators.

Working with alarms

Modern vessels are now managed by advanced computers and Human Machine Interfaces (HMIs) that generate an overabundance of alarms for ship equipment.

Crews find themselves inundated with so many signals that it often leads to alarm exhaustion.

Numerous studies have shown that the accumulation of too many alarms on a ship can overwhelm the crew, leading to a dangerous practice of simply resetting or bypassing them without addressing the root cause.

Designed to be intuitive – the Ecochlor ballast water management system control panel

With the continuous introduction of advanced technologies to manage, it is essential to streamline these systems. Doing so will help prevent mental fatigue for the crew and ensure the safety and efficiency of maritime operations.

Alarms alone don't keep a vessel operating smoothly; it's the crew's quick action that matters! However, the mere structure of alarm systems on board a ship can sometimes make remote monitoring less effective.

Usually, crew members monitor alarms on both localized control panels as well as general signals throughout the vessel. When an alarm sounds, they must go to these panels to find out what's wrong.

Once an issue is identified, it must be communicated to the relevant parties and then evaluated to determine a next step scenario.

This process can significantly delay response times.

Some equipment may trigger multiple alarms simultaneously, adding to the effort and further postponing a timely reaction.

And while crews are well-trained to manage safety-critical alarms, the same level of attention isn't always given to regulatory compliance alerts, such as with a ballast water management system (BWMS).

If the crew isn't familiar with handling these alarms and considers them non-essential for safety, they might bypass, workaround, or silence the alarm without proper investigation. This can result in system failures or potentially more severe outcomes.

Today, seafarers are burdened with more responsibilities than ever before and with less crew onboard to assist. They manage complex operational and support systems, often with limited time and resources.

Although maritime technology has greatly advanced, these sophisticated tools can sometimes overwhelm rather than assist the crew. The key challenge is to ensure any alarm systems support the crew and provide clear, reliable alerts to maintain operational integrity.

Alarms in ballast management

Ballast water management Systems (BWMS) utilize various treatment technologies, each with distinctly different operational methods. Typically, these systems are retrofitted into vessels already in commercial service, necessitating integration with existing systems.

The BWMS alarms play an important role in regulatory compliance by continuously monitoring the ballast water treatment process. They provide real-time data on water quality and system performance. By alerting operators to deviations from acceptable parameters, these alarms help maintain the system's operational integrity.

System warnings act as early indicators of compliance risks, notifying crew members of potential issues before they escalate. Given the importance of a BWMS in cargo operations, resolving any interruptions quickly is vital.

Alarms on Ecochlor's EcoOne

The reliability of a BWMS is closely linked to the effectiveness of its alarm network. It is important to minimize unnecessary alarms and prevent overly sensitive alerts.

Ecochlor's EcoOne filterless and hybrid BWMSs feature an intuitive human machine interface, helping crew members interact with the system easily and to make quick decisions.

The system uses a network of sensors and monitors to collect real-time data on water quality, flow rates, automated chlorine dioxide dosage, and system performance.

These devices detect any issues or changes from set standards, triggering alarms or warnings only when needed.

The control panels act as the link between the BWMS and the ship's crew. These panels display vital information like water quality and system status, allowing for manual adjustments as well as housing the alarm systems.

Hardwired connections from the control panels to the vessel ensure information about the BWMS status is always available.

Our goal was to provide a BWMS that was simple for crews to operate while still maintaining effective and clear alarms.

When crews face too many warnings and alerts, they may be tempted to ignore them, which we hoped to prevent.

Beyond standard alarm integrations

Standard BWMS alarm systems usually offer limited remote monitoring.

This means that to understand the system's status, crew members often need to be close to the nearest HMI control panel.

To make things easier for the vessel crew, Ecochlor offers an option to integrate our BWMS alarms into the vessel's Integrated Alarm System (IAS) or Alarm Management System (AMS).

This integration allows the BWMS to communicate with the vessel's existing alarm system using a networked communication method called Profibus.

This means that BWMS alarms can be displayed on the same screens the crew uses for other vessel operations. A communication cable is used to relay all our BWMS alarm signals.

When integrated into the vessel's IAS or AMS, the crew receives instant alerts with detailed descriptions, thus, helping them make quick and effective decisions.

This is especially important for alarms related to vessel and crew safety, as advanced alerts and understanding of these alarms improve the crew's ability to manage appropriate responses and safety measures before entering the BWMS areas.

Also, with IAS or AMS integration, alarms are also prioritized based on their severity, allowing engineers to focus on the most critical issues first. This results in better time efficiency, reduced downtime, and enhanced overall operational efficiency.

Some of our customers have chosen to integrate the Ecochlor BWMS to their IAS or AMS to save crew time and optimize their ship operations, finding the extra expense well worth it in the long run.

Incorporating your vessel's IAS or AMS to the BWMS is not just about meeting environmental regulations—it's about ensuring the safety and efficiency of your crew and vessel.

Although initial integration may be complex and costly, the long-term benefits are substantial. TO

Bawat - ballast water as a service

Bawat of Denmark is offering a service to treat ballast water at port through mobile units using pasteurisation technology

In July 2024, a 95m tanker in the port of Hamburg was fined Eur 37k for dumping untreated ballast water overboard, according to reports in news service THB.

Bawat offers a mobile service to treat ballast water, while a vessel is at a berth, using pasteurisation. This would have cost significantly less than the fine, says Christian C. Skovgaard, Area Sales Manager with Bawat.

The Port of Hamburg has a particularly high focus on checking shipboard ballast water treatment systems (BWTS) are working properly, he says.

The Ballast Water Convention requires vessels to treat ballast water to a certain standard before discharging it into local waters.

Through experience, it is estimated that 30-50% of installed ballast water treatment systems do not meet compliance standards. There have been studies showing that many vessels with type approved systems are not adequately treating ballast water.

Most regulators around the world work on the assumption that if the vessel has a certified Ballast Water Management System (BWMS) on board, it is working as required, says Emil V. Messmann, sales manager of Bawat.

But this is starting to change.

Bawat's system

With Bawat's system, the killing of the organisms is achieved by keeping the water at 72 degrees for 40 seconds. The heat is re-used so no hot ballast water is discharged to tanks or the sea. "We basically cook the water, meaning it has no limitations, when it comes to water quality. It works equally good in all water types." says Mr. Skovgaard.

The whole system is supplied in a 40-foot container, with treatment capacity of 300 m3/h. It is transported around the port on a flatbed truck. It can also be transported by barge.

A containerised system was thoroughly tested by University of Wisconsin, who wanted to evaluate the potential of the system to kill living organisms in the ballast water, in the North American Great Lakes.

Treating water in the Great Lakes is highly complex due to high turbidity and being both fresh (not salty) and cold, which is a challenge for technologies other than pasteurization.

"The overall conclusion was that the system is highly effective at reducing the migration of invasive species, to USCG & IMO discharge criteria" Mr. Skovgaard says.

Bawat is in dialogue with a number of port authorities around the world, who may support it to establish a mobile service reception facility.

A 'discharge permit' from the Port of Hamburg was received in May 2024, allowing Bawat's reception facility to operate in the port. The reception facility is up and running, ready for servicing vessels.

Service jobs have already been completed in various locations in Europe. TO

Our simple, reliable, filterless ballast water management systems protect the environment while using far less power than competitor systems—meaning they can also help reduce your fuel consumption and emissions.

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EcoHarbor – mobile / onshore ballast water treatment

EcoHarbor of Carnegie, Pennsylvania, is developing a range of mobile and onshore ballast water treatment offerings, including for ships whose systems are not operational, and for dry docks

Shipboard ballast water treatment systems are typically designed to work at their full rated capacity in only about 80 per cent of the world's waters, reckons Mark Riggio, a maritime ballast water treatment consultant and president of ecoHarbor, a company developing mobile and shore based solutions for ballast water treatment.

An Australian study published in December 2023 looked at 44 samples of water which should have been treated from 39 vessels and found that 16 did not comply with the D-2 standard, amounting to 36 per cent non-compliance. (Document MEPC 81/INF.6 can be downloaded at docs.imo.org, free registration needed).

For now, very few port state control authorities are checking if systems are working, most are satisfied enough when they see the vessel has an approved system onboard. But this is changing, with the port of Hamburg known to be particularly active in testing treated ballast water.

The IMO MEPC 81 meeting agreed that ships could discharge untreated ballast water in the event that they have a type approved ultra-violet system onboard and it cannot operate properly due to high sediment levels in the water, and all possible methods to treat it have been considered (see Tanker Operator June 2024 issue). If a mobile treatment system was available, presumably such ships would be obliged to use it.

ecoHarbor

For now, ecoHarbor is a small company, but it has backing from investment company Green Swan Partners LLC. It is reviewing the best locations for installing mobile or onshore ballast water treatment systems, where a system would be in the highest demand.

EcoHarbor is not developing its own ballast water technology but working in collaboration with manufacturers such as ERMA FIRST and Ecochlor. It does not have any bias towards any particular technology.

Mark Riggio, maritime ballast water treatment consultant and president of ecoHarbor

Mr Riggio points out that every offering has strengths and weaknesses. Pasteurisation (heating the water to kill organisms) is very effective, but uses large amounts of energy, so may not be viable for large water volumes, and not every port has the power available. UV systems do not work well with high sediment ('challenging') water. Electrochlorination systems require the water to have a certain level of salt or require salt to be added if it is fresh water.

The chlorine dioxide system provided by Ecochlor may be very good as a mobile / shore-based solution, because it has type approval to be used without a filter, he says.

The chemical treatment solution can be mixed with ballast water once it is onboard, so the ship's own ballast pumps can be used to move most of the ballast water. However, their filterless option does need some salt to be in the water, he says.

Shore based treatment

EcoHarbor is considering a number of different use cases where there could be demand for shore based or mobile ballast water treatment.

A first use case is vessels which do not need to treat ballast water very often, such as shuttle tankers which do not move around the world frequently, and fixed mooring tankers supporting oil production, which only move every few years.

Operators of such vessels may prefer to hire a system rather than have their own.

A second use case is dry docks. Ships need to load ballast before they leave dry dock, to ensure stability when the ship is launched into the water. But with systems onboard the ship not operational during dry dock, it is not possible to use the onboard treatment system.

It is common for vessels to directly load seawater as ballast in dry dock, because they know they can treat it on discharge. But organisms can continue to live onboard, such as in pipework and tank sediment, which is not flushed out when the ballast water is emptied (see box text).

A third business case is for companies who wish to make life easier for seafarers. Operating ballast water equipment is complex, even if everything is working. Crew on tankers are generally discharging liquid cargo at the same time as they are loading ballast. It would be helpful if crew could focus their attention on the cargo and have the ballast water treatment looked after by someone else.

The fourth business case is for ships who, for whatever reason, are not able to treat their ballast water on discharge and need to discharge it in order to load cargo.

One ship in this situation in the Mississippi river had only one option – to go back out to sea to do a ballast water exchange and return. The cost included transit time back out to sea and return (2 x 2 days), plus pilots and tugs for going into and out of the river. The charterer could not be billed for this vessel time. Hiring a mobile solution could be much less expensive than this, Mr Riggio says.

For ecoHarbor to offer discharge ballast water treatment with treated water released to the sea, it needs permits similar to those required by operators of municipal waste treatment systems, Mr Riggio says.

The company is applying for such permits in Louisiana, Texas, Netherlands, Belgium and Germany. There are many major ballast water discharge ports in these states and countries (where liquid cargo is loaded), and also ports where regulators take a keener interest in what vessels are discharging.

A fifth use case is ballast water loading ports known to have challenging water, which cannot be easily treated by shipboard systems. They could use a mobile chemical ballast water treatment system provided by ecoHarbor.

Sometimes it is possible for shipboard systems to treat ballast water only if it is loaded at a rate much slower than usual. This means that the vessel's rate of discharging liquid cargo is much less, since it must discharge cargo and load ballast at the same time. It means that the vessel spends more time on berth than would be expected, which can mean subsequent vessel discharges are delayed.

The same occurs if ballast water is being discharged, and needs treatment on discharge, and cargo is being loaded, he says. "If we can help the terminal operator guarantee they can receive delivered ballast water at 2000m3/h or 4000m3/h, you're talking about the opportunity for a cost sharing model between the ship and the terminal operator."

TO

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