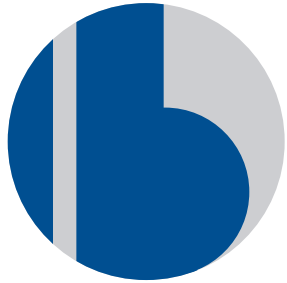


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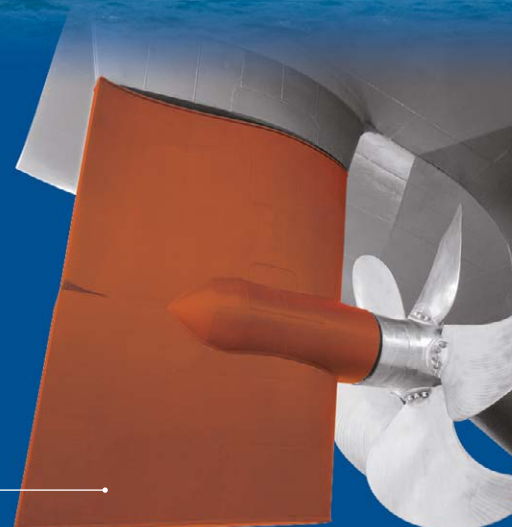
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Seafarer morale tops list of growing safety concerns

In *Tanker Operator*'s reader survey of the biggest growing safety concerns, "crew morale" proved to be by far the biggest

Tanker Operator surveyed our readers to find out what areas of tanker operation are you more concerned in terms safety than a year ago. The biggest concern by far was crew morale.

Respondents were invited to tick as many boxes as they like for issues they thought were an increasing concern.

89 per cent ticked "crew morale". 28 per cent ticked navigation, 26 per cent piracy, 15 per cent work in enclosed spaces, and 28 per cent the increasing complexity of managing propulsion with new fuel rules.

When asked to elaborate further about their safety concerns, a crew member from Mumbai said, "no one cares for the seafarers actually."

A UK crew member said, "medical treatment from shore. Multiple cases of denied access even before Covid. Training standards are dropping"

A service provider from Norway said, "The way seafarers are treated due to Covid is appalling. Governments need to take care of their human rights."

A senior HSEQ manager from Greece said, "Limited reaction by national authorities in relation to crew-change issues encountered."

A seafarer said, "in this pandemic situation, seamen all over the world are frontline workers. In this situation, at least for the seafarer, there should be arrangements for on time sign-on and sign-off. Being away from family is difficult for everyone. When there is extended contract beyond the person's limit, then there comes a situation where safety is compromised. That is too dangerous for the person as well as the other fellow crew members."

A senior tanker operator manager from Hong Kong said, "ever changing COVID-19 situation and crew repatriation regulations".

A charterer and vetting manager in Malaysia said, "shipboard stay for extended period, risking safe operation of vessel."

An ex-master, and current marine advisor in Nigeria said, "Several accidents are occurring mainly due to extended stay onboard and inability of organisations to relieve people on time."

Other safety concerns

A number of growing safety concerns not related to COVID were mentioned.

A tanker junior manager from Singapore said, "overall decline in training, costs and crew retention"

A regulator in Middle East said, "Need to tackle the decreasing capabilities of the senior sea staff."

A master in Europe said that a key detriment to safety was "office unnecessary pressure to answer questions yesterday, if possible. Usually the chartering departments ask questions related to several future cargo prospects and most of the time you don't have the time to answer the first question, but you get 2-3 questions more, which take some time to answer, not to mention there are always other pressing matters that happen in the same time. Apparently the operators and their managers don't have any patience to wait for an answer."

A tanker operator senior manager in India said, "Criminalising seafarers due to pollution of sea / air. Less crew, more paper work. Blame culture. Pollution of the seas /air due to malfunctioning

of equipment. Complexities using multiple fuel types. Heavy stress when entering or leaving ports. Multiple inspections."

A service provider in Antwerp said the growth in remote surveys was itself a safety hazard. "Remote surveys and issuance of e-certificates without physical visit on board will induce a lowering of the norm for those ship, crew and manager already operating at the minimum acceptable standard. With Port State Control having drastically cut down their ship's visits, and some operators/flag performing remote ISM surveys, what is the last line of defence to pick the bad apples? Vetting inspections? Bad luck, SIRE is going for remote inspections! What a joke. Hopefully is CDI not going on this remote funky concept."

A master in Singapore said a big safety concern was "missing uniformity for the navigational instruments."

An ex chief engineer in Kuwait said, "what is hindering safety is the exhausting official documentation and duplication of inspections, which negatively reflects owner's income and divert ship staff from more essential and practical safety and maintenance issues."

A service provider in Scandinavia said he had concerns about soft skills (management / leadership) from tanker officers recruited from certain parts of the world, "even though technical skills and nautical knowledge are reasonable to good. BRM/MRM/CRM was added to the STCW requirements but is now officially taught by a large number of people who do not have a clue about the core features and concepts of the original BRM/MRM training programme."

(Note BRM = bridge resource management, MRM = maritime resource management, CRM =

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crew resource management).

This person continued, “Another fundamental issue is the widespread use of third party management companies which runs ships for a fixed fee but without caring of the state of the ships; Three to five years later they hand back the vessels more or less totally destroyed. Have seen this happening a number of times with a number of different well-reputed shipping companies.

“Unfortunately probably difficult to change this as the shipping industry in general is carefully set up to allow most (except the crew) to be able to blame someone else. Together with the shipowners’ favourite clause in the P&I insurance agreement, crew negligence = Payable claim. Guess who’s to blame?”

“Over time the various inspection regimes in the tanker business (primarily SIRE and CDI) certainly has made a significant difference to the better. Unfortunately these systems have been around long enough and become important enough to make people figure out ways to manage inspections.”

“Additionally, these inspections are often considered so important that it is not uncommon that people onboard focus on creating the required paperwork but forget - or run out of time to - perform the actual work that eventually should result in documentation being produced.”

What is improving

Respondents gave interesting responses when asked where they feel safety is improving,

“Piracy, safety of navigation” (manager in Hong Kong). “Incidents during safety drills, small improvement though” (manager in Greece). “Technical quality and propulsion” (manager in the US). “Mooring Operations” (manager in Greece) “[reduced] potential for fire” (manager in India).

A tanker operator junior management / superintendent in Turkey said, “personal protection equipment is getting better.”

A UK service provider / consultant said, “navigation - there appear to be less collisions than previously”

An ex-master, now marine consultant in Nigeria, said, “enclosed space entry - This aspect has proper risk assessment tools. “

A tanker operator junior management / superintendent in Oslo said, “Cybersecurity,”

A tanker operator senior manager in Canada said, “bridge teams, tank cleaning teams”

A service provider / consultant in Antwerp said, “Paper based management and digitalisation. But is it really an improvement or merely an evolution? Paper documents are not real life.”

A master in Europe said he thought safety in general was improving. “This is obvious when

those on board gain more experience and the office personnel take things slowly, with an accent on safety, rather than doing more in a shorter period.”

A tanker senior manager in Peru said, “access control.”

A charterer and vetting Manager in Malaysia said, “safety awareness with crew are better shown.”

A tanker operator senior manager in India said, “precautions before entering enclosed spaces. navigation - electronic charts, fire detecting / firefighting techniques, operation of critical equipment.”

A tanker operator senior management in Greece said, “reporting and openness”.

Morale - Columbia's perspective

To get more insight on factors which affect crew morale we spoke to Norman Schmiedl, group director crewing with Columbia Shipmanagement. Columbia is the fifth biggest ship management company in the world according to Lloyd's List 2019 data, with 320 vessels in full technical management and providing crew management to a further 60.

Even before COVID, the company was taking something of a leading role in the industry in boosting crew morale, including providing crew with free telephone counselling services to discuss any stresses they might have, and making special effort to improve catering onboard.

Mr Schmiedl endorses the view that crew morale is a major growing safety concern for tanker operations. It could be looked at in terms of mental fatigue, the sense of exhaustion which arises when people find they are not in control of their lives - both the plan for leaving the vessel and the plan for when they get back onboard, he says.

There is an increasing understanding that achieving safety “really boils down to the people,” probably more than procedures or safety standards, he says. It is people who “have to use these systems,” he says.

One of the main ways Columbia tries to maintain crew morale is “basically keeping crew busy” and encouraging social interaction onboard, so helping keep people’s minds off the situation, he says.

Columbia has put a lot of effort into maintaining high catering standards, including providing high quality food and training for shipboard chefs, and also ensuring that there is a variety of food, so it does not get boring, and gives people something to talk about.

Columbia has been encouraging crew to take part in fitness programs, which can have a competitive element. This also gives people something to talk about with each other. Most ships have gyms today, although the gyms are

normally much smaller than on shore, typically with just a few devices, and maybe some equipment which can be taken into cabins.

In terms of social interaction, life on board ships is different to a few decades ago, when shipboard life was more sociable. The numbers onboard are lower, working days can be longer, and at the end of a working day crew want to take advantage of internet to talk to their family.

Crew also do not talk so much to each other about the equipment itself as they used to. In the past, they might discuss better ways to get performance from an engine. Today there is much more automation, and resolving a problem probably means reading equipment manuals rather than discussing with colleagues, he says.

Another way to improve crew morale is to keep crew in close contact with the company. The CEO Mark O’Neil releases personal videos to the crew twice a week, informing them on how the Covid situation is evolving, what is happening, and assuring them that the company understands they are facing very difficult times and is trying to do everything it can, although matters are largely beyond the company’s control.

Efforts are also made to encourage the crew to understand they are in a very unusual situation, and can contribute themselves by trying to be positive and resilient, and acknowledging that no-one on the ship or in the office is able to change the situation.

The company has a program for all company directors, both operational and non operational, call ships accordingly to a rota, so every ship gets regularly contacted.

Crew have provided feedback that they find the phone calls useful in keeping them informed, and understand the steps which the company is taking to try to push authorities in the respective countries to be more supportive of faster crew changes.

In this way, it is able to take advantage of cheap and fast satellite communications available today. In the past, a shipping company would only communicate with the captain, perhaps asking him to distribute information onboard, and the message may get diluted. But today it is possible to communicate directly with everyone, and send them videos.

Software tools can support more informal discussions, including with people keeping in touch with the company through multiple channels, and electronic polls to find out people’s opinions.

Columbia is providing free internet to crew, to help them keep in touch with their families, and is seeing the usage grow. “Before, crew were [typically] speaking half an hour a day to family and friends,” he says. “Now it is 1.5 hours.”

How Neste is improving vessel performance

Neste Oyj is implementing digital tools to improve the performance of its vessels and its vessel logistics, including chartering, scheduling and monitoring vessels. Shipping performance manager Risto-Juhani Kariranta explained the project

Neste Corporation, the world's largest producer of renewable diesel and sustainable aviation fuel, is implementing new digital tools to improve the way it manages vessel logistics, including chartering, operations, scheduling and fleet performance.

Shipping performance manager Risto-Juhani Kariranta explained how the project is being managed, speaking at a webinar organised by Tanker Operator's sister company, Digital Ship, on Sept 3.

Mr Kariranta has been working on ship performance related matters for 10 years, in different roles in different companies.

By "vessel logistics" it means the whole activity of chartering, managing and scheduling vessels to meet its cargo transport requirements.

Neste has approximately 4,700 employees (Q2/2020). In 2019, 82% of the company's comparable operating profit came from renewable products. Neste has a global growth strategy for renewables, based on waste and residue as well as other innovative raw materials.

The company operates a fleet of 20 tankers including product and crude oil carriers, and books a significant amount of spot voyages a year.



Shipping performance manager Risto-Juhani Kariranta

The spot voyages are mainly on voyage charter, where a fixed price is agreed with the owner for the voyage including fuel. In this case, Neste takes an interest in the fuel consumption and emissions but is not directly affected financially if consumption goes up or down. But some vessels are on shorter time charter, where the charterer (Neste) pays for fuel. "We have more control and interest in those," Mr Kariranta said.

Neste operates production facilities in Porvoo, near Helsinki, Rotterdam and Singapore.

It works with an increasing number of terminals around the world, mainly for gathering raw materials for making renewable fuels. This includes used cooking oil, animal fat and residues from vegetable oils.

Due to the short voyages, the time-chartered vessels spend about 40 per cent of their time in ports for loading or discharging.

Some cargoes need to be heated, because otherwise there might be deterioration in cargo quality, or they are harder to pump out of the vessel. This heating is a significant consumer of fuel.

The sea area around refineries and terminals in the Baltics can get an ice cover in winter, and this also needs to be planned for, as it affects the vessel logistics.

Optimising fleet utilisation

The company is keen to optimise everything associated with the shipping activity.

It wants to get the best "rotation" of vessels, when it has a number of options about which vessel should go where, when and with what speed.

It aims to find the best choice first by comparing different plausible alternatives, calculating the base cost, weather impact on the costs and speed, risk factors and cost difference of each. Once the calculation engine for this is accurate enough, utilization of high end optimization algorithms will be possible to a larger extent.

It is a complex equation because some cargoes are more sensitive to delays than others and many restrictions and uncertainties exist.

It is necessary to understand how much time vessels need for each port call, so they can be allocated the right amount of berth time. In the same way the sea voyage duration predictability is being improved. The biggest volatility comes with the possible waiting times for the berth availability and many measures to predict or at least mitigate the possibility of it are under work.

Vessel performance

In terms of improving the performance of individual vessels on longer voyages, weather routing is proving interesting, also taking weather and currents into account. For example, on one voyage the company saved 37.3 tonnes of fuel from weather routing, amounting to \$26,000, Mr Kariranta said. On shorter voyages the speed and propulsion power optimization are in focus as there are benefits to be gained on each voyage with systematic speed control and optimization for JIT-arrival.

The main KPIs being monitored for validating the performance are vessel waiting time, average speed for the whole fleet and individual vessels, consumption of fuel per nautical mile.

Digital project management

Neste vessel logistics digitalization leap was initiated in early 2019 to transform the business, the main goals were to reduce manual work, process lead times and costs by changing the way people do their daily operations with the help of digital tools.

In order to transform the business and reach the goals, Neste uses agile methodology for organizing the work and providing the needed capabilities. The work is done incrementally, working with the multiple solutions at the same time and keeping the value delivery in the core. The approach is similar to the "Scaled Agile Framework".

The first step was to define the key interactions across the whole organization. A large number of interviews and discussions were conducted to map the processes, understand the biggest challenges and come up with the key capability areas that will be in the

focus of the work.

One example of these capability areas is “Fleet performance” that is responsible for managing documents and tasks for voyages, KPI tracking, and safety incident reporting.

The next step was to identify the pain points and understand the dependencies by finding out how information flows between different parts of the organizations. Prioritization was done based on value creation; the work was started from the areas that have the biggest benefit opportunity.

“We created a rough roadmap of what kind of solutions we want to work on for the following half year,” he said. “We are planning to continue this work for some years. We target in selecting a focus point for each year.”

We need to also think where do we get the resources? Can we do this internally or utilise some partners for the development? Are there software products already available that we could utilise, off the shelf or with customisation?”

After these steps we define more specifically what we want to achieve in each stage, how the achievement can be assessed, and whether the measurement method is correct.

“We are not developing for the sake of digital transformation. We are developing in

order to have a positive effect on our overall performance.

“It is actually quite laborious work to find the right indicators for measuring the improved performance. You very seldom are completely happy with the matrix,” he said.

“It is true we can’t change everything overnight,” he said. “Implementing new technological solutions is not only buying a software or new tool, it is always tied to the people and processes of the company.”

“I have been very happy about our agile way of working model, it has been very good and flexible and gives a backbone for the whole development.”

“I think we have succeeded to align it quite nicely. It is not every single project working for different areas [goals].”

Experimenting

“In general we want to do more quick experimenting, try out some concepts improving our performance with least possible effort but a clear way to measure, in order to find out we are doing the right thing. If you find something that is not working, or you need to do more of something else, you simply do it by changing the priorities, you are not tied to any heavy waterfall project plan,” he said.

Often, when you start a project, you have some assumptions about what effect would come from what action, “and it doesn’t work like that, it might have some other effect, our vessel logistics is a complex puzzle and each piece has effect on others” he said.

The company experimented for example with ways to send an instant request to a vessel to slow down, when the data showed that if it kept the current speed, it would arrive before the jetty was free, and have to wait.

The approach which worked was simply to send an automatically triggered message to the vessels. “It seems to work quite nicely, just tell them, ‘OK at this time your jetty is free,’ and they seem to slow down. We start to implement that for the whole fleet.”

In one example, a vessel receiving such a message when departing from ARA to Finland, dropped speed by 2 knots compared to what it had originally planned, and saved 30 tonnes of fuel on just one voyage.

This article is based on two presentations at Digital Ship webinars – one on digital project management (see <https://youtu.be/KS5gsHqOqD4>) and one on vessel performance (see <https://youtu.be/JFGXfTzxG00>)

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Seafarers and COVID-19: ICS webinar

The International Chamber of Shipping (ICS) reviewed how COVID-19 is affecting seafarers and how the industry might find better ways to influence government, with a webinar on Sept 9, with senior speakers from EuroNav, PTC Holdings, ILO, ICS and DNV GL

The shipping industry has had big problems with seafarers unable to get home from vessels during the Covid-19 period. In early September, there were 300,000 seafarers estimated to be unable to get home from vessels due to travel restrictions.

"Shipping has been at the heart of a humanitarian crisis," said Esben Poulsen, chair of ICS and chair of the webinar. "Despite strenuous efforts, which resulted in convening of ministerial summits, intervening of the United Nations secretary general, a message from the Pope himself. None of this has been sufficient to resolve this crisis."

"We must ask ourselves, why is shipping not

heard - and how can we change that? How can we build global relationships that deliver, and ensure we can learn the lessons?"

He was speaking at a webinar organised by the International Chamber of Shipping on Sept 9, "Shipping 2020 – Analysis of the impact of the COVID-19 pandemic".

The root cause of government's lack of willingness to help may be the secretive culture of the industry, said Hugo De Stoop, CEO, EuroNav, Belgium. For years the industry has tried "to be in the shadows, to be discrete, to be forgotten."

The reason for that is that "nobody wanted to pay tax, nobody wanted to be heavily regulated."

But as a result, the industry is represented in international discussions by very small countries - small flag states. They do not have large economic clout at the United Nations, he said. "You cannot come to the UN and claim something if you don't represent economically anything."

"That is something which needs to be changed. I believe it will be gradually changed."

"There's a lot of private companies populating the shipping world, people prefer to say 'discrete.'"

But such discrete companies do not talk about what they do in times of normal business.

"The result is that when people hear about shipping, they only hear about the bad things," he said.

On the positive side, we have seen "unprecedented level of co-operation" during the period, Mr De Stoop said.

"The main reason is that we are in a crisis. Did we have any other choice but to cooperate? I don't think so. People when facing a crisis do behave in different ways. Let's just hope whatever level of cooperation can be maintained for the future."

Guy Ryder, ILO

Guy Ryder, Secretary General, International Labour Organization, Switzerland, agreed "the international community has done a very bad job in responding to this global crisis."

"What we've seen is an accumulation of national responses to a global crisis."

And with rising geopolitical tensions, there is "not much appetite for global co-operation" at the moment, he said.

A complication is that the pandemic involved different parts of government, as it "mutated from a health crisis to a socioeconomic crisis to a humanitarian crisis."

The people in various national governments responsible for maritime affairs may not be closely linked to the decision makers around Covid, often in health departments.

The industry showed itself to be lacking in the right relationships with the right government organisations to get problems resolved, he said. "You haven't been able to produce the political reaction."

We have also seen that countries are reluctant to act on behalf of other countries' nationals. Mr Ryder was invited as an observer to a G20 Foreign Ministers' Meeting in early September, discussing movement of people across boundaries. But the discussion was nearly all about tourism – there was only one reference to seafarers, by a representative from India.

We may need governments to consider how their nationals would be affected by disruption to their supply chains caused by a troubled maritime industry, he said.

"This crisis should have cleared away our illusions about a benevolent attitude of government towards international obligations."



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They will divest themselves of obligations very quickly when they feel there is an interest in doing so and their local population will agree to it," he said.

"We have to find ways to apply a bit of heat to non-responsive government," he suggested. For example, governments may be willing to apply pressure on other governments because they have many of their own nationals involved with an issue.

Gerardo A. Borromeo, PTC Holdings

Gerardo A. Borromeo, CEO of PTC Holdings in the Philippines, noted that Filipino seafarers bring back around \$32bn a year to the country.

"These people are normally welcomed with open arms. But when this pandemic hit, everyone considered they were transmission vectors, virus carriers. The systems were not in place to adequately test people. Effectively, movement stopped. It put a domino effect on everything else. Even if people could get to Manila, they found they could not get home."

PTC provides crew to vessels, and has a pool of more than 51,000 maritime professionals with 25,000 on board over 1,000 vessels worldwide at any one time.

"One of the reasons many Filipinos go to sea is the sacrifice they are prepared to make to



Screen shot from the ICS webinar.

Top row: Guy Ryder, Secretary General, International Labour Organization; Guy Platten, Secretary General, ICS; Hugo De Stoop, CEO, EuroNav

Bottom row: Gerardo A. Borromeo, CEO of PTC Holdings; Esben Poulsson, chair of ICS; Knut Ørbeck-Nilssen, president of maritime with DNV GL

assist families, the significant economic benefit they have from being maritime professionals," he said.

Shipping companies need to be aware of the pressure which being kept at sea is putting on people. Perhaps they should offer counselling or other services to help release the pressure. They need to be aware of the impact it can have on mental health. "Everybody hits a speed bump every so often," he said.

Ship-shore communications are increasingly important in supporting seafarers' communications with family members, he said.

People say that the virus is a "99 year event we could have never planned for", it would be good to have better preparations for the next time it happens, he said.

For example, it would be useful to have some international identification system for essential workers. "In times of crisis it is important to distinguish who can move and who should move," he said.

There could also be "hub" and "corridor" movement systems in place, such as an arrangement for seafarers to be able to travel from Amsterdam to Manila

Perhaps it is worth pushing for efforts to

improve testing and test result turnaround time, he said.

DNV GL

Knut Ørbeck-Nilssen, president of maritime with DNV GL, noted that the high levels of uncertainty and fatigue among seafarers could easily result in "severe safety issues at sea or at port".

"Frankly speaking, that would be in the hands of local politicians who are not taking these challenges seriously and addressing them," he said. "If this carries on, we will face more severe problems."

ICS

Guy Platten, Secretary General, ICS, said, "it seems to me at times governments are more interested in tourism than crew change and that is deeply frustrating."

"Everyone feels like banging your head against a brick wall - you are not getting through."

"Ultimately - unless the supply chain is actually disrupted - it is hard to see why governments are going to step in, that's the honest truth of it."

"We've seen tanker companies diverted hundreds of miles, take weeks of charter, just to effect a crew change."

"We need to keep making the case that shipping is an integral part of our lives."

Esben Poulsson, chair of ICS, added, "a number of people have suggested it will take some example of crews refusing to sail ships and the supply chain being disrupted, to get governments to focus on it."

"If that is the case, that is most unfortunate."

"We cannot do anything but continue our great efforts to address this problem and bring it to the attention of politicians."

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Maersk's ZeroNorth – optimising vessels in commercial operations

Maersk Tankers spin-off ZeroNorth is finding ways to optimise vessels which are being commercially operated – and Cargill has joined as a partner

Maersk Tankers has spun-off a new digital start-up, ZeroNorth, to find ways to optimise commercially operated vessels worldwide.

ZeroNorth, which already works with 8 major owners and charterers, says its technology is being used on 1000 vessels.

The software grew out of a system developed in house by Maersk Tankers, known first as SimBunker, and later as Optimise. Now it is an independent company.

The software has been used by Maersk Tankers' fleet since June 2019, and generated \$8m in savings in its first 12 months of operation, the company says.

In other words, these are vessels which the company charters in, rather than vessels it owns. Maersk Tankers itself operates over 200 vessels, but many of them are in a pool, and chartered in.

The charters are normally chartered in on a time charter basis, so Maersk Tankers pays for the fuel, as the charterer. But it does not do the technical operations, so it does not have direct control over the decisions which would affect fuel use, such as speed and route.

ZeroNorth has 38 employees with backgrounds in mathematical modelling, software engineering, data science, data engineering, product owners and shipping. Of these, only 3 explicitly come from shipping, reflecting the company's focus on advancing digital technologies with perspectives drawn from outside the sector.

ZeroNorth's CEO, Søren Meyer, is former CEO digital business – and also held previous roles as VP asset management and chartering director – at Maersk Tankers.

With so much technology expertise among its employees, ZeroNorth can create software which is “super easy to use”, Mr Meyer says. “It should be as easy as any other software you buy.”

The company has already announced plans in June 2020 to grow its staff to 100 employees.

Maersk Tankers also said it was looking to attract “strategic investors from the tramp

shipping industry to develop the company and its products to the benefit of the industry as a whole.”

In September 2020, food corporation Cargill announced a “strategic partnership” with ZeroNorth, where it would commit its entire “operated fleet” to using ZeroNorth's Optimise software.

Cargill has been utilising the software as a customer since 2019, testing it on part of its chartered fleet. It charters in a fleet of 650 vessels, including 120 Capesize, 180 Panamax, 120 Supramax, 130 Handysize and 20 Coasters, working with about 30 owners.

ZeroNorth believes the software could ultimately be used for the whole industry, covering tankers and the dry bulk fleet.

How it works

The principles of the software are to “follow the dollar” (focussing on cost savings), utilising already available data, making the user experience as good as possible, and drawing on partner / customer knowledge where possible.

To feed the software, the company gathers all information it can find that has an effect on fuel costs, including fuel price, weather, vessel location and experience with that specific vessel, such as previous fuel bills. It also takes the vessel's market price into consideration.

If the software identifies an improvement which can be made to the vessel's operation – measured in terms of the profit an owner who had the vessel on a time charter would make (known as “time charter equivalent”) – an updated instruction can be sent to the vessel, for example, asking the captain to reduce speed.

If the vessel has a high day rate, it may make financial sense to speed the vessel up to reach its destination faster. Conversely, if the day rate is dropping, it may make more sense to slow the vessel down and save on fuel. If the fuel price is rising it may make more sense to slow down to reduce fuel burn, and vice versa.

Since these factors are continually changing,

along with weather forecasts, the data needs to be managed accordingly.

Also, the terms of the contract with the cargo owner need to be maintained, which will typically state a certain minimum speed.

Alerts can be sent to the operators of the vessels if the software thinks they could be sailed more optimally, suggesting what changes could be made and what their impact would be.

There is a dashboard where the vessel owners, managers and operators can monitor the “time charter equivalent” earnings of a vessel, and then take action during the sailing.

CEO, Søren Meyer observes that there is something of a gap in the maritime operations system, where one party has control over decisions about how to operate the vessel (the technical manager), while another pays for the fuel (the commercial operator). ZeroNorth aims to cover that gap, by giving tools to the commercial operator to better understand how fuel is being used.

“It is a gap in the market - that is not talked a lot about,” he said.

The charter party document will typically include a “fuel curve” stating the guaranteed maximum fuel consumption vs the different vessel speeds – but does not give much further insight into vessel performance, he says. The charterer also knows what the fuel consumption was after the voyage, when it receives the fuel bill.

There are other situations where we see one party paying for fuel and another making decisions about how much is used, and see suboptimal outcomes. For example, a hotel guest who runs a bath with lots of hot water, or a building owner who refuses to invest in energy efficiency because the tenant pays the heating bill.

The algorithms don't yet compare one vessel with another, or make a benchmark, but just work out if a vessel is sailing “optimally” at this point in terms of its “time charter equivalent” earnings.

TO

Clean the hull when resistance increases 10% - GreenSteam

Data analysis by GreenSteam found that the best time to de-foul the hull is when the resistance increases by 10% – and some other useful insights

This article is based on a GreenSteam white paper exploring how machine learning can help optimise hull cleaning

Hull fouling is world shipping's biggest preventable cause of excess fuel consumption and avoidable

greenhouse gas emissions.

GreenSteam's recent whitepaper covers three key topics, including what rules owners and operators should follow to optimise hull cleaning using vessel data, whether regularly timed hull cleaning is enough to prevent runaway growth, and the cost-benefit of hull cleaning optimisation. This article is a summary of the white paper.

The study was originally performed on behalf of a customer who wanted a better system to decide when to schedule in-water hull cleaning.

The customer suggested a strategy of cleaning the vessel's hull when it reached a threshold frictional resistance due to fouling relative to the resistance at the time of the last re-coating (when the hull had no fouling at all).

However, this strategy would require a system for tracking the growth and acceleration of the fouling, indicating a need for heightened vigilance.

To meet this challenge, GreenSteam built a model to calculate "fouling performance". This model is based on daily fuel waste due to fouling, which could be expressed in tonnes of fuel wasted, or its dollar cost. The model also assessed how other KPIs such as speed can compound fuel wastage due to fouling.

GreenSteam also wanted to see how hull performance improved after "in water" cleaning. This was calculated in terms of the level of fouling resistance, and the pace of fouling growth before cleaning, with a particular focus on the pace of fouling development after cleaning.

Two simple rules were developed as a result of this analysis.

The first is that the hull should be cleaned before the fouling resistance reaches 10 per

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cent (calculated as hull resistance with fouling compared to hull resistance with a new coating).

The second rule was that if the rate of growth of fouling resistance exceeds 10 per cent a year, the vessel owner should be in a state of heightened vigilance and carefully monitor fouling to prevent runaway growth.

Fouling growth tends to follow a common pattern, where some initial slime growth precedes more substantial plant and animal fouling, which attaches more firmly to the coating. This is followed by harder, more resilient plant and animal organisms which colonise and deeply penetrate the coating.

The study found that a 10 per cent increase in resistance due to fouling marks a transition from simple slime growth to more substantial and more firmly bonded marine organisms.

Up to this point, the coating can be cleaned with light cleaning methods with no damage to the coating. After this point, harsher cleaning methods are needed, increasing the likelihood that the coating will be damaged.

GreenSteam performed a cost-benefit analysis of different cleaning strategies, accounting for fuel wastage, cleaning rates, risk of damage to the hull, and lost revenue due to layups, and found that more frequent but gentler cleaning is the most useful strategy to keep operational and capital expenditure low.

An analysis of 50 vessels using GreenSteam's platform showed that around half the vessels were only cleaned after this 10 per cent milestone had passed.

This may be because shipping companies associate hull cleaning with damage to the hull coating, which is not surprising if these companies typically only clean hulls at the level of fouling that requires harsh and potentially damaging cleaning methods.

To determine the specific point where the growth of marine life anchored to the hull changes, it is important to monitor the pace

of change of fouling resistance. Fouling will happen faster if the vessel is stationary, and if it is in tropical, coastal waters.

Building on its first two rules, GreenSteam suggests two further rules to help the industry make decisions around hull cleaning with the bottom-line in mind.

Rule 3: The hull should be cleaned when the cost of cleaning is less than the value of the wasted fuel due to the fouling – including lost earnings during the cleaning.

Rule 4: The hull should also be cleaned before the excess fuel consumption due to fouling exceeds the "5 per cent allowance" in the charter party for fuel consumption.

The break-even point for hull cleaning does not always happen before the hull reaches 10 per cent resistance – it depends on the vessel speed. However, according to Rule 3, this means that companies are taking on additional costs for more extensive cleaning and potential coating damage.

Following these four rules, combined with automated push warning notifications, allows vessel operators to reduce fouling-derived fuel wastage by at least 40 per cent.

This is based on a simulation for 3 vessel types, a MR tanker, a handysize bulk carrier, and a capsize bulk carrier, over 1.4 to 3 years, with one simulation calculating accumulated bunker waste from fouling, and another simulation following these rules.

Are periodic inspections enough?

Many shipping companies might prefer to rely on hull cleaning at planned intervals or do it when they sense that the vessel's performance is deteriorating.

However, the data suggests that simple periodic cleaning is not a sensible substitute for a monitored, condition-based approach.

GreenSteam analysed 50 vessels with a wide range of coating types and trading patterns, chosen at random from its customer base in

different sectors. GreenSteam found that half of these vessels' hulls were cleaned after the 10 per cent additional resistance threshold had been passed (Rule 1).

GreenSteam also found that a third of the 50-vessel sample passed the 10 per cent point in under 6 months, and another third took between 1.5 and 3 years to reach this point.

Some shipping companies rely on periodic inspection of the hull, getting a snapshot of the hull's condition at a certain point in time. However, in addition to being expensive, this method does not take into consideration the cost impact of fouling before being detected by this method.

GreenSteam customers can use the GreenSteam system to get automated notifications around Rule 1, warning them when fouling goes above a certain threshold.

To prove the cost-benefit of its rules, GreenSteam also looked at financial data for the handysize bulk carriers, MR tanker, and capsize bulk carrier analysed above. Each vessel's hull fouled at a different rate, and operators took a different approach to timing of hull cleaning.

GreenSteam calculated the ROI for following Rule 1, using simple assumptions on time charter equivalent (TCE) rates, days out for cleaning and cost of hull cleaning.

Following Rule 1 reduced total vessel fuel consumption by 4 per cent, and even after accounting for extra cleaning costs, time out of service and GreenSteam's fee, resulted in a payback of around \$20k per vessel per year.

If the service was used on 50,000 vessels in the world fleet, the shipping industry would save \$1bn a year.

This article is based on a white paper available on GreenSteam's website, which includes supplementary data. It can be downloaded here: <https://blog.greensteam.com/hull-fouling-white-paper>

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Review: LNG fuelled crude / chemical tankers

There are developments with LNG fuelled chemical / crude tankers happening around a number of ‘focal points’ – Shell, Swedish owners, Sovcomflot and shuttle tankers

There are a number of developments happening around the world to use LNG fuel for crude / chemical / products tankers – which seems to be happening around ‘focal points’ of Shell, Swedish owners, Sovcomflot and shuttle tankers. This article reviews the developments.

There is nothing new about using LNG fuel for LNG carriers – as a way to use their own boil off gas. Using LNG to power tankers for normal liquid cargoes – crude and chemicals – is still very new.

Oil major Shell is taking a leading role, taking LNG powered tankers into its own fleet and its long term chartered fleet.

In May 2020, Shell added 12 LR2s (105,000 to 115,000 dwt product tankers) to its newbuilding program.

These vessels will be built by China State Shipbuilding Corporation (CSSC), with contracts signed by China’s Bank of Communications’ leasing arm, BoComm Financial Leasing.

They will all be delivered by 2023, being built at Shanghai Waigaoqiao Shipbuilding and Guangzhou Shipyard International. The vessels are reported to cost \$54m each, and to be 120,000 dwt capacity.

The deal follows Shell Tankers (Singapore) agreeing in August 2019 to charter a new fleet of 10 LNG fuelled crude oil and products tankers, owned by Sinokor Petrochemical Co Ltd, which expects to take delivery of them from Samsung Heavy Industries in South Korea in 2021.

It also agreed long term charter for four LNG dual fuel product tankers, owned by “institutional investors advised by J.P. Morgan Asset Management,” with delivery of the vessels expected from 2021.

Shell also has a number of LNG fuelled Aframax tankers on charter from Sovcomflot (see below).

Sweden

There is a cluster of activity with LNG fuelled tankers in Sweden.

The Gothia Tanker Alliance pool have 6 LNG dual fuelled tankers in operation, and a further vessel in construction and another on order. The pool members include Furetank, Thun Tankers, Wisby Tankers, Rederi AB Älvtank, Uni-Tankers, OHM and DSD Shipping.

The Alliance announced in April 2020 that its 7th LNG tanker had started construction China’s Avic Dingheng shipyard, with a keel ceremony held on April 18. The vessel has a working name of AD0037. A further 8th vessel has been ordered from Avic Dingheng.

In 2019, the fifth and sixth of the LNG dual-fuelled vessels were launched. These vessels are all 16,000 dwt, ice class 1A.

The first of the series, Fure Vinga, was delivered in April 2018, for Furetank Rederi.

Separately, in August 2020, Gloryholder Liquefied Gas Machinery (LGM Engineering) announced that it had been contracted to supply integrated LNG equipment for two dual-fuel 13,000 dwt chemical tankers for Swedish operator Tarbit, being built at Jiangsu New Yangzi Shipbuilding Company Limited (YZJ).

In September 2019, LSM announced it had contracted Chart Industries to provide fuel tanks for two 22,000 dwt dual fuel products and chemical tankers being built at Wuhu Shipyard, China. These vessels were ordered by Rederi AB Donsötank of Sweden, taking delivery in 2021.

The Bit Viking, also owned by Tarbit, was the first ship to be converted from heavy fuel oil to LNG operation in 2011 by Wärtsilä, and the first cargo-carrying merchant vessel other than a gas carrier to use LNG as fuel.

Sovcomflot

Sovcomflot (SCF) has taken delivery of 5 LNG Aframax tankers since 2018 - Lomonosov Prospect, Mendeleev Prospect, Korolev Prospect, Vernadsky Prospect, and Samuel Prospect. The Samuel Prospect is named after Sir Marcus Samuel, the founder of its client, Shell Transport and Trading Company.

The ships are operated in the Baltic and North Seas. Each vessel is 114,000 dwt, with an ice class 1A hull.

It follows the launch of the Gagarin Prospect in mid-2018, a 114,000 dwt Aframax ice class vessel chartered to Shell.

Sovcomflot has five further LNG-fuelled tankers on order. The company is building two Aframax tankers for charter to Russia’s Rosneft, and three dual fuel 51,000 dwt MR tankers with ice class 1B, to be chartered to Russian energy company Novatak.

These are being built at Zvezda Shipbuilding complex in Russia.

Sovcomflot is also providing technical supervision for the construction of five LNG-fuelled tankers for Rosneft at Zvezda Shipbuilding complex. It is likely to provide technical management for the vessels in operation, with the first LNG-fuelled tankers of Russian construction to begin operating in the Baltic in 2022.

LNG shuttle tankers

In March 2019, Teekay Offshore launched its first LNG powered “e-shuttle” tanker Aurora Spirit, at Samsung Heavy Industries, South Korea, a 130,000 dwt vessel, with battery packs for power distribution and back-up power. It is the first of four vessels to be operating in the North Sea.

In February 2020, Italian oil major ENI announced a plan to take two LNG powered shuttle tankers on up to ten year (long term) time charter, owned and operated by Knutson NYK Offshore Tankers.

Other projects

Cosco Shipping reported in December 2019 that it had signed a “supplemental agreement” with Dalian Shipbuilding, that its VLCC on order at the yard would be dual fuel, with LNG as its principal fuel. It said that this agreement increased the order value by \$6m, and led to the delivery date being pushed back from March 31, 2021 to December 31, 2021.

Samsung Heavy Industries reported in April 2020 that it had an order for \$209m for two LNG powered VLCCs, for an unnamed “Bermuda based shipowner”, scheduled for delivery on April 30, 2022.

MISC, the shipping division of Malaysia state oil company PETRONAS, stated in December 2019 that it planned to replace half of its 60 tanker fleet to run on LNG dual fuel by 2030.

In August 2019, Samsung Heavy Industries published a stock filing saying it had orders to build 10 x 113,000 dwt LNG fuelled crude oil tankers for an “Oceanian customer”, in a deal valued at USD 620m, to be delivered by the end of 2022.

GPS spoofing – and a proposal to fix it

GPS spoofing is a growing concern for the maritime industry – but a UK company has a technical solution

By Tom Gray, VP of Product and Marketing, FocalPoint

In June 2017, a French oil tanker, the Atria, lost its GPS signal as it approached the Russian city of Novorossiysk.

When the signal returned the captain noticed the position it gave was forty kilometres inland.

Nearby vessels reported similar malfunctions in their navigation systems with a total of 20 other ships impossibly located at the Gelendzhik inland airport.

Simultaneously, Uber customers in Moscow taking short trips across the city were charged for thousand-mile journeys to distant airports.

There was speculation that the security team for Vladimir Putin might be using a portable device to disrupt GPS signals to mask the Russian President's whereabouts and protect him from possible drone attacks.

But this wasn't an isolated incident. Researchers used data from ships' continuous broadcasts and realised the problem was larger than anyone could have guessed.

According to a report released in March 2019 looking at GPS spoofing in Russia and Syria, there were ten thousand spoofing incidents at sea between February 2016 and November 2018, with 1,300 vessels affected. (See <https://www.c4reports.org/aboveusonlystars>).

It is more accurate to use the term GNSS spoofing, since "GPS" is the name of the US satellite positioning system, and GNSS, Global Navigational Satellite System, is a 'family' name for all systems, also including Europe's Galileo system, Russia's Glonass and China's BeiDou.

GNSS spoofing involves the broadcasting of fake GNSS data to make a device think it is in different location. It can target any location-aware IoT system.

Spoofing in shipping, confusing connected devices, puts lives at risk.

Another threat is from getting incorrect timecodes. The GNSS system is built on satellites broadcasting accurate timecodes, and often used to provide an accurate clock in the correct time zone. The clock on your mobile phone usually automatically updates with data from GNSS signals.

The determination of true time underpins a vast

array of services in our connected world - from ATMs to cell phone towers, stock exchanges and electrical grids.

Deceiving a device as to what the true time is by broadcasting fake signals can cause potentially catastrophic problems.

GNSS technology

The core GNSS technology hasn't changed much since the first GPS satellite was launched in 1977.

Today there are a number of different systems - from Europe's Galileo, Russia's Glonass and China's BeiDou - each relying on satellites orbiting at 20,000 kilometres, which emit a radio signal that contains a timecode and a description of the satellite's exact position.

By measuring the transmission time of the signal, GNSS receivers can determine their distance from the satellite. If the receiver can access signals of at least four satellites in its line of sight, it can determine its position in three dimensions.

How to spoof

GNSS chipsets can be easily deceived and misdirected simply by broadcasting fake satellite signals at them.

Malicious individuals, who can purchase cheap equipment online and download free code, can broadcast spoof signals, disrupting radio mast signals and interfering with emergency services.

The cost and complexity of spoofing is coming down rapidly. Pocket-sized GPS jammers are proliferating.

A few years ago, so many truck drivers on the New Jersey Turnpike were using jammers to obstruct their employers' tracking systems that spill over interference disrupted the GPS landing system at Newark Liberty International Airport.

Our method

Shipping companies usually detect GNSS spoofing by having two GNSS receivers at either end of the vessel and comparing signals to highlight any discrepancy.

But too many companies find the investment in



Tom Gray, VP of Product and Marketing, FocalPoint

additional technology off putting and don't take the spoofing threat seriously.

FocalPoint, a UK business set up by Dr Ramsey Faragher, part of the original design team for the ExoMars Martian Rover's "Seeker" visual navigation system, has been working on another solution.

Their "Supercorrelation" technology is a software upgrade to the GNSS chip which enables it to recognise and reject fake signals based on determining the angle of arrival of the signal.

When installed on a GPS receiver it can precisely determine where satellite signals are coming from.

This, in turn, enables the chip to ignore reflected and non-line-of-sight signals from positioning, both protecting the device from spoofing and enabling 10x improvements in the accuracy and integrity of GPS.

This patented innovation works at a chipset level, using sensor fusion, machine learning and signal processing.

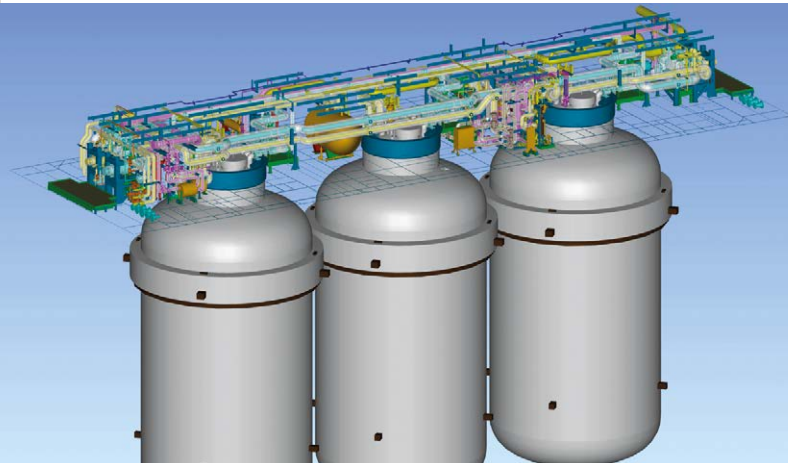
Supercorrelation enables chips to determine spoofer signals from true signals - discarding the signal, and thus securing the device against malicious interference.

These capabilities are currently only available in military grade technology costing tens of thousands of dollars, while FocalPoint's technology is designed to be installed at the chipset level on the GPS receiver - making it available to consumers and industry.

The Royal Institute of Navigation and the US-based Institute of Navigation recently awarded prizes to Supercorrelation in recognition of its potential.

FocalPoint is working with leading chipset companies to bring it to market.

TO



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Using VDR data to audit navigation

You don't need to send an auditor to a vessel to meet OCIMF's TMSA guidance for "navigation audits". Another way to do it is to inspect voyage data recorder (VDR) data. We spoke to Avenca's Dr Neil Baines, an expert on maritime VDR analysis

One of the sections of the Oil Companies International Marine Forum (OCIMF) Tanker Management Self-Assessment (TMSA) guidance is that shipping companies should engage independent navigation auditors to get a sense of how well the vessel is being navigated.

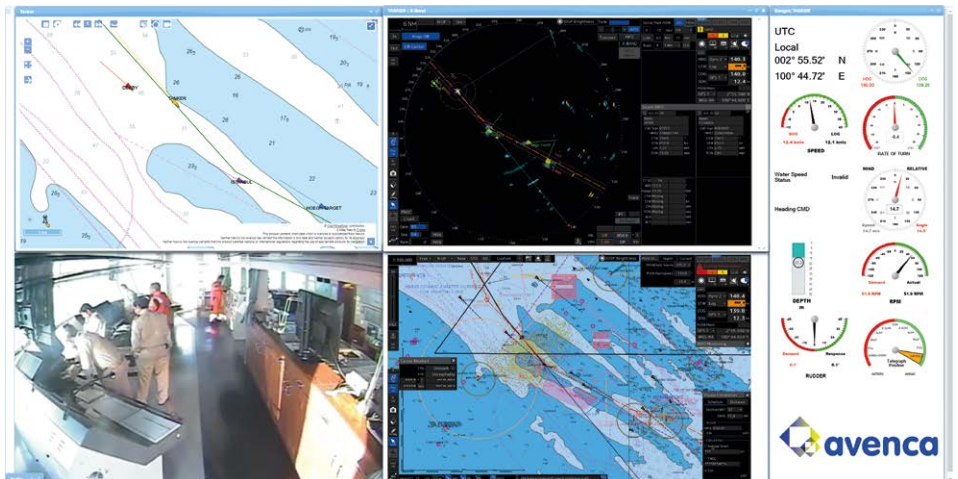
This can be done by sending an auditor onboard the vessel to watch the crew at work. But this is very expensive, particularly in times of COVID-19 and uncertainties about when people can get on and off vessels. Also, having someone physically watching over the crew may not show the crew's typical behaviour.

Another way to do it is to review voyage data recorder data.

OCIMF recently (Aug 2020) published a revision to its document "Recommendations on the Proactive Use of Voyage Data Recorder Information," which was originally published in 2013. The revision considered the impact of recent updates to the VDR performance standards, made by IMO. It is available for free download on the OCIMF website.

Dr Neil Baines, Managing Director of AVENCA, advised OCIMF on writing these recommendations. Dr Baines says that his company has seen increasing enquiries from tanker companies over the past few years for assistance working with VDR data, mainly for remote navigation auditing services.

The original regulatory requirements of a VDR were that it should store a minimum of 12 hours of data, because the systems were designed to be used after an accident. 12 hours is not enough to make a general audit of navigation quality.



Avenca's "AURA" software to present a compilation of VDR data which can be used to understand how a vessel is being navigated. You can see a video / audio of the bridge, the radar screen, the ECDIS screen, AIS data on a separate map, and instrument data

Since 1 July 2014, the regulations have required new VDRs to provide storage for a minimum of 30 days' data, but adding on additional storage capacity to older VDRs may not be very difficult or expensive, Dr Baines says.

VDR data has 3 "types" – bridge audio recording; video data from the radar and electronic chart system; and equipment data (known as NMEA/serial). Some companies also have CCTV data. It is increasingly common for VDRs to be connected to the satellite communications system, although companies would usually only upload equipment data to the satcom, other data files are too large to routinely send by satellite.

Insights you can get

The data can be analysed over long time periods and short periods, and both would be done in

different ways. For long time periods of data, you can run computer scans to get a sense of whether any risks were being taken. For short term periods, you can look at all of the available data to get a comprehensive understanding of how the vessel was being navigated.

If you are looking at a long period of equipment data, you can check for specific 'events', such as if there was a low under keel clearance while the vessel was above a certain speed, if the rate of turn was above a certain change in degree per minute when the vessel had a certain speed, if there was an excessive rudder angle when going at higher speed.

You can check the average time taken to change engine speed after an instruction is given. You can check AIS data for any close encounters.

The position data can be analysed together



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Dr Neil Baines, Managing Director of AVENCA

with chart data, to check that the vessel has adhered to any Traffic Separation Schemes, and complied with any speed / depth restrictions of that scheme.

If you are investigating an accident or near miss, or assessing performance in a time of difficult navigation, you might want to look at all the data over a shorter time period. For example, you can see what happened in the lead-up to an accident, or how the bridge team were working together.

A comprehensive analysis can review all available data types together – audio, radar / ECDIS, and equipment data. That way you can hear what was being said on the bridge, see what the crew could see on the radar and ECDIS screen, understand how they interpreted it, and what they did with the equipment controls.

If the file sizes are too large for digital transmission, a USB drive can be couriered.

According to the best practise guidance, the navigation audit should also include a review of bridge team procedures, passage planning and voyage documents. This can be done alongside the review of VDR data.

The aviation sector has long seen benefits from analysing flight data, with the International Civil Aviation Organisation (ICAO) making flight data monitoring a standard for all aircraft over 27 tonnes since 2005, Dr Baines says.

Ships are different to aircraft in that there is a larger group of people in charge of navigation. “Listening to how the team are interacting [from audio recordings] is at least as important as analysing the numeric data coming from sensors,” he says.

Avenca's service

Avenca's maritime customers include oil companies, shipping companies, national investigation authorities, insurers, law firms and marine consultancies.

AVENCA's service includes gathering the data (via satcom or couriered file), organising

and merging the data (including CCTV where available), loading it onto a cloud server, and making it available for the customer to access over the web, so they can hear and see exactly what was happening. It has developed its own software system to do this, called “Aura”.

Tanker companies can view the data themselves and do their own navigation audit, or use Avenca's navigation auditing service, where it deploys experienced master mariner auditors. They receive a written report with video clips.

The audit would normally include analysis of a portion of a voyage identified as being of higher risk, such as a departure, approach / berthing, or transit through a traffic separation scheme.

Avenca has produced videos for customers where it compiles together audio and video from the VDR to show something specific – such as an example of particularly desirable or undesirable behaviour, for use in training.

Dr Baines' background is a PhD in acoustic engineering, which gave him knowledge which, he says, often comes in handy improving poor quality audio recorded from some VDRs.

He then worked in aerospace, finally as technical director with Smiths Industries Aerospace Data Management Systems division, which makes aircraft flight data recorders.

When voyage data recorders were being mandated for shipping in 2001, the maritime industry was very focused on how to get the hardware fitted and comply with regulation. Based on his aerospace experience, Dr Baines believed that valuable safety and operational efficiency-related benefits could be derived from analysis of the new data that was being recorded. And he set up Avenca at that time to serve the maritime sector through the provision of suitable analysis software and services.

TO

#03 IN A SERIES



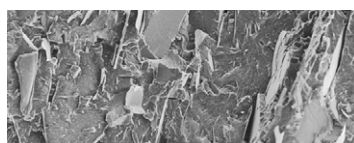
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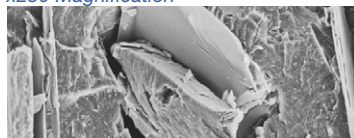
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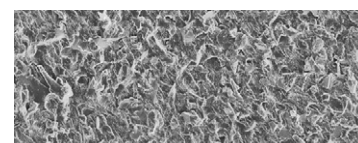


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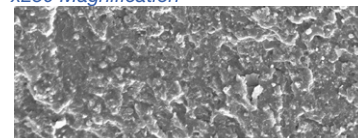


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OneOcean Group has launched a web-based software module “EnviroManager+” which tanker companies can use to set company rules for how specific vessels in their fleet should operate in different parts of the world

Navigation data and software company OneOcean Group has released a web-based software tool “EnviroManager+” which tanker operators can use to set specific company policies and instructions for their vessels.

The idea of the “+” is that a company may wish to set higher standards or include their own company policies that go above the minimum regulatory requirements. Regulatory requirements can be managed through the existing OneOcean software module, “EnviroManager” which is included with “EnviroManager+”

To illustrate how the software might be used, Capt. Malcolm Soares, VP maritime strategy at OneOcean, gives an example of a vessel which was anchored outside a country’s territorial waters. The vessel ended up in territorial waters as it swung in the tide when the wind picked up causing her to drag anchor and take her into the territorial waters.

The local Coastguard apprehended the vessel against local notification and guidelines leading to the vessel being detained for 30

days due to non-compliance of local rules. This resulted in a lot of unwanted trouble for the company.

So a company may wish to specify that vessels add an extra mile of margin, decreeing that vessels may not anchor within a mile from a country’s territorial border, for example.

A company may also make specific company rules for certain vessel types, sister vessels or vessels with similar equipment fit in its fleet.

The onboard installed software module can then warn the crew that they would break company rules (if not national regulations) if they anchor in their current position or any other bespoke company rule set by the office management.

EnviroManager+ can instruct vessels to carry out a number of checks and procedures which the company requires, before entering local or environmentally controlled zones such as US Waters.

The system can also support the company in setting specific company rules for waste discharge overboard, which are more stringent than the Statute regulations say. Or they could



Capt. Malcolm Soares, VP maritime strategy at OneOcean

set company rules about the fuel change over process (beyond what is required by the emission control regulations), or about keeping away from known whale habitats.

On the software, crew members can see the company’s messages, customised for their type of ship and the current location, alongside rules about applicable regulations all ships must follow, generated by the “EnviroManager” software.

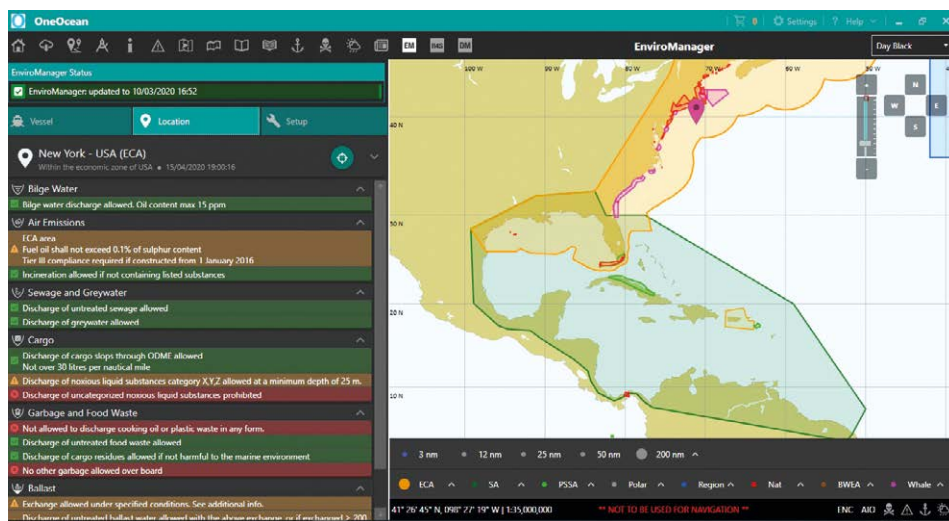
Shipping companies can make updates to their requirements using the browser-based tool software. The onboard software’s database is then automatically updated.

EnviroManager

The regulatory driven EnviroManager software helps seafarers comply with the increasingly complex rules about what they can do in different places.

There are geo-related rules about waste disposal, covering different categories of waste (plastic, food waste for example) and different zones.

The territorial water boundaries can get complex, since your current “territory” is not always the closest country to where you are,



See the regulations to apply to your current position with OneOcean's EnviroManager

Captain Soares says.

If you are in the middle of the ocean but close to an island it can count as “close to land”.

The Territorial boundaries demarcation claimed by countries and regulated distances thereof can be misleading and quite complex with geography, claims around various Island and Archipelagic states, Says Capt. Soares.

There are additional regulations imposed by some countries about what you can do in and around their territorial waters, including by the European Union, Chinese Government, Korean government and the US.

Shipping companies may not be aware of this, particularly if it is a part of the world they do not usually visit.

You also need to use different fuels in different regions, as you move into Emission Control Areas (ECAs) and Special Emission Control Areas (SECAs).

“It becomes a complex maze of puzzle,” he says.

EnviroManager can use the GPS position of the vessel to give you information about what

rules currently apply based on your position.

You can plan the voyage with knowledge of what regulations you will be affected by at all stages of your voyage from berth to berth.

And if there are variations to the plan, such as to avoid weather or due to a breakdown, you can see how this changes the regulations which apply hence assisting the vessels to plan and remain compliant throughout the entire voyage.

The software can also tell you how much time you have before you enter an emission control area or next area of compliance, so you can make sure you have enough time to change over the fuelling system or ensure compliance with whichever region the vessel enters.

Connectivity

The software needs a live position feed from the shipboard AIS system or other position methods from satellite communication terminals.

If the vessel has a server and computer network, the software can be installed on the

network, so everyone with access can use it. In the engine control room, cargo control room, ships office and the captain’s office. OneOcean recommends the Microsoft Surface Pro and Surface Go for better situational awareness. or via tablet handheld PCs using shipboard Wi-Fi, as an example.

OneOcean has already developed two-way component of data transfer that complete passage plans and not just way point sheets which can be shared with the office, enabling ship and office to discuss a passage plan before being approved by the Master.

About OneOcean

The software module is provided as part of the company’s “OneOcean platform”.

OneOcean makes software for all aspects of voyage optimisation, including passage planning, compliance, safety and environmental products.

It provides services to around 20,000 vessels, and was formed from the Nov 2019 merger between ChartCo of the UK and Marine Press of Montreal.

TO



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Being sure about ballast water compliance

Shipping companies have a degree of responsibility over whether they actually manage to remove organisms from ballast water before discharging. How can this be best done? We spoke to Chelsea Technologies

Just buying and installing a type approved ballast water system may not be enough to guarantee regulatory compliance, says Matt Kenney, head of sales and marketing with Chelsea Technologies, a UK specialist in sensor design and manufacture.

Shipping companies have a degree of responsibility over whether the ballast water they discharge contains organisms above the allowed limit.

In most maritime state legislatures, ship operators are deemed accountable for “knowing” that they discharged pollutants into territorial waters.

In the US, ship operators can be prosecuted for non-compliant ballast water discharge even if they do have a type approved system, Mr Kenney says.

A May 2020 study by certification company SGS, “Commissioning Testing of Ballast Water Management Systems,” (available for free download), found that of 95 systems the company was asked to test between October 2019 and April 2020, 21

per cent failed to meet the “D-2” treatment standard enforced by the IMO.

This may be because they had been installed incorrectly. In that case, the shipping companies have spent millions of dollars for equipment which doesn’t work.

Before this study was produced, there was not much data available about how effective ballast water systems actually were, Mr Kenney says.

Now testing ballast water systems is growing as an issue in IMO.

Some states, including Singapore and Panama, have required commissioning testing since 2018 – so all systems are tested after they are installed. Commissioning testing is likely to be required globally by 2021, if it is ratified in the MEPC 75 meeting (previously scheduled for March 30, 2020, currently postponed due to Covid).

The commissioning testing may not involve actually testing the ballast water after being treated. It may be just testing that the equipment appears to be functioning correctly, on the basis that the equipment

itself has already been tested in its type approval process.

But it may also include an “indicative” test of the discharge water, for example using a device like FastBallast. A failure of the indicative test will mean that the installation itself fails, Mr Kenney says.

Deterioration over lifetime

Another unaddressed question is what processes should be used to monitor effectiveness of a system during the lifetime.

Reasons for ballast water system performance to deteriorate can include blocked filters, fouling on a UV element, or the vessel handling a different kind of ballast water, such as from tropical waters, or with higher sediment levels, which means it is harder for UV light to penetrate.

Or a different crew, or even a different vessel owner, may operate the system in a different way, or not know how to use it, or understand its limitations.

Mr Kenney envisages that ballast water testing may one day be like the testing

for oil content in bilge water before it is discharged – where regulations require the water is continuously tested, and discharge is automatically shut off if oil concentration rises above the maximum allowed 15 ppm.

This would be a logical regulation for authorities who really want to make sure no invasive organisms are able to enter their waters, although very difficult to achieve technically.

FastBallast

Chelsea Technologies has developed a small unit, “FastBallast”, which tanker companies can use onboard to analyse a sample of ballast water, get an indication of what the organism level is, and determine whether it is probably compliant before discharge.

The unit costs “under £10,000” (\$13k) which is expensive for a discretionary cost, but low compared to the \$1.5m cost of a ballast water treatment system, or of course any penalties.

The device is the same size, just slightly thicker, than a laptop. So it is feasible for shipping companies to employ staff to visit vessels in port to test their ballast water, carrying the device with them.

It is a self-contained unit with a small sample chamber, where you add a sample of discharge water and then press ‘go’.

Complexities of compliance

The Ballast Water Convention states that inspectors can conduct a sampling of ships’ ballast water in accordance with “guidelines to be developed by the organisation” – but there is no standard methodology for how to sample a ship’s ballast water.

The IMO ballast water standard, “D2”, has multiple layers. The water you discharge must have under 10 organisms per m3 which are over 50 micrometres, fewer than 10



Matt Kenney, head of sales and marketing with Chelsea Technologies

organisms per millilitre which are between 10 and 50 micrometres, plus some other limits of specific indicator microbes.

Knowing for sure if ballast water is compliant would require analysing very large volumes of ballast water, which would be impractical. For example, you would need a minimum of approximately 3m3 of ballast water to make a reasonable check for the “10 organisms per m3” rule. This would likely involve a water tanker driving up to the vessel to collect ballast water and take it to a laboratory.

But the FastBallast analysis can give a reasonable indication of compliance by looking for phytoplankton in the 10-50 micrometre range in a small sample of water – because these are often the toughest organisms to treat, Mr Kenney says.

Phytoplankton typically have a high resilience to ballast water treatments compared to indicator microbes or some

zooplankton in the >50 µm category. In other words, if you’ve killed the phytoplankton, you’ve probably killed everything else too, he says.

The technical challenge is finding a way to measure living organisms in ballast water post treatment but not dead ones. Dead or non-viable organisms are not a concern in ballast water because they cannot reproduce when they are discharged.

FastBallast uses a method known as ‘active fluorometry’ to analyse the number of living phytoplankton cells in the sample.

Phytoplankton display inherent fluorescence from chlorophyll; if the phytoplankton are living, the intensity of this fluorescence increases as they are exposed to a pulse of high-intensity light.

In FastBallast, a 20ml sample is stirred continuously, within which 0.5ml is probed with a 400µs pulse of light. Large phytoplankton typically contain more chlorophyll, so they produce a stronger fluorescence signal than small phytoplankton as they pass through the 0.5ml analysis region. By analysing the intensity and variation of the fluorescence signal, FastBallast can accurately calculate the number of phytoplankton within the sample.

FastBallast can detect down to 1 cell per ml, well below the IMO D-2 standard of 10 cells per ml. The reading takes only 2-10 minutes. It can be used for over 2 years between services, and needs minimum consumables, no laboratory testing or costly reagents.

Normally it works with 20 ml sample volumes, so a little smaller than a standard whisky shot (25 – 35 ml). It can also be set up to provide continuous measurement, but this is not usually necessary for most operators.



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De Nora – treating ballast water via “slip stream”

De Nora Marine Technologies has pioneered a method of electrochlorination ballast water treatment where the disinfectant that eliminates aquatic invasive species is generated from a low flow, separate water supply to the actual ballast water, known as a “slip stream”

In electrochlorination ballast water treatment, a DC current converts seawater into a sodium hypochlorite solution (NaOCl) and hydrogen gas.

Sodium hypochlorite is an effective disinfectant to eliminate aquatic invasive species.

There are two methods that electrochlorination systems can use to treat ballast water: full flow or in line and slip-stream. This is what they are.

In *full flow systems* the filter and the electrolyser are fitted directly into the main ballast line.

It sounds like a tidy engineering solution, but comes with a big disadvantage – all of this equipment needs to be installed somewhere between the ballast pumps and the ballast tank – which generally means the pump room.

The pump room is considered a ‘hazardous’ environment on tankers, so anything which can create a spark is not allowed. And installing all of this means a lot of welding – “hot work” – while there is of course a lack of available space.

The equipment needs to be big as the treatment capacities are large – capable of handling at least 1500m³ per hour of ballast water flow.

In a *slip-stream electrochlorination approach*, being developed by De Nora Marine Technologies, the sodium hypochlorite is generated in-situ, from a different source of saline water, requiring less than 1% of the main ballast flow for the electrochlorination process.

You can use any flow of saline water. The company suggests using the engine cooling water. The equipment can be housed in the engine room, which is not considered a ‘hazardous’ environment, and so work is easier. Then the sodium hypochlorite can be injected into the main ballast water system next door via small size pipe lines.

The slip stream system does not eliminate hot work in the pump room – you still need to install a filter, to remove zooplankton, some phytoplankton and sediments.. But the work in the pump room is much reduced.

The electrolytic process also generates a dangerous by-product – hydrogen.

Low flow rate allows efficient degassing, says Dimitrios Tsoulos, regional sales manager

EMA – marine business unit, De Nora Marine Technologies, based in Greece.

A further advantage of the slip stream system is that there is much more flexibility about where and how on the ship the system is installed, he says. It is easier to break down the electrochemical system into a number of sub-assemblies, giving you more installation flexibility.

De Nora is not the only company offering a slip stream ballast system, but the company claims to have invented it for ballast water treatment applications and have been developing it longer than other ballast water companies.

Aft peak tank treatment

Another challenge with ballast water systems on tankers is what to do about ballast water in the aft peak tank. It must not mix with ballast water in the main ballast tanks, because this is considered “hazardous”, due to the risk of oil leakage into it, and the aft peak tank is in a “gas safe zone”.

Some companies using UV or full flow EC systems have considered fitting a completely separate ballast water system just for the aft peak tank treatment, he says. So for a VLCC you might have two large (3000m³ / hour) ballast systems in the pump room and a smaller system (300m³/hour) for the aft peak tank treatment.

But with a slip stream system, all which is needed is another pipe to supply sodium hypochlorite from the EC system to the aft peak tank, meaning a much simpler installation. The only equipment which needs to be installed at the aft peak tank is a small capacity filter. “With a single EC system we can treat multiple ballast lines,” Mr Tsoulos says.

Choice of systems

Many tanker fleet owners are still considering the best solution for their vessels, Mr Tsoulos says.

The market has now simplified to a choice of EC slip stream, EC full stream, UV, and chemical dosing, he believes.

Slip stream EC systems are most appropriate if you need to treat more than 1500 m³ an hour of water, and perhaps full flow EC and UV are more applicable to lower capacities, Mr Tsoulos



**Dimitrios Tsoulos, regional sales manager
EMA – marine business unit, De Nora Marine Technologies**

believes.

Chemical dosing systems are most appropriate where there is limited power available on vessels, because UV and EC systems are high consumers of power. Or where the owner prefers to pay a higher cost for chemicals – perhaps because of operational limitations or the vessel’s remaining life span does not justify investing in ballast water equipment.

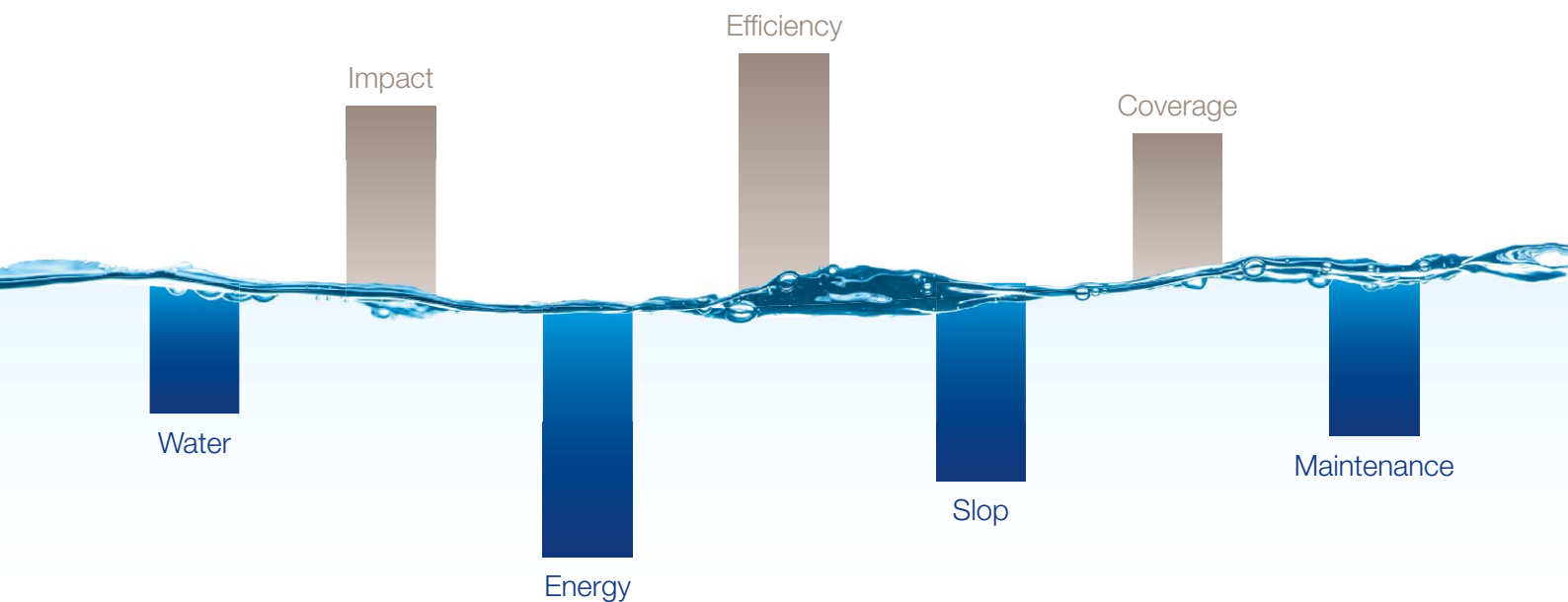
Electrolyser cells

De Nora is probably the only provider of fully approved EC ballast water systems to the maritime industry, which is also sole manufacturer of electrolyser cells, Mr Tsoulos says.

It has developed self-cleaning electrolyser cells, which it believes are unique. Typically, electrolyzers accumulate hardness from the seawater over time. The calcium and magnesium in the seawater accumulates on the electrode plates, bridging the gap between electrodes, causing poor seawater flow, reducing cell efficiency, overheating, and potentially causing arcing.

This self-cleaning feature is provided by the unique electrode coating and power reversing modules installed with a switching-mode power supply. For the electrolyzers installed with the self-cleaning feature, the polarity output of the power supply is reversed after each ballasting cycle. This dissolves the small amount of

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hardness accumulated after each cycle and eliminates the need for acid washing for the life of the electrode.

Other companies have been suggesting that electrodes are cleaned with acid. But with the self-cleaning system, “the crew do not need to perform any difficult maintenance onboard carrying acids,” he says.

De Nora specialises in electrochemical solutions in a number of industries, doing design, manufacture and supply, making electrodes and coatings. It has been doing this for 95 years.

Chlorine analysers

One of the biggest complexities with EC ballast water systems is learning how to use the “Total Residual Oxidant” (TRO) analysers, which measure the chlorine concentration in treated wastewater, to ensure that it meets regulatory

requirements.

TRO analysers are complex for seafarers to use. It is “one of the biggest headaches,” Mr Tsoulos says.

De Nora offers an Oxidation Reduction Potential (ORP) analyser as an alternative, ORP (oxidation reduction potential) is a value, measured in mV that expresses the oxidizing (disinfection) power of a water.

It is a “simply immersed in-line instrument, easy to be installed, very easy to be calibrated during the operation,” he says. “It is an approved technology, proved to be reliable during the operations of the vessel.”

Dry dock postponements

Ballast water system implementations took something of a backseat during the Covid period, with shipping companies more pre-occupied with

immediate issues, such as getting crew home, Mr Tsoulos says.

And many dry dock appointments have been postponed, due to difficulty of staff travelling to them, including company superintendents and class surveyors. For example, there are many repair yards in China, and tight travel restrictions on foreigners going to China.

Regulators have issued extensions to the allowable period of vessel operations between dry dock.

This also means that some of the ballast water system implementations De Nora had planned are now being postponed.

For similar reasons the number of new build vessels being launched is significantly dropped compared to previous years, which affects the market for ballast water systems, he says.

TO

Thun's bunker tanker which sits on the seabed

Thun Tankers has launched its first “NaabsaMAX” bunker tanker which can sit on the seabed, to be used in ports where the water runs out of the harbour basin at low tide

Thun Tankers of Netherlands / Sweden has launched its first “NaabsaMAX” bunker tanker which is designed to sit on the seabed when the water runs out of the harbour basin due to tidal differences.

It is designed with an extra strong bottom to allow this.

Naabsa is an acronym for “Not always afloat but safely aground.”

The vessel also has a high aspect rudder and

strong bow thruster for better manoeuvring, which is needed on tidal rivers, when operating in small ports at close quarters with other vessels.

It is chartered to Geos Group, which claims to be UK's largest supplier of marine gas oil to the shipping and offshore industries.

Barry Newton, CEO of Geos Group, anticipates that the vessel will open up some “great commercial opportunities”, with “A new

generation of coastal tankers in UK waters”.

The vessel is owned by Thun Tankers, which is based in Delfzijl, The Netherlands. It is part of the Erik Thun Group, which has been operating tankers since 1952.

Today it operates 18 small vessels, of which 15 are fully owned and 3 belonging to its close partner Wisby Tankers. It has 4 small new buildings on order, with delivery expected 2020 to 2022. It has a further 5 intermediate size vessels in operation, and a further intermediate size vessel to be shortly delivered from a yard in China.

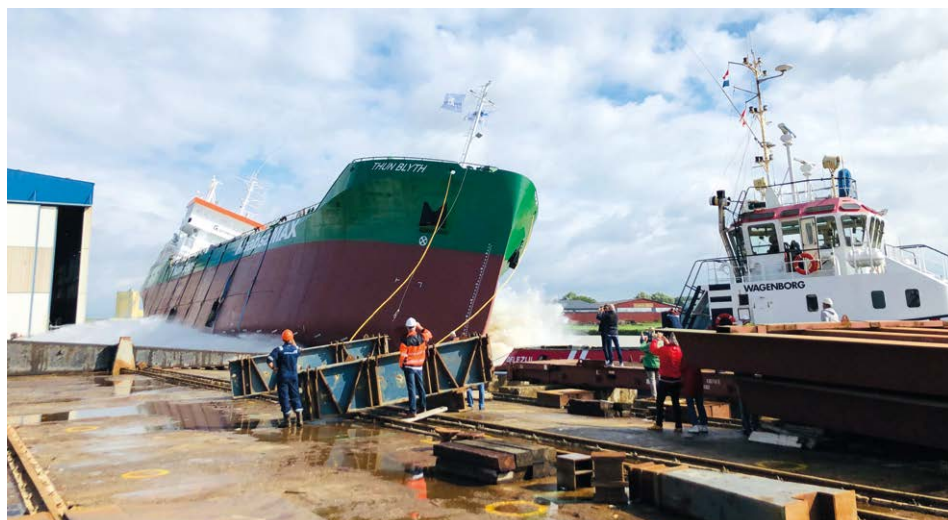
The vessel was built in the Leer, Germany yard of Scheepswerf Ferus Smit B.V. It has a 4,800 m3 capacity, 4250 DWT, a length of 79.9m, beam 15m, coated with Jotun Flexline.

The company has already ordered a second 4,250 dwt NaabsaMAX product tanker, to be delivered in May 2022, also built at the same yard and to enter long term service with Geos Group.

Scheepswerf Ferus Smit has previously built more than thirty-five vessels for the Erik Thun Group.

It was launched sideways - a dramatic video of the launch is on YouTube at <https://youtu.be/ed4es9cpDBI>.

TO



Launching the NaabsaMAX bunker tanker at Scheepswerf Ferus Smit in Leer, Germany - Aug 31, 2020

Liquid cargo storage – an insurer’s perspective

Low oil prices have encouraged many owners to use vessels for medium- to long-term floating storage – but a number of issues arise from an insurance / risk management perspective

By Rod MacLennan, master mariner and loss prevention executive, North of England P&I

In general, a more refined product has a shorter shelf life than crude oil.

However, due to a vast range of characteristics, compositions and potential additives, it is difficult to exactly determine the shelf life of a particular cargo.

How can a vessel owner and crew help protect themselves against a potential claim?

Good vapour management

From a basic operational perspective, careful vapour management is key.

Excessive venting through PV valves can result not only in cargo losses but also a change in the quality or specification of the cargo.

If venting is required, it is important to check that local regulations permit this.

Some areas, such as California, do not permit tank vapour venting even as a means of controlling tank pressures arising from an increase in pressure due to diurnal (during the day) variation.

Risk of decomposition

From a more complex perspective, the rate of



Rod MacLennan, master mariner and loss prevention executive, North of England P&I

decomposition of a refined cargo depends on many factors.

These include the nature of the original crude, the distilling process, water content, additives used (anti-stat, antioxidant, etc) and vessel-related factors such as tank coating condition.

A certificate of analysis and quality should be provided on loading and used as a reference for composition, additives and water content.

Monitoring the cargo

Monitoring by analysis may be the only way to truly know how well a cargo is surviving storage.

Where liquids are concerned, before the vessel goes into storage mode, take samples of the cargo and have them tested in the presence of an independent surveyor.

When in storage mode, take regular samples and analyse them to determine the quality of the cargo.

However, this level of analysis may be reliant on laboratories being located close by and is not always an option.

If this is the case, the vessel’s crew should continue to regularly take samples and check them visually for colour, viscosity and sediments as well as noting the odour.

In addition, take regular ullages [head space measurements] and record them along with cargo temperatures, bottom soundings (such as free water and sediments), inert gas readings and external temperatures.

It is also important to record any controlled or uncontrolled venting and, if required, operation of the inert gas plant.

TO

SPS: repairing tankers with a steel-elastomer-steel sandwich composite

SPS Technology suggests that tanker operators repair cracks using a structural composite, rather than standard gouging and welding techniques

SPS Technology suggests to tanker operators that they repair cracks by creating a composite panel in-situ.

The company’s patented very stiff and strong composite material SPS comprises

two metal plates bonded with elastomer core.

When repairing cracks, a thin steel bar is fixed to the steel face plate around the crack, either by welding or adhesive bonding, depending on whether hot work is allowed.

The new steel top plate is then welded,

bolted or bonded onto this metal bar to create a cavity, and the elastomer is injected into this.

To understand the technology, consider that elastomers are used to make car tyres and shoe soles. The material bends easily,

but it does not break.

In engineering terms we can say that elastomer has low stiffness and high failure strain. Steel, on the other hand, has high stiffness, and high failure strain, apart from its propensity to corrode and get cracked, which elastomers do not have.

So by having steel and elastomer layers together, you combine the strengths and benefits of both. A strong bond is generated between the elastomer and the steel to create one body rather than three layers.

This is an alternative method to repairing cracks via the standard “gouging and welding” – gouging out the affected steel, and welding in a section of replacement steel into the hole; a task which requires dry dock and major disruption.

SPS Technology and BASF developed the technology and have multiple patents on it.

Jonny Lim, director, SPS Technology Asia, says that one major tanker operator first used the method to repair cracks in 2005. It had a crack which was continually re-occurring on one of its vessels, being repaired every time it appeared by gouging and welding techniques.

SPS was used to repair the crack, and after the vessel had been in operation for several years, the crack did not reappear. Now it uses the method as standard for vessels in its fleet.



Jonny Lim, director, SPS Technology Asia

On ships, it can be used to reinstate bottom and side shell plates, decks, tank tops and bulk heads. It has been used on cruise ships, bulk carriers, tankers, ro-ros, general cargo ships, dredgers, barges, LNG carriers, LPG carriers and floating storage units. Over 430 projects have been delivered over the past 20 years in maritime and offshore sectors, the company says.

It can also be used to repair corroded

steel. Classification societies usually require that steel is repaired or replaced once the corrosion level reaches 20-30 per cent, Mr Lim says.

The material has also been used in stadiums, buildings, bridges and the offshore oil and gas industry.

The method does not necessarily involve less steel for the main plate – you might replace a 18mm sheet of steel with a 12mm sheet, a 20mm layer of elastomer and a 8mm sheet of steel. But the resulting material will be stronger, so you would not need any additional stiffeners.

Further benefits

Another benefit, perhaps more of value to naval vessels but tanker operators may be interested these days, is that the material has strong ballistic strength. It is also providing better blast resistance in comparison with stiffened steel.

Also, it has more vibration dampening properties than steel, and has improved impact resistance, noise dampening, and increased fatigue life, the company says. There are environmental benefits, because SPS is lighter for heavily loaded structures. This means there can be more re-use of the old steel, and less need for additional steel stiffeners.

SPS also has in-built thermal insulation properties, perhaps of interest to tanker operators carrying heated cargo.

The method has approval of “all major classification societies” for permanent repair and strengthening of existing vessels, SPS says.

Cracks on tankers

Cracks on tankers can be very hard to detect visually. It is pretty common that the cracks are identified when cross contamination between tanks occurs, for example oil leaking into ballast water tanks, Mr Lim says.

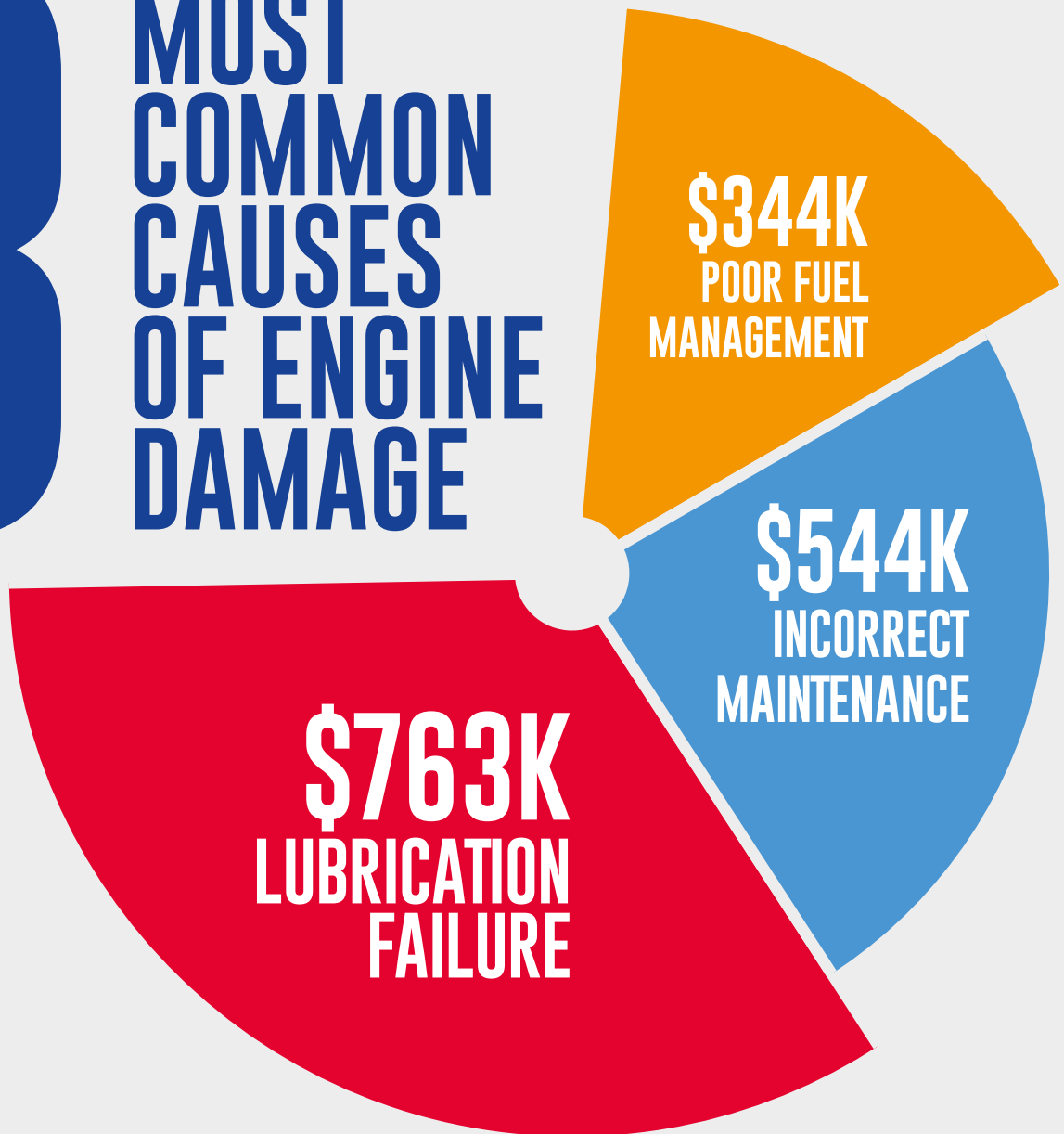
They are usually caused by high stress on a certain part of the structure. This can be due to a combination of factors such as a flaw in the design, corrosion, fatigue, cycle loading, extreme weather conditions, or different cargo loading conditions.

The advances in structural analysis software (finite element analysis) can be used to understand the stresses on individual sections of steel, and so better understand why these cracks occur – although this software was not available when many older tankers were built, Mr Lim says.



Crack repair and reinforcement

3 MOST COMMON CAUSES OF ENGINE DAMAGE



Satcoms and COVID

Seafarer video calls on WhatsApp increased 79 per cent during the pandemic – and one vessel grounded after going too close to shore so seafarers could get a mobile signal. Jens Ewerling of Cobham Satcom tells the vessel communications story of the pandemic
By Jens Ewerling, Director, Maritime Broadband, Cobham SATCOM

Following the global spread of COVID-19, and consequent crew-change crisis, the importance of reliable and sophisticated connectivity is fast moving beyond that of just ensuring the physical safety and wellbeing of crew.

In fact, data from a recent survey conducted by AST Group showed that video calls on WhatsApp had increased by 79% during the pandemic.

The survey results reflect the increased reliance by seafarers for internet applications and video conferencing services to connect with family and loved ones onshore.

Installing connectivity solutions to provide high performing broadband internet, to ensure total crew wellbeing, and facilitate services such as video conferencing and safeguard operations, is widely acknowledged as integral to future operations.

In August this year it was confirmed by the Panama Ship Registry that the Panama-flagged M/V Wakashio had grounded due

to the ship coming too close to shore as it sought mobile phone reception so its crew could speak to their families.

As survey after survey and extensive anecdotal data has confirmed, seafarers will prioritise employment with ship owners and operators who provide rapid and reliable internet connectivity at sea.

With a current shortfall of approximately 15,000 officers, investment in connectivity solutions could also save huge recruitment costs in the long term.

Although the impact of COVID-19 is changing the maritime industry's perception of what it can achieve with advanced ship-shore connectivity, the reality is that adoption of robust and reliable connectivity systems remains uneven across shipping's different sectors.

Up to 50,000 of the world's commercial shipping and fishing fleets, and around 15,200 tankers in total, are already equipped with Ku- or Ka-band VSAT for broadband services on-board.

But COVID-19 is slowing the rollout of broadband projects due to travel restrictions and reduced availability of ship access in ports.

In addition, with an increasing number of countries recognising the importance of employee mental health, we are increasingly likely to see the implementation of laws within the next decade that will require a far greater investment from their employers.

To invest in a total connectivity solution now is to stay one step ahead of the curve.

At Cobham SATCOM, improving the safety and wellbeing of those at sea through reliable and rapid connectivity is at the heart of all our innovation.

Since the 1980s, we have been developing connectivity solutions to protect those at sea in the world's toughest environments in all circumstances.

It's a recognition that's increasingly widely shared, and we have recently seen an increase in enquiries for our SAILOR

and Sea Tel product ranges, reflecting an awareness and accelerated desire for sophisticated maritime communications solutions.

For example, on top of an installed base of around 12,000 Sea Tel VSAT antennas we are looking to soon celebrate the shipment of our 14,000th SAILOR VSAT antenna system.

We also recently ran a webinar series which was well received showing not only an increase in interest in online training experiences, but an ongoing need on behalf of crew to enhance understanding around current and future maritime connectivity solutions.

With new mega satellite constellations due to come into commercial service between 2022 and 2024, sophisticated connectivity solutions providing powerful and fast broadband connectivity out at sea are set to become industry standard over the next decade.

However, there exists mature maritime connectivity networks, such as Inmarsat's Fleet Xpress network coupled with futureproof SAILOR VSAT connectivity solutions, which offer high data speeds and has the capability to set new standards in the maritime sphere both now and in the future.

The coronavirus crisis has highlighted not only the important role of internet applications and video conferencing in connecting crew with family and loved ones but their value in attracting and retaining the next generation of seafarers.

During times of crisis, there lies opportunity for re-evaluation.

As an industry it is apparent that better standards need to be set for seafarers to ensure total wellbeing and the continuation of our industry; with the connectivity solutions currently available and seafarers' reliance on internet applications at an all-time high, now is the time for vessel owners to future proof operations and invest in their crew.



Jens Ewerling, Director, Maritime Broadband, Cobham SATCOM

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