

# TANKEROperator

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**Inside – how MarineShaft did an urgent repair of a corroded and bent tanker shaft – including repairing corroded areas using robotic laser cladding technology and cold straightening.**

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# Latest from OCIMF

**In its November and December newsletters, OCIMF reported on its new managing director, summarised what it sees as the impact on shipping of COP 26, its new programs 'quality assessor' role, and its plans for a SIRE update**

**K**aren Davis has been appointed managing director of OCIMF (Oil Companies International Marine Forum), to replace Rob Drysdale, who has completed the usual (around) three years in the role.

Karen is a master mariner who spent 15 years at sea working on tankers carrying crude oil and clean products, rising from third mate to master. She moved to onshore technical management roles in 2001, and in 2013 became ConocoPhillips' global marine assurance manager. In 2019, she was seconded to Qatargas Operating Company as a Limited Senior Adviser.

"I must say I have enjoyed this role enormously," wrote Rob Drysdale, in the November newsletter. "Even the impacts of the pandemic have made it a unique experience, albeit with some aspects we could all have done without."

"Karen [Davis] is enthusiastic about taking over for the next three years or so. I know she'll do a great job in leading the organisation."

"I recall my very first log in June 2018, when I mentioned what a fantastic job previous directors had done in leaving the organisation in a better place than when they started."

"My commitment at the time was to do the same thing and I hoped then that I could truly make that claim at the end of my tenure."

"With the new strategy, SIRE 2.0 development and application of human factors in everything we do, I feel that I can claim some limited success, but I'll leave it to others to judge whether that is indeed the case."



**Karen Davis, managing director of OCIMF**

Ms Davis wrote in the December newsletter, "I took over from Rob Drysdale as Managing Director on 1 December. He eased my transition with his

characteristic humour and experience gained from his time at OCIMF and in the industry."

"He saw the organisation through a change of strategy, accomplished amid a global pandemic. I'd like to congratulate Rob on his work at OCIMF with hopes that I may further his vision in my three years."

"As we adjust to our new strategy and organisational structure, I am keen to build a culture among us that seeks diversity of thought, innovation, and openness to changes that benefit the industry."

"I will encourage further engagement within OCIMF teams, our wider membership, and the greater shipping industry."

"This will enable us to tackle the challenges of achieving the IMO Sustainable Development Goals, specifically finding solutions to meeting the energy-efficiency regulations and standards addressing GHG emissions."

"We plan to launch SIRE 2.0 in spring 2022. This has involved a huge amount of work and I congratulate those who have accomplished the work to date and are dedicating more hours to finalise the project."

## Decarbonisation key points

OCIMF co-sponsored a shipping conference in Glasgow UK on Nov 6, "Shaping the Future of Shipping," hosted by the International Chamber of Shipping, while the COP26 meeting was happening.

These were the key points emerging, as reported by OCIMF.

Decisions [on decarbonisation policy] cannot wait for too long as industry needs regulatory certainty and the transition to net zero or low carbon fuels must take place with safety in mind.

There is no single fuel solution. There will be a range of alternative low carbon fuels depending on the ship type, companies' trading patterns, risk management, training and many other variables.

The IMO should continue to be a global policy maker. There was some concern that regional initiatives may create unfair market distortion and inconsistencies for a global industry.

The transition will not be successful without seafarers trained in how to safely handle new fuels.

Transition fuels and zero carbon fuels will create new markets. Shipping will have to compete with other industries for these fuels.

## Shipping and COP26

For the main COP26 meeting, while there were no decisions in the main event with a direct impact on shipping, there were a number of agreements on the sidelines which may have an impact, OCIMF said, such as the ones outlined below.

The "Clydebank Declaration" supports the establishment of zero emission maritime routes or 'green corridors' between international ports. Signed by Australia, Belgium, Canada, Chile, Costa Rica, Denmark, Fiji, Finland, France, Germany, Ireland, Italy, Japan, Marshall Islands, Morocco, Netherlands, New Zealand, Norway, Spain, Sweden, UK, USA.

The "Just Transition Task Force" a UN Global Compact and shipping industry people-centred Task Force to ensure a Just Transition to net-zero. The task force will focus on the development of new green skills and green and decent work, with a specific focus on developing economies.

The "Global Methane Pledge" seeks stronger regulation of methane emissions. Participants joining agreed to contribute to a collective (global) effort to reduce global methane emissions by at least 30 percent from 2020 levels by 2030.

The "Glasgow Leaders' Declaration" agreement to support nearly 50 vulnerable nations from climate change in respect to deforestation and land use.

The "Beyond Oil and Gas Alliance (BOGA)". The core members are Denmark, Costa Rica, France, Greenland, Ireland, Sweden, Quebec and Wales. The associate members are California, New Zealand and Portugal. The aim is to work on phasing out oil and gas production. Core members of BOGA are committed to end new concessions, licensing or leasing rounds for oil

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and gas production and exploration. Also, to set a Paris-aligned date for ending oil and gas production and exploration on their territory.

“Roadmap on implementing green hydrogen” – a joint initiative between the International Renewable Energy Agency (IRENA) and Japan.

“Climate Finance” - 36 countries agreed to mandatory actions to ensure that investors have access to reliable information about climate risk to guide their investments into greener areas.

### Quality assessor role

As part of SIRE 2.0 OCIMF is introducing the new role of Quality Assessor (QA), assessing the usage and impact of OCIMF programs (not the quality of vessels).

The Quality Assessors will be seconded from member companies. Their function will gradually be extended to cover all OCIMF inspection programs.

This engagement will help in the collection of programme participant feedback on regional issues, specific programme feedback, impact that OCIMF programmes are perceived to be having and any opportunities for improvement.

They will provide support to OCIMF Training and Accreditation activities for applicants and inspectors.

The first four Quality Assessors are Unni Menon (Shell), based in Texas, USA; Captain Sashidaran Gopala (BP), based in Malaysia; Captain Luo Hongbo (CNOOC), based in

Mexico; and Captain Rohit Bajaj (Shell), based in Singapore.

### SIRE 2.0

OCIMF is planning a new version of its Shipboard Inspection Report Program (SIRE), version 2.0, to be launched in April 2022.

It ran a webinar on Dec 20, 2021 on the new inspection processes, how human factors will be applied in inspection and reporting, the IT integrations, and management of change actions.

You can watch the webinar online free here <https://ocimf.org/publications/video/videos/sire-2-0-programme-recipients-webinar>

A full SIRE 2.0 question library and supporting guidance materials will be published in Jan 2022, and a feedback portal made available to programme participants from April 2022.

OCIMF has made a plan for training its inspectors, so they are ready for the programme launch in Apr 2022.

### Technical advisors

OCIMF has welcomed two technical advisors on three year secondments,

Luis Filipe Ferreira de Santana, engineering adviser, seconded from Petrobras, and Ton Mol, barge adviser, seconded from Interstream Barging.

### Mooring safety

OCIMF held an online workshop on mooring

safety and human centred design on Dec 8.

It was led by members of the Nautical Expert Group, and had participation from the barges, offshore, engineering and structures expert groups.

Presenters shared examples of human-centred design. They showed ways to improve the layout of mooring systems to minimise exposure to crew and substantially reduce snap back zones. Also they showed alternative mooring concepts being trialled in the industry.

A review of sampled mooring incident data from 2015-2021 revealed that mooring-related incidents could be catastrophic in nature once barriers are compromised and people come in the line of fire.

### Executive Committee meeting

A meeting of OCIMF’s Executive Committee was held on Dec 1, hybrid live in London and online.

Topics covered included strategy implementation update; engagement in the Asia Pacific region; seconded resourcing; update on SIRE 2.0 progress; financial update, including the 2022 budget and the five-year financial plan; Principal and Functional Committee updates.

This article is a summary of the OCIMF November and December newsletters. The full text is online at <https://www.ocimf.org/news-and-events/news/newsletter>



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# Developments in Gibraltar

**Developments in Gibraltar over the past year of interest to tanker operators include the start of LNG bunkering, new STCW refresher courses, and the use of drones by regulators to monitor exhaust**

**T**he first ever LNG bunkering operation carried out in Gibraltar took place in March 2021, with the Shell chartered LNG bunker vessel Coral Methane supplying LNG to Sovcomflot's Aframax tanker Lomonosov Prospect.

LNG imports to the territory of Gibraltar began in 2019, mainly for use in electricity generation for the grid. The same LNG supply chain is also been used to supply vessels. Before 2019, Gibraltar's electricity supply was dependent on diesel imports and generation.

The Port of Gibraltar envisages supplying a range of 'future fuels', once demand materialises, says John Ghio, CEO and Captain of the Port. "We're looking for that to start increasing."

Mr Ghio has been with the Gibraltar Port Authority for over 10 years, initially as Bunkering Superintendent, and was formerly an Operations Co-ordinator with Aegean Bunkering.

Peninsular Petroleum is also looking at submitting an application for a license, he says. [Currently it has plans to start providing LNG via



**John Ghio, CEO and Captain of the Port of Gibraltar**

the nearby Port of Algeciras, also to the Strait of Gibraltar, ].

"One of the things we see – the current levels of demand [for LNG] aren't huge in our corner of the world. We have the capability [to grow] in advance of the demand materialising significantly. That's our strategy, to grow in our

Port."

Gibraltar is the biggest bunker port in terms of volume in the Mediterranean, Mr Ghio says. Its suppliers are looking at other 'future fuels', to see what the logistics set-up needs to be, to be ready to supply when there is customer demand and fuels are available.

Gibraltar is seeking to develop further its maritime services in a number of ways as a maritime cluster. This includes providing crew training services and ship-to-ship tanker cargo transfers. "Vessels call at Gibraltar to take bunkers – but they do a lot of other stuff," he says. Speaking at the opening conference at Maritime Week Gibraltar on Nov 9 2021, the Hon. Vijay Daryanani MP, Minister for Business, Tourism, and the Port, said that the awarding of the LNG bunkering license was a first step in Gibraltar's green ambitions. "We will work proactively towards the energy transition," he said.

"Gibraltar is working to position itself to contribute to the sustainability of the maritime sector on the fuel availability side."

"This sets down a marker that the Port of Gibraltar is at the forefront of the drive for greater sustainability and improved environmental performance of the maritime industry internationally."

## Peninsula and LNG

In June 2021, Spain's gas grid operator Enagás, and Gibraltar bunker supplier Peninsula, signed an agreement for construction, joint ownership and charter of a 12,500m<sup>3</sup> LNG bunker vessel. It will be chartered exclusively to Peninsula, built at Hyundai Mipo Shipyard, scheduled delivery June 2023.

Peninsula will supply LNG as marine fuel to vessels at the Port of Algeciras and in the Strait of Gibraltar.

Enagás will participate through its subsidiary Scale Gas.

The project is co-financed by the European transport aid program Connecting Europe Facility (CEF), which has contributed 11 million euros towards the vessel development through a consortium of Enagás, Scale Gas and the Algeciras Port Authority.

Scale Gas has a strategic plan to develop small and medium-scale LNG infrastructure.



**Sandvik Marine installs a voyage data recorder in Gibraltar**

This agreement is part of the 'LNGhive 2' strategy, led by Puertos del Estado, a company owned by the Spanish state, which manages state owned ports. Its objective here is to support the development of the LNG market as a sustainable marine fuel.

"This project is one of many initiatives around Peninsula's strategic pillars, customer centricity, sustainability and technology", said John Bassadone, owner and CEO of Peninsula.

### STCW refresher course

The University of Gibraltar's Maritime Academy delivered its first Standards of Training, Certification and Watchkeeping (STCW) Refresher Basic Safety Training Course in August 2021.

The five-day Basic Safety Training course, approved by the UK's Maritime and Coastguard Agency (MCA), has a mix of theoretical elements and practical activities such as firefighting and personal survival techniques.

The course is provided in partnership with Stream Marine Training and runs over 5 days.

It is targeted at some of the 20,000 crew members who change vessels via Gibraltar every year, at the 10,000 vessel calls a year.

Representatives of government customs participated in the course.

Arthur Asquez, a customs officer in Gibraltar, said, "this course has given me confidence and skills to tackle a number of potential scenarios which we could quite easily encounter during our daily marine duties at HM Customs – be it on our own vessel or whilst on board a vessel that we could be clearing or searching.

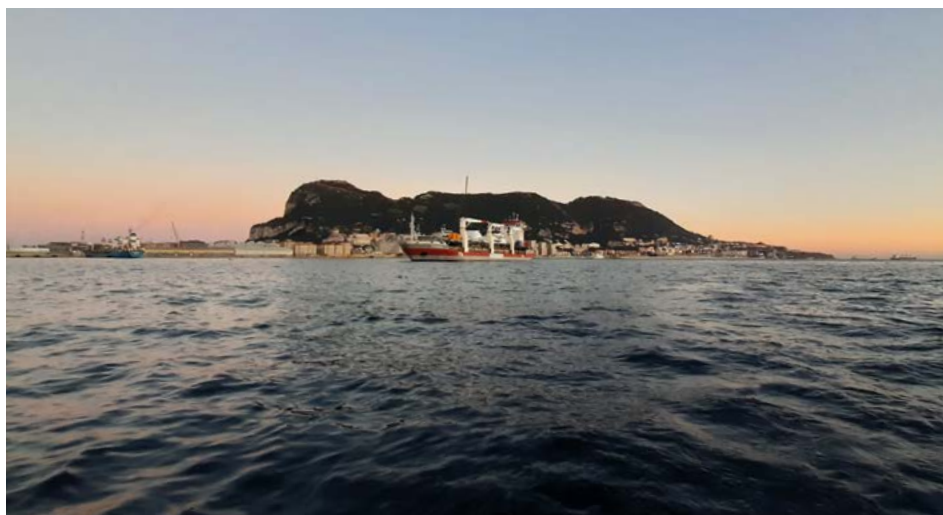
### Sandvik Marine Electronics

Sandvik Marine Electronics, based in Gibraltar, reports that it started providing its fleet electronics maintenance services to "several" more ships over 2021, now serving around 180 vessels, including from BW Gas, Westfall Larsen, Golar, and Transpetrol.

Sandvik also has offices in Panama, Antwerp and Singapore, and is planning to open an office in Rotterdam. It has technicians travelling worldwide, including one technician serving 3 months continuously in a shipyard in Malaysia, doing work with two BW LNG vessels.

It recently became an agent for speed logs and voyage data recorders for manufacturer Consilium. It provides ballast water treatment systems from manufacturer Headway. "This has kept us busy in 2021 as many ships are now installing to meet the deadlines," says John King from Sandvik.

Sandvik is also an official agent for Furuno and JRC, and offers radio, voyage data recovery



Gibraltar – image courtesy Sandvik Marine

and AIS surveys for most classification societies. It offers a full service for all bridge navigation equipment.

### Drones to monitor SO2

Over summer 2021, the European Maritime Safety Agency (EMSA) operated drones (remotely piloted aircraft) to monitor the level of sulphur oxides emitted by ships transiting the Strait of Gibraltar.

The goal was to detect sulphur oxide emissions above 0.5 per cent in fuel, indicating a possible breach of the International Convention on Maritime Pollution (MARPOL – Annex VI).

The operation was carried out by the Spanish General Directorate of Merchant Marine, under the direction of the Spanish Ministry of Transport, Mobility and Urban Agenda. Flights operated from mid-July until the end of October. There were two flights every day, making an average of 10 inspections per day.

Of 294 vessels monitored, 27 were found to be in possible breach of the limits.

The information is passed to port authorities to target ships for inspection, and arrange lab testing of samples.

It marked the first time emissions outside the specially designated emission control areas (SECAs) in Northern Europe had been monitored by drone.

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# Case study: A tanker managers' unknown liability

**A tanker manager was asked to pay \$20m plus 9 per cent interest for a ruling in a court case 6 years earlier, which it had not even known about, says ITIC**

**T**he liability of a ship manager may not always arise from negligent performance of their services, as a recent case demonstrates, reports maritime professional indemnity insurance company ITIC.

The story starts in 2012 when a crude tanker suffered an explosion whilst undergoing repairs in the UAE.

After investigation by the UAE authorities, the matter was closed without any action being taken against the master, owner or manager.

The vessel was sold, unrepaired, and a settlement was reached between the owner and the insurer without the involvement of the ship manager.

Although the ship manager was named as a co-assured under the vessel's insurances, neither the owner nor the insurer asserted any claim over the ship manager who assumed the matter was now closed.

Seven years later, in 2019, the manager became aware that back in 2013 – in the UAE – the insurers had commenced litigation proceedings against them, and five other defendants.

The claim was for \$26 million.

The other defendants were able to appoint lawyers to represent them in court. But as the ship manager was unaware of the claim, it did not do so.

Claims against the other defendants were dropped leaving the ship manager liable for \$20 million plus interest at 9 per cent.

ITIC was engaged to appeal the claim but its appeal was dismissed.

ITIC tried a second time and was again unsuccessful.

However, due to the ship manager

having no presence or assets within the UAE, and the UAE having no reciprocal enforcement agreements with the relevant jurisdictions, it was judged to be extremely difficult for the insurers to enforce the award.

Therefore, ITIC began arbitration proceedings on behalf of the ship manager, against the owner, to tie any litigations elsewhere back to the management agreement and to secure an indemnity from the owners pursuant to the agreement.

A “drop hands” offer (where both parties agree to cover their own costs and walk away) was made by the managers to settle the approach from the insurers, but this was rejected.

In mid-2020, following many exchanges, the ship manager offered a “without prejudice” settlement of \$540,000, this amount being the manager's contractual liability limit under the management agreement.

After a counter-offer from the insurer of \$12.5 million and much negotiation, a full and final settlement of \$1 million was made and accepted.

As legal costs had amounted to almost \$500,000, ITIC covered the full \$1.5 million.

In this case, the ship manager had done no wrong but was caught up in an extremely complex and drawn-out legal process.

Ship managers need to be aware of the pitfalls surrounding their position as a third-party and fully understand the associated liabilities and limits.

This case study was provided by maritime specialist professional indemnity mutual insurer ITIC, managed by Thomas Miller. The name of the company concerned was not disclosed.



# Repairing a corroded, bent propeller shaft in 8 days

**MarineShaft of Denmark repaired a corroded and bent propeller shaft on an Icelandic tanker in 8 days. Here's the story**

**M**arineShaft of Hirtshals, northern Denmark, recently repaired a propeller shaft of an Icelandic tanker in 8 days, with work involving both replacing corroded steel, and straightening a bend.

The work was done in November 2021.

The vessel is MT Keilir, described as “the only oil tanker in Iceland”, providing bunker fuel to the fishing industry. It was built in 2018.

The problem was first noticed when water was seen leaking into the vessel through the seal around the propeller shaft. November is high season for Icelandic fishing, so it was urgent to fix the problem.

The vessel was taken to a local shipyard. After removing the seals, it became clear that both shafts suffered from corrosion.

The superintendent of MT Keilir contacted MarineShaft.

The vessel has two stainless steel propeller shafts, 120mm diameter and 3190mm long.

Repairing the corrosion involved machining the corroded steel from the shaft, and then rebuilding it to the original size by laser cladding.

The propeller shafts were shipped to MarineShaft in Denmark on a ferry.

Laser cladding is a special technique to replace corroded steel, using welding robots which are numerically controlled. The filler material in this case was Inconel 625 powder, a nickel-based alloy with high strength properties and protection against corrosion and oxidation.

Laser cladding is a technique which guarantees 100 per cent attachment of the filler material to the base metal, MarineShaft says. It does not need any heat treatment afterwards, can be done very quickly, and has class approval. Other materials which can be used for filler, which have class approval, are Stellite 21 and bronze.

The laser cladding work in this case was done at MarineShaft's premises, but it is also possible to transport the equipment to a customer site.

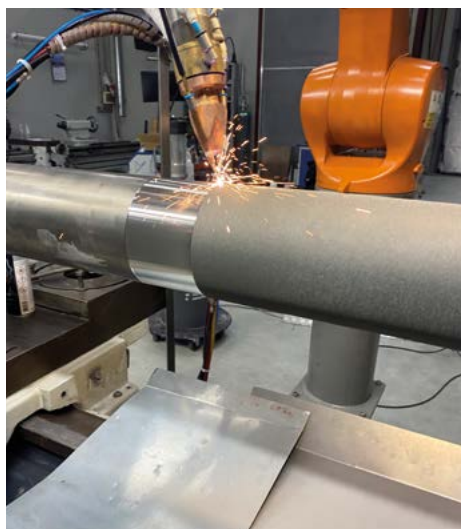
Additionally, a test on the shafts showed that both had a minor deflection (bend).

MarineShaft has a special technology called “cold-straightening” - basically using a purpose built hydraulic press to straighten the shaft without heating it.

In only 8 days, MarineShaft completed this repair job, including work over weekends.



**Corrosion on the shaft of MT Keilir – showing areas which needed repair**



**A robot doing the laser cladding**



**Finished shaft for MT Keilir with laser cladding completed**

# Exmar - perspectives on alternative fuels from Belgium

**Exmar's experience with LPG fuel and ammonia plans; concerns about availability and costs; plans for methanol and hydrogen engines. Some topics discussed at a webinar organised by the Belgian Ministry of Transport and partners in November**

**G**as shipping company Exmar is already operating an LPG carrier running on LPG fuel. It has plans in place for an ammonia fuelled ship but is held up by the lack of an available engine. It also has a design for a maritime CO<sub>2</sub> carrier, we heard in a webinar organised by the Belgian Ministry of Transport and partners in November, "Alternative Fuels – Powering Ships to a Sustainable Future."

Exmar is the gas transport business of CMB (Compagnie Maritime Belge) of Antwerp, and has 4 LNG carriers and 33 LPG carriers in its fleet.

The company has already achieved 20 per cent energy reductions with its ships without using new fuels, such as from more efficient propulsion and better hull forms.

"There is a limit to that, physical boundaries you cannot breach," said Frederik Van Nuffel, technical director of Exmar. "The next step is to go to alternative fuels."

"First, we go to a fossil-based fuel, LPG gives 10 to 15 per cent savings."

Exmar had a very large gas carrier delivered this year, carrying 88,000m<sup>3</sup> LPG, "the first in the world to be LPG fuelled," he said.

The project had been in planning since 2012. "We found our first ideas, we had approval in principle from LR," he said.

"It took up to 2018 when our client, Equinor, saw the opportunity and merit of having this alternative fuel. We signed a contract in 2019 leading to delivery of the ships."

"We have been able to save 38.5 per cent emissions of greenhouse gas compared to the IMO EEDI baseline" (this is the average of all ships in a category), he said. "We have best in class, this was our first primary goal."

There are many further advantages to LPG fuel. When used with a scrubber, NO<sub>x</sub> emissions can be avoided. Particulate



**Frederik Van Nuffel, technical director of Exmar**

emissions are 90 per cent reduced. There is no equivalent of 'methane slip' for LPG - all hydrocarbons are properly burned. There is no need for bunker stops, because the cargo can be used as fuel. "We don't have any SO<sub>x</sub> because LPG is sulphur-less," he said.

## Ammonia

"The end goal is [green] ammonia as fuel, which will lead to almost zero emission," he said.

Exmar has started making plans for an ammonia fuelled ship, and has selected a 41,000m<sup>3</sup> LPG carrier design.

3,000m<sup>3</sup> of the cargo space will be allocated to storing the ammonia fuel (so there will be 38,000m<sup>3</sup> left for cargo). "There's quite a lot of volume needed, because ammonia has a much lower calorific value compared to diesel and LPG," he said. [Calorific value is a measure of energy released per volume of gas combusted].

"That's a challenge we can overcome by reserving space in our cargo tanks, also using deck tanks," he said.

If the vessel is already approved to carry ammonia as cargo, it means it is already in compliance with the IMO IGC code

(International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk).

Exmar's sister company Euronav already ships 2.5m tonnes of ammonia a year and has been shipping ammonia for 3 decades.

An ammonia carrier would be the "perfect pioneering project for ammonia as fuel, because we can see the ammonia fuel system simply as an add on to the existing ammonia cargo handling system," he said.

"All we need is an exemption from the administration. The cargo is toxic. Under the IGC code you cannot use a toxic cargo as fuel."

"Using risk-based design principles, we are doing our utmost to convince everybody this is a safe way to proceed."

"We tried to make this much faster than the LPG implementation," he said. "In 2021 we had approval in principle from LR for the entire fuel gas supply system on the ship and the ship design."

"Now we are actually in holding mode, we are waiting for development of the engine. Engine makers are very hardworking on having their engines available."

"We believe we can place an order in 2023 to have a ship sailing on ammonia as fuel by mid-2025."

Even if zero carbon ammonia is available, it does not mean zero carbon emissions, because ammonia needs to be mixed with a certain amount of 'pilot fuel' – conventional fuel to start combustion.

Other advantages are that there will be "almost no" particulate emissions, and with a scrubber it will be fully compliant with NO<sub>x</sub> regulations. There is work to do ensuring that there will be no ammonia slip (ammonia slipping unburned through the engine into the exhaust), and no nitrous oxides produced by the engine, he said.

"We will do our utmost to reduce this to a minimum. We will install either the



necessary catalysts or work with combustion, to ensure there's simply no creation of those emissions," he said.

It is also important to analyse emissions on a well to wake basis, so you consider emissions made before the fuel reaches the vessel, such as leaks of gas from pipelines.

"It can be that if we shift to ammonia as fuel, we increase emissions compared to decreasing them, which is a very big threat on this development."

Exmar envisages starting with "blue ammonia", made from processing fossil methane, with the CO<sub>2</sub> produced as a by-product sequestered in the ground.

"That will be a step to green [renewably sourced] ammonia, which will be available hopefully later this decade," he said.

"We believe this is a perfect test case on how we can lead the industry towards a leaner, and low emission footprint and work towards the 2050 goal of zero carbon emission," he said.

Separately, Exmar is developing a vessel design to transport CO<sub>2</sub> in a liquid form in large quantities. "Our LCO<sub>2</sub> carrier will be able to support the CCS projects around the North Sea and worldwide," he said.

Mr Van Nuffel was asked what he thought was required from other stakeholders such as ports, charterers and policy makers. He replied that they need to make emitting CO<sub>2</sub> more expensive.

Today "it is not more economical to go to an alternative fuel - it is more expensive," he replied.

"We need very clear goals and very stable policy making, preferably from IMO, to ensure the right targets are being set."

"These targets have to be set on a very long timeline; decisions being made today are still [relevant] 20 years from now."

"Because of the lack of straightforward long-term policy, any decision which we take now - might [turn out to] be the wrong decision."

"[Otherwise] what will happen is that no decisions will be taken. We keep on running the ships as they are."

## Shipowners' perspective

Shipowners have concerns about whether alternative fuels will be available, said Hélène Smidt of the Royal Belgian Shipowners' Association.

"Our vessels will need to be equipped with dual or tri / multi fuel engines because we can't be sure that the answer is yes."

"Since 2030 is a couple of years away, we should not underestimate the role that transition fuels can still play," she added.

"LNG has received a bad [press] over the



**Hélène Smidt of the Royal Belgian Shipowners' Association**

years because [of problems] with certain engine types. We need restrictions on the levels of methane slip, get these engines out of the market."

It would be helpful to have lower carbon fuels which can run in existing vessels. "It is important to make a distinction between new builds and the existing fleet," she said. "The engine cannot be replaced as easily as a refrigerator on a vessel."

Better and more detailed standards for fuel quality are important, to ensure they do not cause problems. "We saw so many engines breaking down when low sulphur rules came into place," she said.

There should also be lifecycle assessments of fuel. "An alternative fuel should be produced in the cleanest way possible."

A further concern is the price tag – how much more expensive fuels will be, whether conventional fuels will be made more expensive, or new fuels subsidised.

Ms Schmidt leads the Maritime Industry Decarbonisation Council, an organisation set up by the Royal Belgian Shipowners' Association, which brings together stakeholders in the decarbonisation value chain.

## Common safety standards

Shipowners have to comply with a wide range of safety standards from regulators relating to alternative fuels, and it would be helpful if they were standardised, said Roy Camber, chief technology officer with CMB.TECH, a company in the CMB group which is focussed on hydrogen and ammonia combustion engine applications and infrastructure.

"We had a totally different experience in four ports on how to bunker with hydrogen. One said, 'It is CMB, please go ahead.' Another [demanded] lots of safety studies."

"It would help if there was some kind of framework [such that] if we have approval of one port the others follow on."

## Anglo Belgian Corporation

Medium speed engine builder Anglo Belgian Corporation (ABC), based in Ghent, Belgium, is developing an engine in the range 1MW to 2.5MW which can run on methanol as well as conventional fuels (dual fuel).

ABC makes engines of between 800KW and 10-12 MW, 600 rpm to 2000 rpm, for inland vessels, fishing vessels, tugs, CNG ferries, polar cruise ships, wind installation vessels, navy vessels, coasters and wind turbine installation vessels.

It sees customer interest in methanol engines from the dredging sector and "many ferry sectors".

It is considering a hydrogen dual fuel engine, and a hydrogen '100 per cent' engine, at 1MW to 2.5 MW, said Tim Berckemodes, CEO.

Compared to a hydrogen fuel cell, Mr Berckemodes believes a hydrogen engine has a 3x lower investment and will last 10x longer.

One challenge is getting permits for pilot projects. "The certification process is quite complex, quite long, expensive for a small project," he said. "It does not help innovation."

There are also multiple different rules, such as the IMO, EU, and European inland waterway regulations such as from the Central Commission for Navigation of the Rhine (CCNR).

"As a manufacturer it is quite complex to have all these different regulations, process parameters, different criteria, sometimes different test equipment to satisfy to all this diversity of regulation," he says.

"We don't need new regulations coming into force almost the day after the first one has been coming into force."

It has developed digital tools to help guide clients, with information about regulations, emission rules, heat capacities of fuels, and necessarily post combustion equipment.

Regulators could make it easier for existing engines to be retrofitted, "and not force them to go to EU Stage V (emissions legislation) which is very expensive and quite difficult to integrate," he said.

This article is taken from discussions in a webinar held on Nov 19, "Alternative Fuels – Powering Ships to a Sustainable Future", organised by the Belgian Ministry of Transport and partners. The webinar is on YouTube here <https://youtu.be/gQoAMyPr6zA>

# What COP26 meant for shipping

**Eirik Nyhus, director environment for maritime DNV, explained what the United Nations COP 26 meeting (Glasgow, Nov 2021) might mean for shipping. No direct changes, but there are indirect implications**

**T**he November 2021 United Nations “COP26” climate meeting in Glasgow, UK, was important because it was planned as the meeting to ‘take stock’ of world progress on emissions. This stock taking was initially planned to take place five years after the 2015 Paris meeting but delayed due to Covid. The initial agreement made in Paris was to limit global warming to “well below 2 degrees C”. the stocktaking reviews whether we are on track to get there.

“There is no doubt in my mind COP26 was a significant meeting, and this extends to shipping,” said Eirik Nyhus, director environment for maritime with DNV, speaking on the DNV “Maritime Impact” podcast.

“But I think it’s important to emphasise that its main significance is adding political fuel to the fire of negotiations at IMO. It will have implications for the process leading to IMO decisions in 2023 and beyond, and hopefully also impact on decisions themselves.”

COP26 comprised 2 weeks of “challenging negotiation,” leading to the “Glasgow Climate Pact” plus a number of separate agreements and pledges. “We saw everything from smiles and cheering, to tears being shed by the COP 26 president,” he said.

“Pledges made at Paris are still unresolved. [While] the fundamentals are now in place, a lot of work is needed to establish a mechanism.”

For example, a continuing source of conflict is about how much money will be paid by developed countries to developing countries, he said.

## Indirect pressure

There were no outcomes from COP26 which immediately and directly impact the shipping sector, and COP26 itself did not directly negotiate shipping related issues.

“This is not to say that COP26 does not matter for shipping, it does, but rather to emphasise the implications are more indirect,” he said.

The discussions drove home awareness that countries are not, so far, on target to achieve their goals. This pushes states to look for areas they can tighten. While the shipping regulations are still set through a pre-planned schedule of reviews, it means that when the reviews take place, state representatives may then feel more pressure to push for higher targets. IMO consists of the same member states which were in discussion in Glasgow.

“There is no doubt that COP26 increases external pressure on IMO to increase its ambitions and accelerate its actions,” Mr Nyhus said.

But we may also see the same fault lines appearing at IMO, with some countries pushing harder than others, particularly on the need to reduce coal power, or set up carbon markets. “We are unlikely to see unanimity,” he said.

“I suspect we’ll end up with a split screen image, one side building on COP26 to advocate strongly for more action faster, the other side being significantly more reluctant. Instead of a new and more ambitious consensus, we are likely to see sharper and more vocal disagreements in the run up to 2023.”

## Declarations

Alongside the main discussions, there were a number of separate discussions, leading to various declarations, which may have consequences “down the road” for shipping, Mr Nyhus said.

There was a Global Methane Pledge, which aims to reduce global methane emissions by 30 per cent by 2030. This was focused primarily on upstream oil and gas and agriculture. But the maritime industry is also responsible for methane emissions, when LNG is burned in ship engines and some of it ‘slips’ out unburnt, known as ‘methane slip’.

Another area was discussion about lifecycle analysis for fuels.

A pledge to phase out coal also impacts shipping companies which carry coal – although this was not supported by Australia, China, India and the US, which are huge coal users. The conference nearly collapsed

over this, until a compromise was reached to use the ‘slightly softer’ term ‘phase down’ for coal, Mr Nyhus said.

The “Clydebank Declaration” was an intent to establish ‘green shipping corridors’ between major ports. “Whether it will have a real life impact remains to be seen,” he said.

## Carbon market

One core part of the COP26 negotiations were discussions on rules for a global carbon market, known as ‘Article 6’. It is about establishing the right of countries to exchange emissions reductions, either between two countries, or between multiple countries such as on a market.

“They are not shipping specific but will be of significance if and when IMO manages to move ahead with a market based measure,” he said.

Some of the text refers to how to account for transfers related to industrial emission reductions.

“Potential real life consequences are still some way off,” he said. “The agreement needs to be developed into a mechanism.”

[Outside COP26, IMO is discussing market based mechanisms (MBSs), and the outcome is still “very much up in the air,” he said.]

At COP26, 30 nations signed a “Just Transition Declaration” committing them to strategies which ensure that workers are supported in the transition to greener economies. This could be relevant to seafarers.

“The importance of seafarer competence and training should not be underestimated, not least when it comes to safety aspects of the transition,” Mr Nyhus said.

This article is based on Eirik Nyhus’ “Maritime Impact” podcast. You can hear the full podcast online here <https://www.dnv.com/expert-story/maritime-impact/COP26-the-outcomes-and-implications-for-shipping.html>





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# What MEPC 77 means for shipping

**The IMO's MEPC held its 77th meeting online on Nov 22-26, with expectations from some that it would increase IMO's GHG targets. DNV's Eirik Nyhus explained what actually happened**

**T**he IMO's Marine Environment Protection Committee (MEPC) held its 77th meeting online on Nov 22-26 2021.

Since the meeting followed closely after the COP26 United Nations climate change meeting on Oct 31 to Nov 13, there had been expectations from some that MEPC participants would be encouraged to adopt more ambitious greenhouse gas reduction targets. Also, that they would make faster decisions about the next generation of greenhouse gas regulations, said Eirik Nyhus, director environment for maritime at DNV.

But IMO had already decided, when it established its first greenhouse gas strategy in 2018, that it would be reviewed and maybe revised in 2023, Mr Nyhus said.

MEPC is following a work plan to develop these new regulations for mid- and long-term measures, aiming to build consensus and make final decisions in 2023.

The regulatory measures EEXI, CII and SEEMP were adopted in MEPC 76 last year. Now this has been done, "IMO has started to really focus on these longer-term issues," he said.

"MEPC 77 was therefore supposed to be more about free and frank exchange of views on IMO GHG goals and associated regulations, rather than making decisions. This would keep the consensus-based process on track."

## GHG discussions

There was a proposal that the meeting should set a target for full decarbonisation of shipping by 2050.

"Despite significant support for this goal the proposal did not get sufficient support. There were various views expressed. There were concerns that the proposal was premature in light of the existing agreement to revise the strategy in 2023. There were questions about equity for developing nations not being adequately addressed. Others simply disagreed with the goal itself."

"Maybe most important, as was pointed out by many, the reactions demonstrated how challenging it would be to reach consensus. [It

followed that] MEPC 77 would be better spent working on the mid to long term measures."

"The discussions that followed did not turn into tangible decisions."

There was a proposal on the table for a \$100 / tonne CO2 bunker levy, but this was "simply bundled into the broader discussions over pros and cons of market-based measures for further consideration down the road."

"There was also positioning from some of the major players on a different mechanism, a fuel greenhouse gas standard, the idea of imposing some kind of limit on GHG footprint of fuels."

There were discussions about a proposal from shipping industry organisations for a \$2/tonne bunker levy, which would raise roughly \$5bn over 10 years, to support research, development and deployment of green shipping technology. This would be called the IMO Maritime Research Fund (IMRF).

"While there has been support for this, there has also been a push back, the decision by MEPC 77 was to yet again send the proposal to the next meeting for further discussion."

"But this time with a twist, it is now to be seen to be a proposal for a mid- and long-term measure not a short term one. It is a seeming innocuous relabelling; the consequences are that it becomes bundled with other discussions to be made in 2023," Mr Nyhus said.

"My take is that IMRF is now on life support at best. Some design elements may be lifted into a broader market-based measure [but] as a standard regulation IMRF is unlikely to see the light of day."

There were proposals for amending the IMO data collection system, "to cater for greater transparency and to facilitate other carbon intensity indicators."

These proposals "were kicked down the road to MEPC78. The meeting simply ran out of time."

"MEPC will continue the discussion on both the strategy and potential regulation on GHGs at several meetings next year."

"IMO will continue finalising regulations for measures adopted at MEPC 76. The CII and the SEEMP guidelines are presently in progress in correspondence groups with approval expected

at MEPC 78."

"Work on lifecycle analysis guidelines will continue both at an upcoming intersessional meeting in March and MEPC itself. We hope to see this finalised in 2022 but would not be surprised to see this also slide into 2023."

"At the end of the day, with respect to greenhouse gases, MEPC 77 was more about exchanging and clarifying views than about making hard decisions. But the meeting did reaffirm the IMO's commitment to revising the strategy and agreeing on new regulations in 2023."

So as with the COP26 meeting, while there were no directly tangible outcomes, "neither did we see IMO's GHG process go off the rails."

"Frankly speaking that's not a bad outcome."

## Non GHG

Marine environmental issues are not all about greenhouse gas. "After almost 2 years of COVID restrictions, MEPC has seen the backlog of non-GHG issues steadily increase," Mr Nyhus said.

"It was hoped that this latest meeting would reduce the size of the backlog somewhat. But with the originally scheduled two days of GHG discussions turning into three full days, this became a challenge."

At MEPC 77, a resolution was agreed over the use of distillates or other cleaner fuels to reduce emissions or black carbon in or near the Arctic.

"As a voluntary measure it is not clear what impact it will have, but it is certainly a very clear policy signal both to member states and to shipping itself."

Secondly, the guidelines on exhaust gas cleaning systems were revised.

Thirdly, there was an analysis of data from the 'experience-building phase' on ballast water management.

This article is based on Eirik Nyhus' "Maritime Impact" podcast. You can hear the full podcast online here <https://www.dnv.com/expert-story/maritime-impact/MEPC-77-the-discussions-and-implications-for-shipping.html>



# Marsoft, ICS, Seaspan, BCG perspective on sustainability

**Can shipping companies access carbon markets, what future technologies may make a difference, engaging charterers and customers, and getting a supply of low carbon fuel – some topics discussed in the first and second sessions of ABS' Sustainability Summit, held online October 26**

**A**n interesting question is whether the maritime industry could gain access to carbon markets, so they could be paid for reducing CO2 emission, measured according to a carbon price, said Arlie Sterling, President and Co-founder, Marsoft, an advisory firm for maritime investment, chartering and financial decision making.

He was speaking at the first session of an online Sustainability Summit organised on Oct 26 by classification society ABS.

With decarbonisation, "the key from Marsoft's perspective has always been the business case, the balance of risk and return that is required in order to make an investment," he said.

"We know that there are significant markets on the voluntary side and the regulatory side for carbon. There's a barrier between shipping and those markets that we're trying to get through. The carbon markets have their own language and very strict requirements in order to enter."

"The price of carbon right now is between \$5 to \$15 a tonne in some voluntary markets, maybe \$60 in some exchange traded markets, \$200 in California," he said. "The chaos is not going to go away. Everyone is going to figure out, where they're doing their business, what the price of carbon is, in that market."

"Most economists will tell you we need north of \$100 / tonne to make a significant difference."

"As an economist I like the pricing mechanism, I'm encouraged by the numerous initiatives to put a price on carbon."

"I think that's a big challenge for the industry to imagine imposing that on itself. Decarbonisation is in a mythical world for many people. They haven't really incorporated that to their risk return decision making."

Another big question for shipping companies

is how much and how sustained the support from politicians for decarbonisation will be. "Over the short term, now we have seen the re-emergence of gas shortages in the world, politicians may be driving initiatives which increase fossil fuel supply and use, rather than reduce it, he said.

"Interpreting that is a big part of our conversations with our clients. We've seen a big change in the world."

The energy transition will mean big changes in demand for hydrocarbon transport. "What that means in terms of lifetime of assets, the ability to attract both debt and equity to those investments, is a huge issue."

Another external factor is the banking and investment sector. "Many of the institutions that have traditionally supported investment in fossil fuels are moving away. [This includes] many institutional investors that have traditionally provided vast amounts of liquidity. We're seeing some of the consequences now in terms of shortage."

"Shipping is going to look very different in terms of what is being traded in 2040 if we maintain the pace we're on now. Fuels are going to be different. Demand for ships is going to be potentially very much less."

But there are things which could make a big difference. "Here's where the technology bets start playing."

"To what extent is carbon capture going to be a significant part of our future? If it becomes a big part, maybe some of the traditional shipping survives. You have intermediate scenarios - carbon capture .. muddling our way through."

Another new technology which may make a difference is nuclear fusion. "We, here in Massachusetts, can see the first demonstration for fusion power in 2025. Imagine what difference

that will make."

More technology is important since it seems "quite probable" that future policy will be ineffective, he said.

"History teaches us to keep our [policy] expectations modest," he said. "I think there's a risk of backsliding, if the political powers are not aligned to address short term issues [such as a gas shortage]."

Another question is whether traditional hydrocarbon trades are displaced by transport of CO2 and hydrogen. "My hunch is we'll see a lot of it, but my hunch isn't what investors go on."

Another issue is that charterers do not have much to gain from decarbonisation. "There are not so many charterers that get a bonus if they reduce CO2 emissions, that remains a real cut throat game."

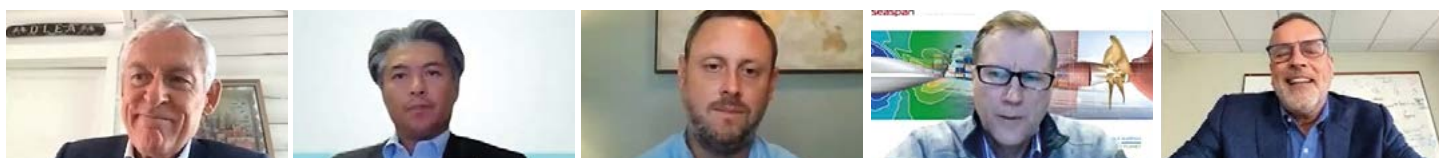
"If you're a charterer and you have no incentive to recognise the cost of carbon in your chartering decision, the board level debate [within shipping companies] must seem very academic. The Sea Cargo Charter is a step in the right direction, but it needs to become much broader."

Marsoft's approach is to outline different scenarios for what might happen. "It is important to look at investment in our industry under each of those scenarios, work through the problem in a systematic fashion."

"The path forward is a transformation for our industry. We don't quite know where we're going to be on the other end of it. I think shipping is becoming more expensive, it requires more equity.

## Esben Poulsson, ICS

"It is very true that some charterers apparently are not feeling very pressured on this [decarbonisation] issue," Esben Poulsson, chair of the International Chamber of Shipping (ICS).



**Screenshot from the first panel of ABS' Sustainability Summit. Left to right:** Esben Poulsson, International Chamber of Shipping; Yasuhiro (Oliver) Imaizumi, Sumitomo Corporation; Jesse Lashbrook, ABS; Peter Jackson, Seaspan Corporation; Arlie Sterling, Marsoft

"But in the container segment, the shippers want to know what we are doing about this," he said. There is more pressure than in dry bulk. Even in dry bulk, some of the big guns [such as] BHP and Rio Tinto have been very vocal about what they are trying to do."

Mr Poulsson said there was a need for policymakers to impose costs on carbon emissions on shipping, to make low carbon fuels worthwhile. But it needs to be implemented globally.

There are "danger signs coming from the European Commission," he said, who have "impatience, to be very frank, with the IMO's process."

If the IMO does not impose a carbon tax, "it is entirely conceivable [the EU] will come up with some emission trading scheme of their own. In our view this should be avoided at all costs. A distorted market is not the thing we want."

"Shipping has been extremely successful because it is a competitive business run by business people," he said. The message should be, "leave it to industry and industry will sort these things out."

"You need a level playing field in a business like shipping. This has been said a thousand times before. I think even the bureaucrats in the EU can see that. But they are impatient and their voters are impatient."

"The politicians have to step up and show some agreements, instead of putting roadblocks in our way when we're trying to do the right thing."

There has been a shift in IMO in recent years, away from debates being dominated by technical experts, or "nuts and bolts regulatory stuff", to becoming much more political, Mr Poulsson said.

"Debates are often had by people who don't understand these issues. That makes it more complicated. We want an IMO that is bold and can deliver for us."

Revenue from selling carbon credits amounts to a 'carrot', so it is not all 'stick' on shipowners, he said. "The carrot is much better. The stick will come, come what may. If we can be ahead of the game with the carrot, we'll be quite a lot better off."

"Shipping has made tremendous improvements," he said. [For example] "I was at a conference where we a [roro] ship fitted with solar panels on deck, so in port these ships are zero emission."

"I am very confident that we will reach these goals because I would never underestimate the ingenuity of mankind."

ICS has a proposal for a carbon levy on fuel, imposed through international legislation, which would create a fund which could be used to develop supplies of low carbon fuels, while also providing an incentive to use them.

"I think there is general agreement that it has to happen, I don't think anyone is seriously against it any longer," he said.

### Seaspan Corporation

Peter Jackson, Vice President, Projects and Technology with Seaspan Corporation, an operator of 125 container ships, said that much of the drive to decarbonise comes from its customers.

Many of Seaspan's vessels are operated as a service to liner companies such as Yang Ming, MSC, MOL and Maersk, so these companies are its direct customers.

"Some of our customers are starting to make choices based on what their customers are wanting. If the 'Walmarts and Nikes' want more sustainable shipping and they are prepared to pay for it, that's a strong influence to start moving shipping along."

"As a shipowner, we cannot develop our decarbonising strategy separate to our customers," he said. We have to keep an eye on their customers which are consumers. Consumers over time will start to vote with their feet. Consumers have a lot of power to be able to start influencing the way we move.

Seaspan's decarbonisation strategy begins with continuous efficiency improvement, which will continue irrespective of what fuel is used. "Carrying more cargo, continuous efficiency improvement, bulbous bow, propeller and engine improvements, air lubrication, there's all sorts of technology."

"Improving efficiency of the ship reduces the emissions but ultimately it comes to the economic [gain]."

The second part is the transition to alternative fuels. The first step is LNG, but with a view that this will continue to bio LNG and synthetic methane. "On the horizon we have our eyes on green ammonia, onboard CCS."

Seaspan is putting a lot of effort into understanding how market based instruments (carbon shipping) could be used by the maritime sector, he said. "They can be quite complex, between global and local."

"We're starting small," he said. A starting point is "for us to see if we can generate carbon credits from the efficiency improvements we make. If we exchange a bulbous bow and reduce emission can we get carbon credits?"

This way, "can we lower the overall costs for us to be making these energy improvements."

"If we can get traction on that, and costs can come down, it can start to translate out [financially]. We have to spend a lot of money to keep upgrading our ships, that doesn't necessarily always reflect in our charter rate."

"I hope it will improve the business case for us to do all these retrofits, these improvements."

"We've got a lot of work to do to understand what's going on when it comes to carbon credits, carbon trading and all that stuff."

On the plus side, "there's a lot of opportunities for creative shipping leaders," he said. "Shipping today will not be similar to shipping in a

decarbonised world. Creative shipping business leaders need to look for those opportunities and see what they can do with it."

### Willingness to pay

In the general consumer world, there has been a big growth in customers who are willing to pay more for products which are marketed as "sustainable" in some way, said Peter Jameson, partner with Boston Consulting Group, who is based in Copenhagen.

A big willingness to pay could translate into a willingness by charterers to pay more for more environmentally friendly vessels.

However studies have shown that 63 per cent of the purchases of sustainable products are made by the boomer generation (born 1946 to 1964), he said.

For many end customers, there is a difference between their stated intent and actual behaviour. For example, only 0.1 per cent of people choose to pay extra to offset the CO2 when buying a flight.

Buyers are not necessarily willing to pay more money for 'sustainable products', sometimes they just buy them preferentially over others at the same price.

Meanwhile many people are happy purchasing products which are not very sustainable, such as groceries with a lot of air miles.

Corporate buyers may actually be more inclined to pay a premium for sustainable products than consumers. "50 per cent of corporations say this is central to their buying decision," he said. In the maritime sector, "75 per cent of shipping buyers said, 'we're willing to pay a price premium.'"

### Maritime fuels supply

Mr Jameson believes that concerns about supplies of low carbon fuels is hindering investment by shipping companies into ships which would use them.

"We need clearer commitments with people who are going to invest. Once we get that signal moving, we'll see a shift in the pace of the transition," he said.

Perhaps the maritime industry should be more proactive in its discussions with oil and gas companies which produce and supply fuels, added Michael Parker, Chairman, Global Shipping, Logistics and Offshore with bank Citi.

"Shipping should be telling the energy industry what it is willing to use to put on its ships."

"We need to expect shipping is going to be much more expensive, ships are going to be more technically difficult to manage," he added.

This report is based on the first and second panels of the ABS Sustainability Summit, held online on Oct 26 2021. The full event is online here <https://event.on24.com/wcc/r/3428277/774EB29106984AC1EAA62805CBF95B85>



# How to move to alternative fuels

Speakers from Angelicoussis, Mærsk McKinney Møller Center, Seaspan and Vanderbilt University shared perspectives on how shipping companies should move to alternative fuels, speaking at the third panel of the ABS Sustainability Summit on Oct 26

One challenge shipping companies face when considering alternative fuels is to know how much they reduce your total carbon emissions.

"A scientifically sound methodology is needed to assess well to wake greenhouse gas emissions," said Stelios Troulis, Director - Decarbonisation, Oil & Gas with Angelicoussis Group.

For example, the variability in carbon emissions between grey, blue and green hydrogen, "needs to be understood," he said. "Some additional sustainability aspects need to be considered - land and water use, use of mineral resources."

Mr Troulis is a former LNG advisor with ExxonMobil handling commercial business development. Angelicoussis Group has 140 vessels serving oil, gas and dry cargo markets, through its companies Maran Tankers, Maran Gas, and Maran Dry.

"One aspect that should not be forgotten is the lifetime of the vessel. Making a vessel obsolete prematurely can be quite counterproductive, causing more greenhouse gas emission," he said.

"Another aspect should be the ability for solutions to be 'cross fuel' technology. [It means] vessels can run seamlessly on other fuel platforms."

The shipping industry will be in competition with other industry sectors for access to low carbon fuels, he said. "It's not just the shipping industry that is decarbonizing, every sector is under this obligation. aviation, heavy duty industry, other transport sectors. These sectors will

need this high energy density fuel to deliver the long-distance transport the economy needs."

Decarbonisation could be cheaper if regulators could count the average emissions for a fleet, rather than individual vessels, he said. For example, if a shipowner needs to achieve 5 per cent improvement from a fleet of 20 vessels, they could put all of their money into one zero carbon ship.

"In some cases, it may still be a lot more attractive than modifying the whole fleet."

## Fuels research

"We are looking for energy carriers [fuels] that have high energy content and are relatively easy to store," said Torben Nørgaard, Head of Energy and Fuels, with the Mærsk McKinney Møller Center for Zero Carbon Shipping, a not-for-profit, independent research and development centre.

For this reason, Mr Nørgaard believes that battery and hydrogen fuels are "out of the question" for deep sea use.

Biofuels "have this ability to allow us to start to transition today, blending in technology which already exists," he said.

"The trouble about biofuels - they are constrained in availability. We are in early phase technology. On a global sustainable basis, what is the amount of biomass we can make available for biofuels, how much will be turned into biofuels, and how much will end up in shipping?"

"If you start to analyse your way through that, it becomes pretty clear that biofuels will

assist in the beginning and be part of the fuel mix all the way through, but it is far from the entire solution for shipping."

"Shipping will face significant problems in actually acquiring the biofuel due to competition from other sectors where willingness to pay is slightly higher."

The next category is the 'blue' fuels, made from fossil energy with carbon capture and storage. They are "slightly controversial," he said. "That will never be 'carbon neutral' but will be 'carbon reduction' compared to conventional fuels."

Then there's 'green' fuels or 'e' fuels made by renewable electricity, including ammonia and methanol.

"There are certain scenarios where we need to consider blue fuel as a potential, while we wait for green fuels to be competitive," he said. "That will happen as we see a declining cost of [renewably sourced] electricity and a declining cost of hydrogen."

"Access to primary energy at reasonable cost will provide constraints in the system."

We are likely to see a mix of all of these in the future, he said.

The Center is putting together a tool which shipping companies can use to assess which fuels are likely to be best applied in different segments, parts of the world, and time in the future. "It is something we look forward to being able to present to the public."

One of the limiting factors in the industry's decarbonisation will be competition from other purchases of green fuel.




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**Screenshot from the third panel of ABS' Sustainability Summit. Top to bottom:** Stelios Troulis, Angelicoussis Group; Gareth Burton, ABS; Edward Washburn, Seaspan; Torben Nørgaard, Mærsk McKinney Møller Center for Zero Carbon Shipping; Dr Leah A Dundon, Vanderbilt University

"There's going to be so much demand for that from different sectors, industry, land, transport, aviation," he said. Even power plants are looking at switching from coal to hydrogen and ammonia if it were available.

Ammonia and methanol are also the biggest traded chemical carried on ships, after oil-based products, he said. This may help a move towards using them as fuel.

"What's quite clear, we need to revisit the entire value chain in how we do business."

## Seaspan perspective

Edward Washburn, senior vice president, fleet operations with Canadian container ship operator Seaspan, also emphasised the need for more information about full well to wake emissions, not just tank to wake. "We need to focus on what the true emissions are and how we can mitigate it," he said.

"It is relevant for blue fuels [with carbon capture], they have methane leakage from the upstream installation."

"As we start to move into biofuels arena and see biomethane substitute LNG, then we still have methane leakage onboard the vessel."

Mr Washburn is interested in ammonia fuel, since it "has the obvious benefit that is carbon free." A drawback is "there made be some laughter gas [nitrous oxide] which is a fairly aggressive greenhouse gas. It is subject to how the technology on the internal combustion engine is developed."

"We [also] need to focus on [exhaust] after treatment on vessels, to gain the full benefit of this particular fuel."

"There is a debate ongoing whether LNG is more attractive from a carbon intensity perspective, or whether it's less attractive."

In future, "[fuel] suppliers are going to be partners rather than transactional players," he said. Many fuel suppliers also operate terminals, another industry sector where there is pressure to improve on environmental performance.

In terms of training crew to use new gaseous fuels, the International Code of Safety for Ships using gas or other low-flashpoint fuels (IGF Code) covers it, he said. It is generally interpreted to mean that the master and engineering officers have advanced training, and the rest of the crew, even galley crew, have basic training.

The advanced training includes fairly specific knowledge of firefighting and familiarisation of vessel equipment.

"There's very educated officer mariners in the fleet, this is something they can handle. I think, overall, the mariner will be ready for the new fuels."

"We're permitting a hydrogen bunkering operation on the US West Coast. Certainly,

that involves a lot of training, and the training is available."

## Inland waterways

Dr Leah A Dundon, director of the Vanderbilt Climate Change initiative at Vanderbilt University, Nashville, Tennessee, was asked to give perspectives on fuels for inland waterways.

Inland waterways vessels "have extraordinary long lifespans," as much as 70 years. So, a primary consideration is whether a fuel can be used in existing vessels.

As well as being burned in the same engine, the fuel must be kept in the same tanks, which implies an energy density similar to marine diesel. "There's two fuels which come to the top of the list, that's biofuel and methanol," she said.

"Biofuels probably have the most promise, about 95 per cent of the energy density of marine diesel, they can be used in existing tanks."

Biodiesel means "relatively low adjustment" for vessels, she said.

Biofuels have their own special carbon considerations, "which are starting to be more researched". This includes the environmental impact of growing plants – including emissions from making fertiliser, farm machinery, transport and processing facilities.

The land use changes need to be considered – for example if a forest was cut down to grow soybeans.

Coming to methanol, it "does have real promise in the inland sector. It requires 2.7 x the amount of methanol to get the same amount for power and speed, but it has potential in the low load applications."

An example of 'low load' applications is the Ohio river, which is 900 miles long, with many locks. "You're not fighting a lot of current." So long as there is refuelling infrastructure at adequate intervals, vessels could use methanol fuel.

"Boats on the Mississippi burn about 3 x as much fuel as on the Ohio," she said.

"Methanol is going to take a bit more adjustment. Handling is going to require more training and be more difficult. We'll need to have detectors in engine rooms in case of a leak. It requires crew training, also probably government approval."

Electrification of inland waterway boats is possible, with charging stations along the waterway.

TO

The webinar is available to view online here <https://event.on24.com/wcc/r/3428277/774EB29106984AC1EAA62805CBF95B85>



# LLI study on maritime incidents 2012-2021

**The most common causes of injuries onboard tankers were fire and explosions. This was also behind most tanker vessel deaths. Some of the tanker related findings from a 10 year LLI study on maritime incidents**

**L**loyd's List Intelligence has compiled a study of maritime safety incidents over 2012-2021, sponsored by DNV, with some data specific to tankers.

Safety incidents which were counted in the report were war loss / hostilities, foundered (filled with water and sunk), fire / explosion, contact, collision, wrecked / stranded, and hull / machinery damage.

The study looked at LLI's database of 866,000 inspections, 26,000 detentions, 22,000 casualty incidents, and 1,000 losses. The 'safety incidents' was calculated by summing the detentions, casualties, and losses.

The most common cause of safety incidents across all vessel types was

machinery damage. It is difficult to tell for sure, but the sulphur in fuel regulations in special emission control areas (SECAs) introduced in 2015, and consequent rise in fuel types, may be a contributing factor, the report said.

The report calculated the 'incident rate' for all vessels and for different vessel types, calculated as the total number of casualties divided by the total fleet number. For all vessels, this incident rate rose from 1.7 per cent in 2012 to 2.0 per cent in 2014, then declined to 1.7 per cent in 2020.

The incident rate specifically for tankers was below the total fleet average. It was highest in 2017 at 1.7%. From that level, the incident rate dropped to 1.6% in 2019 and 1.4% in 2020.

2021 which led to injuries, a total of 107 injured people.

The only liquids tanker incident with more than 10 injuries happened in 2018 when a large crude oil tanker collided with a fishing vessel off the coast of Munambam in India, causing twelve injuries.

The most common causes of injuries onboard tankers were fire and explosions.

Fire and explosions were also behind most tanker vessel deaths. There were 27 fatal tanker incidents in the past 10 years, which resulted in 67 deaths.

Some vessels caught fire and/or suffered an explosion while dry-docked. Others had engine room fires, but there were also various other accidents or incidents that caused fires and explosions. Eleven incidents caused by foundering took another 28 lives.

There were few incidents involving gas carriers that led to injuries, deaths or missing people. In 2019, the LPG tanker Maestro suffered fire and explosion in Kerch Strait, between the Black Sea and the Sea of Azov, and later sank. 14 people died in the incident.

The report also analysed detentions and found that the vessel type sectors with the highest average age at the time of detention in 2012-2021 were passenger and ferry with 26.3 years, followed by roro/PCTC (25.7), 'other' (25.5), and general cargo (23.1). Tankers were on average 15.4 years, and gas carriers 18.7 when they were detained.

## Recent events

One of the most recent major accidents on a tanker was with the 160,000-dwt crude tanker New Diamond, 20 years old, on Sept 3, 2020. The vessel had a fire in the engine room and issued a distress message, while East of Sri Lanka. The vessel was towed to Port Fujairah on Oct 7 and found to be beyond repair. It was sold to breakers in May 2021 and towed to Gadani scrapyard, Pakistan, on July 6.

The full report can be downloaded free at <https://www.dnv.com/maritime/insights/publications.html>

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# Why is there a growth in anchor related claims?

**Both insurer Gard and class society DNV report a scary increase in vessel incidents related to anchor damage over the past 3 years. Could more heavy weather be to blame? DNV held a webinar to discuss**

**D**NV has seen an increasing trend of vessel incidents related to anchors, especially over the past 3 years, said Marit Norheim, VP and materials specialist with DNV maritime.

Anchor related incidents reported across the shipping industry rose from 759 in 2019 to 1000 in 2020. "Anchor losses and damages are increasing quite a lot in the last 2-3 years," she said.

Maritime insurer Gard saw a similar picture, with 42 anchor related claims in 2019 and 71 in 2020. There may have been further incidents when a claim was not made because the cost was lower than the insurance deductible.

A significant number of the incidents were occurring around the Mississippi Delta, said Jarle Fosen, Senior Loss Prevention Executive at maritime insurer Gard. 2019 and 2020 have been exceptional years for high river related casualties, he said.

Gard's data also shows a concentration in an around big shipping ports and in areas affected by bad weather, which would probably be expected, he said.

The Mississippi has special anchoring regulations at times of high river levels in certain areas. For example, stating that all vessels not moored at a buoy or alongside must have three independent means to hold in position, such as 2 anchors and assistance from a tug. Mr Fosen noted that having two anchors can increase safety risk, with the possibility that the chains get tangled.

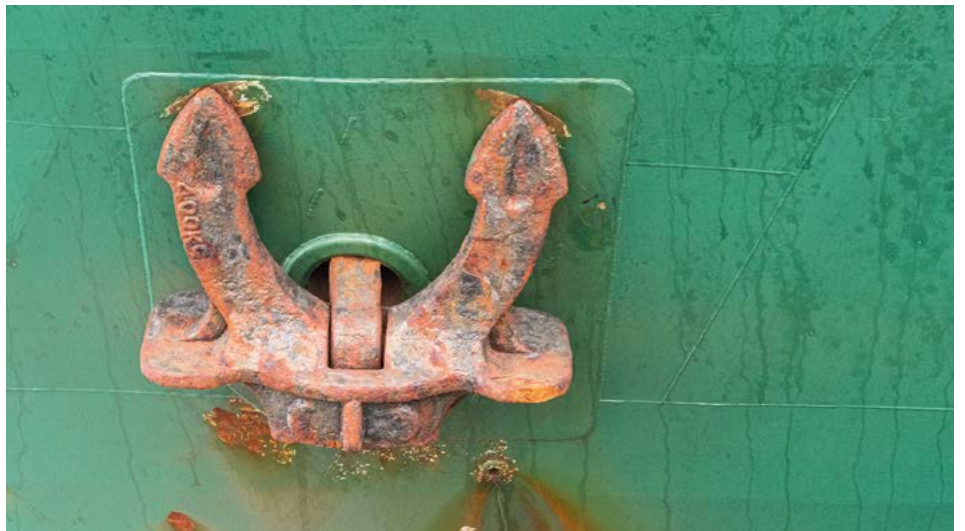
By sorting Gard's anchor related claims by vessel age, you see it peaks at 5 to 13-year-old vessels, he said.

Other data trends might be expected. There is a correlation between the number of times vessels used their anchors and the number of anchor claims, vessels with claims dropped anchors at 28 per cent higher frequency.

There was a correlation between how much time a vessel spends at anchor and its likelihood of making a claim – claiming vessels spent 27 per cent more time at anchor.

Vessels with anchor claims also spent 18 per cent more time in bad weather than vessels without claims.

The total annual anchor losses for tankers, where a claim was made to Gard, over 2015



**Do tanker operators have a growing problem with anchors?**

to 2020, were 9, 14, 8, 6, 12 and 17. The total anchor removals for tankers, with a claim made to Gard, over 2015 to 2020, were 6, 8, 6, 5, 15 and 20. So a big increase over 2018 to 2020 in both sets of numbers.

## Design limits

In class rules of every IACS member including DNV, anchoring equipment is designed for anchorages with no waves, current of up to 2.5m per second, wind of up to 25m per second (48 knots), said Ioannis Tsarouchas, principal engineer, DNV.

Equipment is also designed for an alternative scenario of waves of up to 2m, wind of 11m per second, current of 1.5m / second. And vessels have a maximum anchoring depth (such as 80m).

A DNV customer survey found that only 50 per cent of respondents are aware some limitations in environmental conditions exist, and 20 per cent are totally unaware of any limitations, he said.

Masters need to tell port authorities if they do not think the anchorage assigned to them is safe, said Gard's Mr Fosen. "If you are in a new port do some risk assessment on your anchoring."

## Gard case studies

Mr Fosen presented two case studies of anchor incidents, both of container ships.

The first case was a 2700 TEU container ship in the Arabian sea crossing a monsoon. After the monsoon, the crew went on deck and saw the anchor and chain were missing, although they had not heard or seen anything happen. "One might wonder, if the chain stopper and break was properly engaged during the voyage," he said.

The second case was a 17000 TEU container ship which lost its anchor at an anchorage outside Antwerp, while waiting to berth. There were gale force 4 winds. The anchorage was close to busy shipping lanes in the English Channel, with subsea cables and a wind farm nearby.

The master decided to heave anchor early morning, due to the predicted strong winds, while waiting for the pilot. There was already difficulty heaving the anchor due to the weather at 9.00h.

The wind gusts went up to 35 knots, the vessel was unable to pick up the anchor, and the captain decided to remain at anchor until the wind subsided.

At 2200h, he decided to resume bringing up the anchor, but found that the bottom part of the anchor, known as the "head" and "flukes" were missing. This was a 19.5 tonne anchor, originally 5m long and 3.7m wide.

The port authority decided they would categorise the lost anchor parts as "pollution" and require the ship to recover them.



A search company identified two possible spots for the lost anchor. This was followed up by deploying divers, who could not see the parts on the sandy seabed.

The shipowner had to inform the port authorities that the search had failed to find the anchor parts. The port authorities decreed that the shipowner 'will remain liable for any damage caused at a later time by a lost anchor remaining on the seabed'.

"Our experience is that it is extremely difficult to find lost parts without an anchor chain, they might be submerged in the sand," Mr Fosen said.

An alternative approach is to use remote operated underwater vehicles (ROVs), otherwise known as submarine drones.

Anchor dragging cases are often more serious and more costly, he said.

In one example, a vessel made contact with the quayside of a chemical terminal and then grounded on a riverbank.

In a third case, a ship was faced with sudden high winds, and the anchor damaged and underwater fibre optic cable. The master was charged by Australian authorities.

"Most anchor losses are preventable," he said in conclusion. Ship operators must never rely on an anchor in weather conditions which are too strong for it.

"Make sure crew monitor weather forecasts, they are quite good these days. Know when to leave anchorage, know the limitation of the anchoring equipment."

Gard created a 14-minute video, explaining what can go wrong with deepwater anchorages and bad weather, and what the impact can be. See <https://www.gard.no/web/content/anchor-loss>

### Swedish Club perspective

Joakim Enström, Loss Prevention Officer at insurer The Swedish Club said his company's anchor related claims has "over representation" in Fujairah and Mississippi.

The Mississippi River can see high water levels after heavy rainfall. This peaks between Feb and May, but can also occur at other times. It can lead to water currents in anchorages of 6.5 knots, which is way above what equipment is designed for, he said.

In the Mississippi, vessels are often loaded and unloaded at sea, using floating cranes and barges, the vessel moored to buoys and using anchors. But the barges and crane also add to the stress on the anchoring system. "This is not what it is designed for. This operation demands a lot of preparation, having a contingency plan is strongly recommended."

Fujairah meanwhile is one of the top bunkering ports in the world, with several anchorages outside, with water depth 65m to 110m (a typical maximum anchoring depth is 80m).

Globally, one common cause of problems is vessels dropping the anchor rather than 'walking it out' (letting the chain out gradually). Or the chain may be 'walked out' to a certain length then dropped.

Dropping the anchor means it runs out uncontrolled. It is possible the brake on the windlass (anchor winch) is not able to hold the chain when you need to stop. "The anchor should never be declutched from the windlass and dropped by 'let go,' he said.

### Bulk carrier and barge

Mr Enström told the story of a bulk carrier which planned to load in an anchorage in Southeast Asia with a barge and a floating crane.

The bulk carrier was approaching the anchorage with the pilot onboard. The master thought the vessel was too large for the anchorage, but the pilot said, "no problem this is where large vessels anchor."

The master accepted this and anchored with 8 shackles of chain left on deck.

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The water was 90m, with a tidal stream of 3-4 knots. The engines could be started in 20 minutes of notice.

During the night, the engineer noticed that the vessel was dragging the anchor. The master ordered the anchor to be heaved up, and the vessel went to another position, but started to drag again the following night.

The master tried to contact the pilot and the port authority without success. The master considered departing for another anchorage, but decided not to, as he did not have authority to anchor there.

Other vessels reported they were also dragging.

So the master re-anchored in the original position with 9 shackles of anchor chain (90 feet of chain between each shackle) on deck.

He got in contact with the port authority, who said it is not their concern but the pilot's business, but the master could not get in touch with the pilot.

A couple of days later, the vessel started to drag for a 3rd time. The master could not use any more shackles, due to proximity to other vessels.

He was concerned about swinging radius. The wind increased to 30 knots with heavy rain. Eventually, the wind caught the stern and pushed the vessel aground. It had to dry dock to fix some dents.

One note is that the anchoring system is not designed to additionally carry the weight of a barge, Mr Enström said.

### Tanker in heavy weather

A second case presented by Mr Enström concerned a tanker anchored in heavy weather, in a bay, while waiting for a berth. There were 7 shackles of chain (630 feet) in the water.

There was an incoming typhoon which got upgraded to a category 2 typhoon. The wind increased to Beaufort 9 - severe gale.

The master told the chief officer to pay out 3 shackles of chain. The wind increased to 12 - hurricane. The anchor started to drag.

The master tried to manoeuvre the vessel into the wind using engines. 2 hours later the wind had increased further. It was not possible to turn the bow into the wind.

The vessel had turned so wind was acting on the side of the vessel, and the vessel was now dragging anchor. There was nothing the crew could do, and the vessel ran aground.

The crew abandoned the vessel, and shortly after were rescued by a tug. There was no pollution or injuries.

Mr Enström recommended that ships should never be at anchor in heavy weather. If weather is getting bad, you should leave the anchorage.

Also, you can minimise the tension on the chain by keeping it as vertical as possible.

In windy weather conditions, the rudder and engine can be fine-tuned to prevent tension on the chain.

### Anchor materials

Is it possible that the increase in anchor problems is due to a change in materials anchors are made from? No, nothing has changed, says Marit Norheim, VP materials specialist with DNV. There have not been any developments in materials in recent years.

DNV was contacted over 2019-2020 by a number of customers with concerns about the material quality of their anchors, after seeing a number of anchor losses. Also bent shanks (anchor stems) and broken flukes (the pointed part of the anchor which digs into the sea bottom).

"As a metallurgist, we always get the blame, [with suspicions] there's something wrong with material," she said. "We did material failure investigation, certification process rechecking, rules and standard rechecking. We found out there are not [changes] specifically related to the material as such."

Anchors are normally casted (liquid metal formed into shape). Some big anchors on cruise and container vessels are welded.

Normally shipowners prefer to have as lightweight anchor as possible, because this means it takes up less space and has less cost.

"Sometimes we recommend they use a heavier anchor than the minimum in the rules," she said.

### DNV experience

DNV has been asked a number of times to try to find the root cause of an anchor related failure, said Ioannis Tsarouchas, principal engineer, DNV.

The root cause for a number of problems was attributed to hesitation / late decisions, such as a late decision to heave the anchor as weather conditions worsened, or which forced crew to do something which was not in standard anchoring procedures, Mr Tsarouchas said.

Other problems were attributed to exceeding the safe working parameters of the anchoring system - leading to the anchor holding power being compromised, and anchors being dragged along the seabed, or lost.

Another cause is storms being more frequent than before, including gusty winds, turbulence in currents, and steep waves. Heavy rain leads to large flows of water into river basins. As well as the Mississippi, Mr Tsarouchas cited the Paraná River which enters the sea in Argentina (Rio de la Plata).

Anchor dragging is not easy to detect, and also means it will take time to get the vessel back to a manoeuvrable condition, he said. It can lead to damage, as it hits underwater cables

and pipelines, maybe even pollution. "The consequence of a failure in anchor equipment is not only replacement cost," he said.

Mr Tsarouchas emphasised the importance of being aware of the equipment limitations, so for example you don't anchor in deeper water than the equipment is designed for. You can prepare action plans which take the limitations into account.

If you know the limitations, you will better know what level of wind or current will take the anchoring system out of its safe operating range, and monitor forecasts and changing conditions to see if that may happen.

You will also be better able to work out if the weather situation is likely to soon deteriorate to the point where you can no longer rely on the anchor to hold the vessel. "The faster you recognise a dangerous situation, the more time available to react and escape," he said. "Under bad weather, stay alert, follow the action plan, be ready to sail away."

Crew need to be trained so they can perform without making 'unforced errors' even in extreme and emergency situations. "We have seen that many accidents could have been prevented," he said.

If a ship loses an anchor, the first move would normally be to inform the port authority, DNV's Mr Tsarouchas said, and the port authority would probably require that class is involved to assess the situation and make a survey.

### Audience survey

Registrants to the webinar were asked if they had seen damage to anchor equipment over the past 3 years, and a majority replied yes.

When asked when it happened, most said during operation in strong currents, in bad weather and deep water.

When asked if they believe the master and crew are aware of limitations of anchors relating to environment conditions, 43 per cent replied no,

41 per cent yes, 15 per cent don't know.

When asked what factors increased the risk of incidents with anchoring equipment, Some responses included the busy-ness of ports, also ships having to use anchoring equipment for the first time, such as container ships and car carriers, and the pressures on delivery times from high demand.

This article is based on a DNV webinar. You can watch the full webinar online

<https://www.dnv.com/maritime/webinars-and-videos/on-demand-webinars/access/anchor-losses-how-can-we-improve.html>





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