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MARCH 2022

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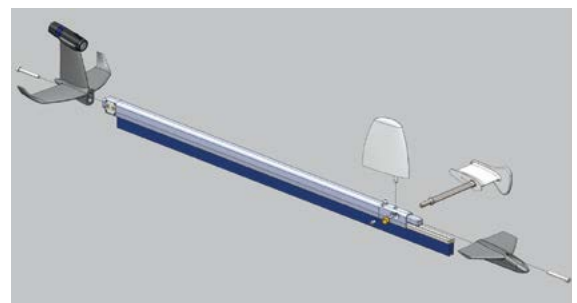
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# RightShip's tool to help charterers assess emissions

**It would be useful, in motivating decarbonisation, if charterers had an in-depth understanding of the emissions its vessels make. Here's how RightShip provides it – and a story of its progress into the tanker sector**

**R**ightShip, a company based in Australia which describes itself as “the world’s biggest third-party maritime risk assessment and due diligence organisation”, has upgraded its tool to help charterers keep on top of the emissions data for vessels that they charter.

Its new Carbon Accounting Reporting Tool, released in January 2022, is defined as an “expanded and enhanced toolset for monitoring, measuring, and benchmarking shipping-related greenhouse gas (GHG) emissions.”

It builds on the carbon accounting tools which RightShip has been providing to charterers and freight forwarders for 5 years, which they can use to manage data about maritime GHG emissions over specific periods.

The most granular data available on the system is data sent for individual past voyages provided by the shipowner for that charterer. This data can also be viewed on a quarterly or annual basis. Charterers can see data for various different vessels, cargoes and route type, which they have chartered.

The Carbon Accounting module only provides measured data about past performance for voyages associated with the charterer. But it is able to make predictions about emissions for vessels which have not been chartered before or where the measured data is not available to that charterer, shown as a “GHG rating”. This is based on its large database of vessel design and vessel efficiency data.

Charterers can make comparisons between similar voyages on different ships based on measured data. They can look for “key emissions hotspots”, areas where particularly

high emissions are being made among their chartered fleet, and then find out why. They can develop realistically achievable pathways to reduce emissions.

They can calculate metrics such as Emission Intensity (emissions per tonne carried), EEOI (efficiency operational indicator), and AER (annual efficiency ratio).

The carbon accounting module also includes improved data ingestion and validation tools.

The data validation system can also help check for inaccuracies or perhaps misinformation. “The issue of false reporting is a real one,” says Lucy Packham, senior sustainability advisor, RightShip.

There is also a methodology to fill gaps in historical emissions data using estimations.

The data can be used to estimate emissions for a future journey, should a previously used vessel be deployed.

The carbon accounting software has been integrated together with other RightShip online services, such as for vetting and inspection data, and insights about vessels which they have not chartered based on publicly available data.

“RightShip prides itself on taking complex data and making it digestible, actionable and valuable,” Ms Packham says.

An example charterer customer is Incitec Pivot, a chemical fertiliser company operating in Australia and New Zealand, which has been working with RightShip since 2016 to “measure, understand and manage” their shipping emissions, she says.

## Benefits for tanker operators

Tanker operators will be asking themselves, if there is any benefit to them of using the system - or is it something which only benefits their customers.

One benefit is that tanker operators with better than average data might be favourably chartered again. They can demonstrate how their energy efficient designs and energy saving equipment installed are leading to reduced emissions.

Also, by working with RightShip they can get insights into how their vessels compare with the market average on different factors.

“We want to work closely with ship operators to help them understand their emissions footprint, benchmark their fleet’s performance against industry standards, as well as their peers, and improve their chartering potential,” Ms Packham says.

## Company background

RightShip was founded in Melbourne in 2001, initially only in the dry bulk sector - its founding shareholders were dry bulk charterers BHP and Rio Tinto.

It was established following an enquiry by the Australian government into the deaths of nearly 100 seafarers between 1988 and 1991 on large bulk carriers, mainly off Western Australia.

In 2006 Cargill joined as an equal partner shareholder and by 2007, US, UK and European offices had been established.

Today, the company has safety data from

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over 76,000 ships, including from vetting inspections, port state control deficiencies and actual incidents.

The data is analysed to provide a balanced picture of the risk level of a specific ship, taking factors into account such as which ports the inspections were made.

A safety score is based on factors such as the number / severity and 'recency' of incidents over the past 5 years; the number of detentions and PSC deficiencies taking the place of inspection into account; the performance of the flag state.

It says its systems are used today by over 3,000 individuals. The company has over 110 staff worldwide.

RightShip's CEO is Steen Brodsgaard Lund, appointed in December 2020. He is based in Singapore.

He worked with Maersk for 21 years, in management positions around the world. From 2010 to 2021 he was with Germanischer Lloyd (as head of Asia), with DNV following its acquisition of the company, and then with Radio Holland and Executive Ship Management.

He is a council member of the Singapore Shipping Association, holding roles including Chairman of the Technical Committee and the Digital Transformation Committee. He has personally invested in a number of maritime technology companies as an 'angel'.

### Tanker inspections background

RightShip has been making tanker inspections since 1990, with the inspections being done within the BHP company passed into RightShip's management.

This evolved to follow the OCIMF SIRE system. BHP is a member of OCIMF. Inspections are done according to BHP requirements, reviewed by RightShip superintendents and uploaded to SIRE.

Vetting services are offered to all RightShip customers, whether they are OCIMF members or not. A shipboard visit is complemented by an analysis of all available data about the vessel, including casualty history, PSC information performance, class records and past SIRE inspections.

Today tankers account for 40 per cent of the vetting decision support services and 50 per cent of its carbon accounting services, RightShip says. It has data about tanker operators carrying crude oil, refined products, LNG and LPG.

TO

# OCIMF's January newsletter

## Encouraging more anonymous accident reports - stabilising the organisation – new chair – some of the themes from OCIMF's January newsletter

"In 2022, we will move past strategy roll-out and stabilise," said Karen Davis, the new director of OCIMF, in her introduction to OCIMF's January newsletter.

"We have ensured the objectives are embedded in this year's goals and we are normalising the new way of working."

"One of the key actions to support the strategic objectives and meet our mission is to collaborate with others on key issues relating to Health, Safety, Security and Environment (HSSE)."

"Our ongoing relationship with INTERTANKO in the Joint Safety Initiative (JSI) is worth highlighting. On 19 January, 23 representatives from both organisations engaged in healthy debate and conversations about ongoing work related to vessel incident data capture, behavioural competency assessments and verification, and human factors."

"I was personally proud to witness the participants' openness and obvious passion for improving the industry's safety performance."

"During the meeting, we received positive news that the Behavioural Competency Assessment and Verification system is now reportedly being used by as many as 750 vessels, and thus, thousands of seafarers to date. I believe this is making a difference."

"However, the JSI is challenged in getting vessel operators to report incidents into the Tanker Accident Database (TAD)."

"Although the TAD has been built for anonymous reporting of accident data, few have been submitted."

"I would encourage members to use this tool. Data is powerful, and we must solve the issues that prevent sharing it."

"Is this a matter of trust, or is there a better way to consolidate the data and eliminate the need for multiple submissions? I offer that we must examine our behaviours when responding to an incident reported, and seek to use the information for learning."

"2022 promises to be challenging, but with challenge comes opportunity. Among many hopes, I pray we witness the end of the pandemic, that mariners are allowed to travel more freely, and the Gulf of Guinea security situation continues to improve."

### New chair of OCIMF

OCIMF has appointed Shell's Head of Shipping & Maritime in Asia Pacific and the Middle East, Nick Potter, as its new chair. Mr Potter formerly held shipping leadership roles for Shell and BG Group in the UK, US, Russian Federation, Caribbean and Singapore,

where he is currently based. He has been involved in the board of OCIMF since 2014.

He succeeds Mark Ross, president of Chevron Shipping Company, who has completed 4 years as chair.

"I am honoured to be working with OCIMF members to advance our priorities. First and foremost, we must continue to focus on the safety and care of the people that work in this important industry whilst also ensuring no harm to the environment. The roll out of SIRE 2.0, further strengthening links across industry and the ongoing work to embed the strategy will be the focus of 2022," Mr Potter said.

### Control of VOCs

OCIMF's Environment Functional Committee submitted papers on the control of Volatile Organic Compounds (VOCs) to the IMO Sub-Committee on Pollution Prevention and Response.

The 77th Session of the IMO's Marine Environment Protection Committee (MEPC 77) invited member states and international organisations to provide more information on technical opportunities to reduce VOC emissions from shipping and proposals to improve the current IMO regulatory framework.

TO

# Seafarer Happiness Survey Q4 - worsening

The results from the Q4 Mission to Seafarers Seafarers Happiness Survey showed a drop in people's self-reported 'general happiness' from 6.8 to 6.56

**T**he 2021 Q4 Seafarers Happiness Survey, conducted by Mission to Seafarers and supported by Wallem and Standard Club, showed people's self-reported happiness dropping from 6.8 in Q3 to 6.56 in Q4. An average of all responses also dropped from 6.59 to 6.41.

Mission to Seafarers' interpretation was that "there are worrying signs that the unpredictable nature of COVID is having a serious impact on mental health and is driving negative sentiment on board."

It said that many seafarers "raised concerns about the draconian nature of repeated testing and expressed concerns about the quality of quarantine provisions."

Seafarers responding were 41 per cent on bulk carriers, 28 per cent on tankers, 13 per

cent container ships, 8 per cent general cargo ships, 5 per cent ro-ro, and 4 per cent offshore. Happiness by ship sector was 7.37 for offshore, 7.18 for bulk carrier, 6.55 for ro-ro, 6.33 for tanker and 5.08 for container ships.

12 per cent of respondents were aged 16-25, 44 per cent were 25-35, 24 per cent were 35-45, 15 per cent 45-55, 5 per cent older. In terms of their answers, the happiest were 45-55 and 16-25, the least happy were 25-35. The happiest rank / role was 'catering department' and the least happy was 'electrical dept' followed by 'chief officer.'

These are some comments from respondents:

"All I can think about is going on vacation, the stress and fatigue after 6 months on board are too much."

"This was the last time I go to sea. My career of over 40 years came to a stop. Who wants this way of life?"

"Until seafarers feel certainty about their freedom of movement, until they feel they have the same access to vaccination as the wider populace, and until they feel accepted and recognised as key workers, then there is a seafaring storm brewing."

## Workload

The happiness about workload declined from 6.61 to 6.3.

"From nowhere we are suddenly expected to keep 6 on 6 off watch patterns. This is not sustainable, and I am already feeling exhausted. There will be accidents".

"We do not have the people to do all that is stated and required. Some things are recorded, but they are not done fully".

Companies "just keep piling responsibilities and paperwork on the officers."

"We have no Sunday or even half-day. No offs, 12 hrs/day normal work and most of the time 18hrs/day work".

"When I joined the company five people used to do the same job as two do now in my department. There is no way to comply with hours of rest when the vessel is on operations".

"Duties from Third Mate have been transferred up to Second Mate, and duties from Chief mate have been transferred down to Second Mate. However, the salary and working hours for Second Mate have remained the same. It is impossible to conduct all those duties properly without working additional hours."

Some officers are having to use "stop work authority as there is too much going on to be handled. Especially in port".

"Everyone thinks seafarers are superhuman with 4 hands and 4 legs".

## Interaction onboard

Happiness with interaction onboard declined from 7.63 to 7.42

Mission to Seafarers' interpretation is that "relationships onboard have become strained as uncertainty and concerns have risen, while they have improved when seafarers felt more certain with regards to reliefs and leave."

"The Omicron COVID variant situation appears to have a significant impact, as relationships and interactions onboard have become more strained towards the closing weeks of the year."

There were accusations that crewmates were "selfish, vain and lazy".

Some responses spoke of bullying onboard, and an underlying feeling of tension, stress and victimisation.

One respondent said that their trips were punctuated by "board games, bingo, movies on Saturday, TV and karaoke, even monthly BBQ on deck. We have lots to look forward to and it makes life enjoyable."

## Training

Happiness with training rose, from 7 to 7.21.

"Our drills and exercises are pathetic. It

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seems that no one is interested, and we go through the motions.”

“We log and show we have done many things for safety training; the truth is not always the same.”

## Health and exercise

Happiness with health and exercise reduced from 7.12 to 6.78.

“Our company always says it is about to deliver new gym equipment, but it never comes”.

“Management needs to draw up a proper plan of what we have, and what we need onboard. They just treat welfare as a hassle, they would not like to live like this”.

“Every trip I seem to gain more weight, and my colleagues feel the same. It is not uncommon to see 10kgs or more gain per trip. A combination of poor food and lack of movement”.

## Food

Happiness with food increased from 6.6 to 6.66.

“Cultural and religious backgrounds are seldom taken into account. It can be incredibly challenging for the cook however it is

completely unfair that the same dishes repeat themselves day in / day out.”

## Wages

Happiness with wages made a big drop from 6.78 to 6.29.

“Salary is generally good – until you compare it relative to profits. My workload and stress have increased over the last four years, company profits increased yet my wages remain the same.”

“Wages/ salary have not been increased at all. We are running the ships day and night 24x7 without any break. We deserve a salary increase”.

“For me what I earn is not enough for totally stressful work, but yes if I don’t like I should leave”.

“When I initially went to sea, senior officers were paid similarly to doctors, dentists and lawyers. However, over the last thirty years, seafarers have endured below-inflation pay increases and, in many years, pay freezes along with employing other nationalities who will work for less, driving down wages. After a full career at sea, I am looking at a very frugal retirement, and will likely have to work way beyond the age I originally planned to retire”.

## Shore leave

Happiness with shore leave rose slightly from 4.6 to 4.63.

“At the moment due to the pandemic, being a seafarer means you are in full lockdown on the vessel the period you are on board”.

“Every seafarer understands that if the local population is locked down, then a vessel in that port should also be locked down.

However, when local authorities are allowing shore leave, yet shipping companies still hold personnel onboard against their will, then we have serious problems to address”.

“Hopefully all ports consider giving us shore leave when the pandemic decreases”.

## Connectivity

Happiness with connectivity grew from 6.6 to 6.92

Mission to Seafarers says the data could show higher levels of happiness for seafarers working on vessels which provided free or inexpensive internet access. Also, seafarers increasingly stated that they always check whether what access they will have before accepting new contracts.

“Today internet on board is vital. Nobody will stay onboard with poor, expensive, or ineffective network systems.”



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# Competency management – and how tech can help

**Tanker operators are putting increasing emphasis on human element issues, including managing competence and learning, finding better ways to share knowledge and gather feedback. Raal Harris explains how technology can help**

*By Raal Harris, Chief Creative Officer, Ocean Technologies Group*

**T**here has been a renewed focus on the human element in our industry over the last 3 or 4 years. OCIMF is taking a particular lead, identifying it as the final frontier as far as risk reduction goes, and then expanding on that theme with a number of pieces of specific guidance.

The first big game changer was the release of the joint Intertanko/OCIMF Behavioural Competency, Assessment and Verification (BCAV) document.

This makes the case for (soft) behavioural competencies as being just as valuable as (hard) technical skills and provides a framework and guidance for their evaluation.

The second important piece of guidance was the Human Factors Approach document that set out some more additional detail.

The term Human Element is changed to the broader term Human Factors that takes in not only human behaviour and decision making, but additional factors. For example, workplace design. Also systems and processes that might influence decisions and, in many cases, impede the human's ability to behave as desired.

## Five pillars

The Human Factors Approach document lays out five pillars that underpin the philosophy.

First, leading and shaping the culture you want - organisational conditions, leadership, listening to your people.

Second, well executed tasks and procedures - designing tasks to reduce the possibility of error, controls and procedures, training, based on 'work as actually done' rather than 'work as imagined'.

Third, well-designed equipment and controls - human centred design, impact of automation.

Fourth, skills to respond to emerging situations - situational awareness and

recovery, how people respond.

Fifth, learning before and after things go wrong - the importance of lessons learned from incident investigation and near misses, also studying and learning about how work is performed to spot things that may indicate an incident is on the way.

These then were further elaborated in the document Human Factors: Management and Self Assessment. There were key performance indicators that you can use to measure your performance against.

This is paving the way to add this into TMSA Element 14.

How can we get on top of these KPIs without overburdening our already over stretched teams at sea and on shore?

## Communicating our culture

When it comes to communicating and fostering our culture, we have some unique challenges in shipping.

We are operating with an international, culturally diverse workforce working remotely and in teams which are frequently changing personnel.

In this environment, induction and familiarisation training is essential to get people started off on the right footing.

The challenge is how to quickly and affordably create and distribute material that communicates your ideas out to your organisation.

## Competency management systems

Many shipping organisations are implementing competency management systems (CMS) for crew, some even for their shore team as well.

Competency frameworks offer a structured approach to managing, appraising and improving performance, by reinforcing values



**Raal Harris, Chief Creative Officer, Ocean Technologies Group**

and encouraging a common culture.

Competency management systems are nothing new in our industry. They are the key to measuring improvement, and for demonstrating that improvement to third parties.

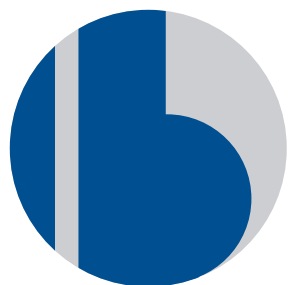
The wider benefits of competency management systems in creating a positive work culture are often overlooked. They are a great way of facilitating transparent career progression, succession planning, and creating opportunities for mentoring, feedback, and interaction between team members.

Many people start off implementing a competency management system with a perception that this will be burdensome for the crew.

But if it is implemented digitally, it can take advantage of smart workflows and centralised data. That can actually reduce much of the burden. It can allow the system to add value to much of what is already happening onboard in a structured framework, capturing informal experiential learning that might otherwise go unnoticed.

When part of a learning management





# becker marine systems

Picture © Kees Tom

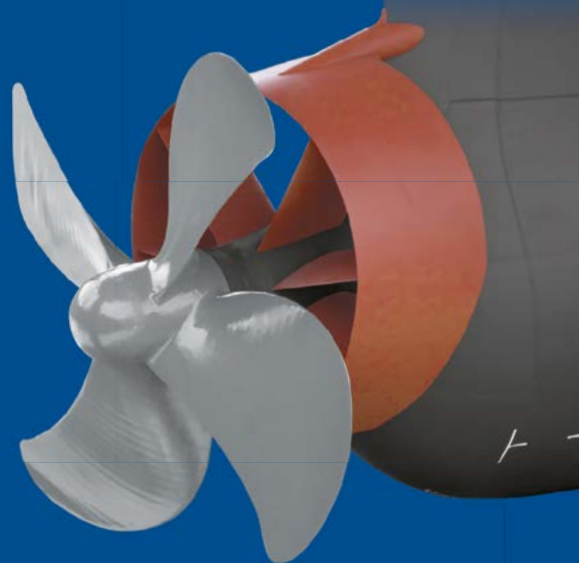


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system, the CMS forms a bridge between real world tasks and e-learning / assessment. Learning materials are not just training for the sake of training but become part of a pathway to proficiency.

You need a competency management system that you can make your own, and which provides smart workflows that facilitate the process and encourage interaction both onboard and with our shore-based teams.

### Learning management system

A learning management system needs to be thought of as more than a “learning locker” – a collection of DVDs. It needs to be a place of communication of your values and a tool for building the right culture, unifying the shore and ship training initiatives with a consistent voice.

Content still has a very valuable part to play, but how can we get our content to work harder for us, leveraging more interactivity to move from knowledge to application of

knowledge and giving us a better idea of how someone will respond to unforeseen scenarios?

By leveraging gaming technology and cloud based simulation you can even test things like situational awareness assessing how people respond to situations.

This starts to blur the line with simulation, something that has been a cornerstone in maritime training and assessment for many years.

Being able to run these simulations in the cloud is a massive game changer in making simulation accessible, scalable and affordable.

Thanks to collaborative efforts such as our new partnership with Wärtsilä we have the ability to manage and consume cloud simulation directly from our platform.

It gives us an opportunity to unify the data and make it more accessible, improving what can be achieved in ongoing competency development.

This coupled with a greater diversity of assessments than ever before at scale and not just technical knowledge assessments, communication and language skills can be tested and cognitive ability and personality traits can be profiled.

As more of these virtual and real-world tasks and assessments are captured as data, we are able to connect the dots and observe patterns and see the impact of our initiatives on performance metrics.

All these elements now in the digital realm generate data and an advanced learning management system gives you the ability to bring the data picture together to find the patterns and deliver insights into how you are performing.

### Sources of feedback

There is one rich source of data that should never be overlooked, the ability to capture feedback from our teams. How they are approaching the work they do, what they value and where they need support.

Many companies are using surveys. They are a great way of finding out how people feel about our initiatives, and removing organisational blind-spots.

But thought needs to be given as to how that data is generated and captured and then combined with the other data sources so that we can truly learn from it.

By overlaying other internal and external sets of data, we can develop an even richer picture of how our vessels and people are performing.

Things like fuel efficiency, longevity of parts, use of consumables, all have a human behavioural dimension.

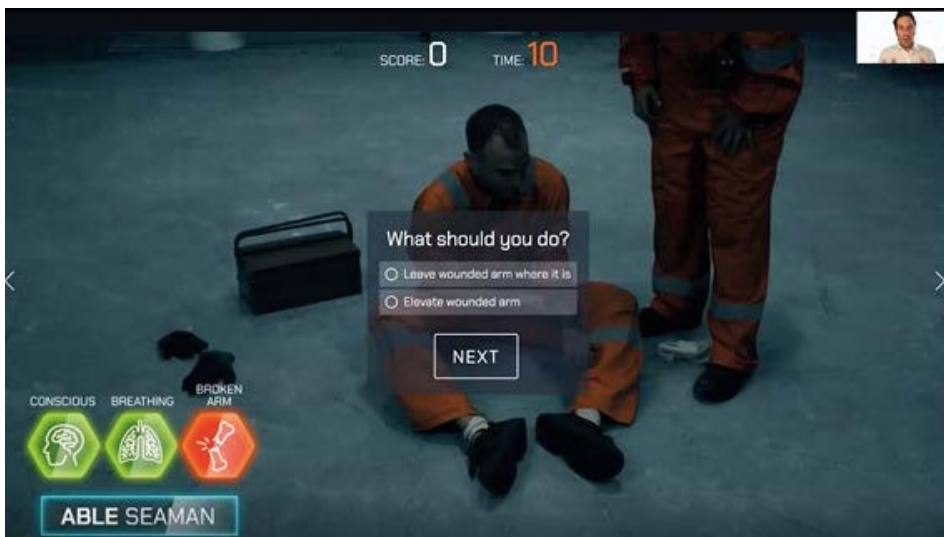
Analysing incidents, near misses and results of internal audits against them allows us to make correlations.

When benchmarking these against industry averages, we are able to see these patterns even more clearly.

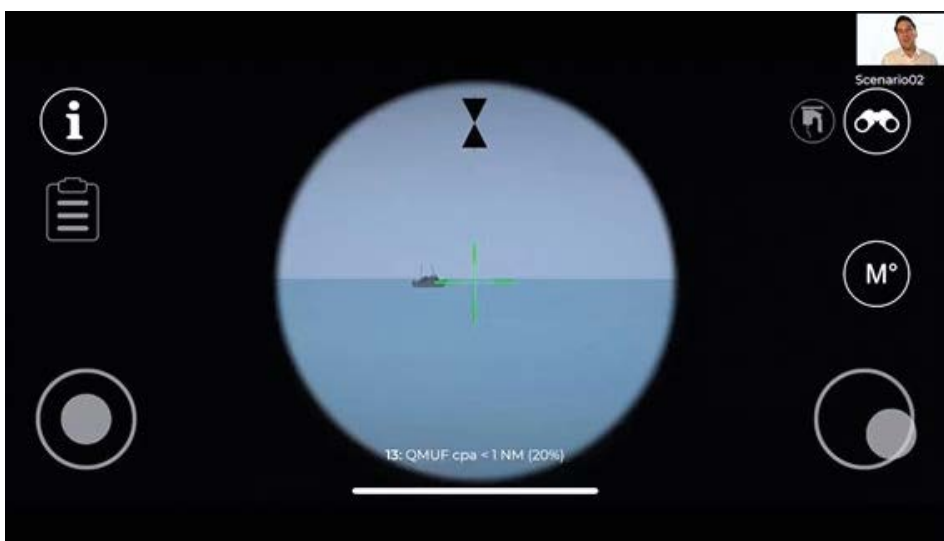
Using data analysis and automating the analysis of these patterns, we can plan more effectively, recommend efficacious behaviours, and nudge people into the right direction via the everyday tools they use.

Though there are clearly lots of wins to be had, we have to do it in such a way as to minimise the work for our teams. So we want more automation, smarter workflows that can minimise the administrative burden.

We can leave our teams space and time for the things that really matter, such as supporting one another, mentoring, shaping a positive culture in which people can work, thrive and perform.



This image shows an example from a first aid – “choose your own adventure” piece we have made, which asks the learner to make decisions at key moments in the scenario.



This image shows a more interactive mobile game in which the player works through Collision Avoidance scenarios, utilising available information from the various onboard systems so that they are able to make decisions.



# Mastering the master pilot relationship

**The working relationship between masters and pilots is very complex, with pilots calling for certain actions while masters take responsibility for their outcomes. A Britannia P&I Club webinar shared advice about how to make it work well**

**M**ost maritime people know about the complexities of the master pilot relationship, where a pilot may call for certain actions while the master takes responsibility for their outcomes.

It is a relationship with potential to go very sour. But most of the time it does work very well, we heard in a Britannia P&I Club Loss Prevention Webinar.

But there is still a fairly large number of insurance claims made due to accidents when a vessel is under pilotage. Britannia counted 1000 incidents over the last 20 years. The claims were all over \$100,000 (normally the minimum to justify a claim) with an average cost of \$1.74m.

The majority are classified as “fixed and floating object claims”, damage caused by a vessel to another object other than a vessel, such as docks, fenders, cranes and buoys.

The second biggest were collision claims, when a ship hits a ship. The third biggest was grounding, although this was only 4 incidents per year (80 over 20 years, or 8 per cent). Of these, a quarter took place in the Suez Canal.

One of the main causes is defined as “suboptimal bridge systems management,” said Captain Slav Ostrowicki, Loss Prevention Manager, Britannia P&I Club.

By this, the term ‘bridge systems management’ includes the pilot as a vital member of the bridge team, since the bridge team is defined as the people who are in control of the ship.

This defines ‘suboptimal’ as something which is less than the best possible, not whether it is right or wrong, he explained. For example, if someone has to make a decision under time pressure with less than complete situation awareness, that is a ‘suboptimal’ situation.

A bridge team operating in ‘optimal’ performance has capacity to manage errors.

Errors themselves are unavoidable. They can result from people’s physiological and psychological limits, such as fatigue, interpersonal problems, cognitive overload and poor communications, he said.

“Whether an incident can be ultimately



**Speakers at the Britannia webinar. Fiona Al Hashimi, claims manager, Britannia P+I club; Captain Ed Verbeek, retired Amsterdam pilot and consultant; Captain Slav Ostrowicki, Loss Prevention Manager, Britannia P&I Club**

avoided will depend on the bridge team’s ability to stop a developing error chain.”

The International Chamber of Shipping published a Bridge Procedures Guide, with an updated edition released in January 2022, including sections on pilotage and bridge resource management.

## Relationship basics

The pilot is brought onboard because they are an expert on ship handling who also has local knowledge.

They will typically get involved during the most critical phases of the voyage, such as in confined waters, or waters with many hazards nearby, or other reasons why there is an increased possibility of getting into situations which may be dangerous, he said.

Under regulations, the ship’s master is ultimately responsible for safety of the ship, crew, environment and cargo when the ship has assistance of a pilot.

But also, the ship is only allowed to enter a port with the agreement of the port authorities, who may demand a pilot.

The pilot can be an employee of the port, and this can have implications. For example, the pilot may be perceived to be also taking operational risk into account, such as a risk which may make a berth un-usable. The master may perceive an instruction from a pilot to anchor in a certain place to be taken as an order from the port.

## Good BRM

Bridge resources management (BRM) is “a team skill which needs to be continually practised and rehearsed,” he said. It involves

soft skills, and as such can’t be described in procedures, or replaced by procedures.

The critical elements are allocation of [human] resources, effective communication, assertiveness and leadership, and obtaining and maintaining situation awareness. “All these rely on soft skills,” he said.

The next question is how they can be acquired, and how shipping companies can be sure they have been acquired. It could be through formal training, simulation, or experience on the job. Many flag states will only accept an approved course, he said.

The 2010 amendments to STCW implemented in 2017 introduced requirements for officer training in areas such as leadership and managerial skills.

The company’s safety and organisational culture is also relevant, including in how it reviews incidents and claims, and cultivates the appropriate leadership behaviour.

Good bridge team management needs both good team interaction and communication, which leads to shared situation awareness and optimal decision making. It also needs people to be comfortable making appropriate challenges to colleagues when they see something which concerns them, and these challenges need to be responded to appropriately.

“We consider a meaningful challenge to any action or non-action should be considered and respected regardless of who is challenging who,” he said.

Members cultivate and improve these skills through mutual support and being open to feedback.

People should be able to reflect on their own performance, in achieving and

maintaining situation awareness, effective communication and good decision making.

One problem with BRM training is that people sometimes don't do anything differently as a result. "For many people, they go to the course, get the certificate, put it on the shelf, and continue to go as normal. It hasn't changed their outlook," said Fiona Al Hashimi, claims manager with Britannia P+I club and a former deck officer.

Companies decide that after an incident, the appropriate response is to repeat the

training, expecting that it eventually embeds the desired behaviours. "No-one has come up with a better idea than repeated training."

"It's hard to make courses based on attitudes instead of courses based on skills," she said.

The International Group of P+I clubs identified that training should be focussed on the master pilot exchange, and making sure pilots and bridge teams are aware of the limitations of the equipment, and the passage plan, she said.

Officers and bridge team members should be taught to question each other and the pilot when they have any uncertainty.

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The webinar is online here

<https://britanniapandi.com/2022/01/britannia-loss-prevention-webinar-bridge-resources-management-under-pilotage/>

# Captain Ed Verbeek's perspectives on pilotage

**Captain Ed Verbeek, a retired Amsterdam pilot who also worked as a master mariner, shared perspectives on how to make the pilot-master relationship work better**

**C** pilot, former master mariner, and who also has a Masters in human factors and systems safety, shared perspectives on how to make the master-pilot relationship work well, speaking at the Britannia P+I Club webinar.

Captain Verbeek told a story which illustrates the value which pilots can provide, but also complexities involved. It concerned a coaster vessel going to Amsterdam, coming to a lock in calm waters, where he served as pilot.

When the lock gates opened, Captain Verbeek went to the bridge wing, because he knew that there would be a strong current, due to the exchange between salty and fresh water.

When a vessel starts moving ahead, this current and its interaction with the lock wall means that the bow tends to shear off and the stern tends to be sucked in, he said.

The effect would be different for each ship. "You start with a sort of medium setting and adjust as necessary," he said. "With the current on the bow you want to be sure your engine is running before you let go the headline [bow mooring line], sometimes engines don't start on the moment you want them to."

I started with the orders "Port 10, slow ahead".

On the wheel was the chief mate. He saw a lock wall on the port side and water on the starboard side. The chief mate on the wheel decided to give a little starboard rudder,

On the engine control was the captain. He was coming to the lock "a bit in a hurry, so his setting of 'slow ahead' was closer to 'half ahead.'"

There were no indicators for rudder and engine on the wing. "So, on the wing, I see the ship come to starboard violently, in my mind with 'slow ahead.'"

As the pilot, Captain Verbeek "decided firm measures are necessary, [calling for] 'hard port - and full ahead.'"

"The captain and the mate see that the vessel is reacting strangely. They decide to do as the pilot says. Suddenly the ship starts to turn violently to port, we are able to leave the lock without damage."

There are a lot of aspects involved in this situation, Capt. Verbeek explained, aside from no indicators of rudder and engine on the bridge wing, where the pilot stood.

There was a difficulty communicating with the bridge team. "Communication on such a distance is not very easy, shouting through a bridge door is not a way to meaningfully exchange concepts. As the ship is very close to the lock wall there is not much time."

Then there is the ship's crew or organisation. "It would have been really nice to have the captain next to me. But with the size of the crew in relation to their busy work schedules that would be very hard to organise."

"This trip taught me that once the ship is moored in the lock, the best thing to do

is to explain to the captain what happens when the lock gates open. Doing this in the times after, reduced the number of times the rudder went wrong."

### Bridge relationships

"There are cases where damage is made because the pilot made mistakes and captains didn't intervene, and cases where damage was made despite the captain intervening. There are cases where it seems likely that damage was made because of the captain intervening."

Advice to captains states, 'when in any doubt do not hesitate to overrule the pilot,' and they should assess the pilot's skill. "But this is not very practical, Captain Verbeek said. "As a captain, when I arrive in a strange port and an unknown person walks on the bridge, how can I assess their skills?"

If the captain and bridge team know in advance what is to be expected, "that will greatly reduce the feeling of uncertainty," he said. Although that won't necessarily avoid problems. "There's a great difference between hearing about an unfamiliar manoeuvre and actually experiencing one," he said.

And any discussion would be better if it is "short and sweet about things that usually happen and the most likely contingency."

If it is a longer pilotage, it is most useful to do the brief just before the action starts. "When you brief on events that might happen in 4 hours, most will be forgotten



when needed.”

Having a port voyage plan can be a great help, if they are specific enough to help you detect where you will deviate from your usual risk. The plan can also include ‘reserve areas’, places where you can go to safely if you can’t stick to your plan, and ‘no go areas’, where you will not go, he said.

The pilot can suggest where the speed should be under 7 knots, where it should be under 5 knots, and where it should be under 3 knots.

Having this plan will reduce the tendency of captains to make decisions during the voyage, for example, “helping a bit on bow thrusters without informing the pilot.”

It is important to bear in mind that in most cases, the working relationship between captains and pilots goes very well.

Captain Verbeek’s brother-in-law was a captain of coaster vessels, and at family get-togethers, he would talk about crazy pilots he had met, and Captain Verbeek would talk about crazy captains. “But we’d find out these were the exceptions.”

As a captain, you find big differences between pilots. One pilot gave a comprehensive briefing about what would happen in a large and busy port; in the neighbouring port, the pilot just said, “captain, I’ve done this before”.

Working as a pilot, Captain Verbeek came across one captain who said, “on this ship, the pilot sits in that chair and drinks coffee.” It was a bit of a difficult start.”

“You don’t have to become friends. For a few hours you have to make sure the voyage is safe. It starts with treating each other with respect. Have a proper greeting. Once you start talking, making remarks and asking questions becomes so much easier. Both have responsibility to make it work the best possible way.”

If things are not working to the level you want, “realise that it is often not the fault of the person but the system in which that person is operating.”

It can be useful to think of the steps Probe, Alert, Challenge, Emergency (PACE). “When concerned you probe, ask questions. If you continue to be concerned, the next step is to alert [someone] of the things you are not sure are right. If you think the response is insufficient you challenge, say something is necessary, such as ‘I think we need to come to starboard now’, ‘I think we need another solution’. Then finally you get to ‘emergency’, doing whatever is needed.”

“All this works best if the team on the bridge are on speaking terms, so it’s important to achieve this. This cannot be achieved when the strangers on the bridge check each other for the first mistake in an atmosphere of distrust.”

“In theory unplanned interventions should hardly ever be necessary. But when real life and theory confront each other, real life always wins.”

An ‘unplanned acute intervention’ should only be necessary if you assess immediate danger so have no time to ask questions; you feel the pilot is not responding adequately; and you have a reasonable expectation that you are able to prevent or minimise damage, he said.

## Captain on the bridge?

Should the captain be on the bridge at the same time as the pilot? If the pilotage is under 3 hours, then the captain should probably be on the bridge the whole time, Captain Verbeek believes.

For a longer pilotage, you can make a plan and decide which areas decisions might need to be made immediately, and so the captain should be on the bridge, and where there would be more time to make decisions. But it can be difficult making a plan so that the captain can get the necessary rest while also being on the bridge at the necessary time.



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# NTSB report - \$72.9m accident 'due to fatigue'

**A report by the US National Transportation Safety Board directly blamed an incoming captain's fatigue for contact with an offshore platform, costing \$72.9m. There were also anchor issues**

**A** report by the US National Transportation Safety Board, on a tanker 'Atina' making contact with an offshore platform offshore Louisiana, directly blamed the fatigue of an incoming captain.

The incident led to \$72.9m of costs, with nearly all of the damage on the offshore platform.

The incident happened on Oct 17 2020, shortly after a replacement captain joined the vessel, having travelled from Turkey, and said he had not slept for 50 hours. Being tired, he wanted to anchor as quickly as possible.

The investigation noted that the company's safety management system required a minimum one-day turnover between senior personnel aboard a company vessel if the oncoming senior person worked for the company, and seven days if the senior person was new to the company.

The incoming master had never been aboard Atina but had worked for the company in the past.

But the incoming master boarded the vessel when it was underway to the anchorage, only seeing the departing master on the tanker's deck.

"The National Transportation Safety Board determines that the probable cause .. was the Atina's operating company not ensuring sufficient time for the master's turnover,

which resulted in the master's acute fatigue and poor situation awareness during an attempted night-time anchoring evolution," it stated in the report.

"Vessel operating companies should ensure that joining crewmembers/ personnel are given the opportunity to obtain a sufficient handover period and adequate rest before taking over critical shipboard duties, such as navigation, that could impact the safety of crew, property, and the environment," the report said.

In this case, "an overlap would have allowed for the incoming master to rest and receive his counterpart's handover information."

Other factors were that the previous captain wished to leave the vessel after problems with a vetting inspection. There were 25 knot winds and difficulties anchoring at the time of the contact with the platform. There was also a river current. The incident happened at night time.

The vessel was also asked to change anchoring location by authorities, and in doing so lost track of the location of the platform.

There were problems with navigation situation awareness, with the vessel anchored 0.7 miles from the offshore oil and gas production platform, while its intended anchorage was 3.2 miles northeast of the platform.

## The contact

Estimated damages to the platform were \$72.3 million. A fractured and bulged leg, and severed, buckled, and crushed structural members above and below the waterline.

Damages to the ship were \$598,400 – the starboard accommodation ladder and indentations to hull plating in ballast tanks 3-starboard and 5-starboard.

The platform's four crewmembers and one technician evacuated to a nearby platform by helicopter after activating the emergency shutdown device to shut in wells. No pollution or injuries were reported.

## More details

The vessel, Atina, is a crude and products tanker, owned by Hanzhou 1 Ltd. and operated by Beşiktaş Group, and flagged in Malta. It has a double hull, a fixed pitch propeller, and no thrusters.

A SIRE inspection report was carried out 2 days before the accident on Oct 15, 2020.

Before joining the vessel, the incoming master visited the company office in Istanbul, Turkey, and learned that the master on board had "issues with the vetting [SIRE] inspector" and that he intended to leave. The incoming master said that he had to "urgently" join the vessel to relieve him.

According to Atina's passage plan, dated October 16, one day before the accident, the tanker's intended anchorage was about 3.2 miles northeast of platform SP-57B and about 5.5 miles southeast of a sea buoy.

The master told investigators that he didn't want to spend a lot of time finding a place to anchor in the middle of the night on a vessel he wasn't familiar with.

He also told investigators that he wanted to anchor the tanker soon after the pilot's departure, because he was tired from having no sleep for over 50 hours while traveling to join the ship.

He checked the electronic chart display and information system (ECDIS) and planned to drop the anchor in the Fairway Anchorage area, in what he deemed was a safe place, about 7 cables (0.7 miles) from the platform SP-57B.



**The Atina after contact with the offshore oil platform. Photo US Coast Guard**



## Accident details

The master, second mate, able seafarer, helmsman, and ordinary seafarer lookout were on the bridge at the time of the accident.

At 0400, radar and ECDIS images captured by the ship's VDR showed the vessel south of its easterly voyage plan trackline and moving farther to the south.

At 0402, with the vessel heading 115° at a speed over the ground of 2.8 knots and a course over the ground of 170°, the master ordered Atina's bosun, who was on the bow of the tanker, to begin lowering the port anchor.

The tanker was in about 167 feet of water and within the boundaries of the Southwest Pass Fairway Anchorage area.

At 0409, there were 2 shots (180 feet) of chain in the water, and the chain was taking a lead of about 9 o'clock. At that same time, SP-57B was about 0.8 miles off the tanker's starboard beam, and the wind was just forward of its port beam.

At 0413, as the vessel's crew continued to lower the port anchor to 5 shots (450 feet) in the water, Atina's master asked the second mate for the distance to a vessel that the master believed had not been visible a few minutes ago.

At 0414, the master told the second mate he believed the target was "6 cables" (0.6 miles), and the second mate replied that it was 1.5 miles.

Nineteen seconds later the master replied, "Okay, but what is that thing we see at 5 cables?" The second mate replied, "Bearing 210, range 1.5 miles." The master asked if the target was moving; the second mate said it was anchored and again confirmed this after the captain asked, "Anchored, right?"

At 0416 the bosun reported there were 5 shots in the water and the anchor chain was leading 8 o'clock. About the same time, SP-57B was about 0.7 miles off the tanker's port bow.

About 0417, with the sea buoy bearing 310° at 2.34 miles from the Atina, the Southwest Pass pilot station called Atina on VHF radio and asked if they were going into the anchorage; the vessel's crew replied that they were "dropping anchor now."

The pilot station then stated, "Move more than 4 miles from the sea buoy," and then repeated, "more than 4 miles from sea buoy."

At 0420, the master stated, "There is no sleep for me, it has been three days straight," and at 0421, he ordered the anchor to be heaved up.

At 0431, the bosun reported the "chain was grinding the hull." The master ordered hard starboard rudder with SP-57B on the Atina's starboard quarter at 0.7 miles and the wind dead ahead of the vessel at 24 knots.

At 0437, 20 seconds after the bosun reported 3 shots (270 feet) on deck, the master asked the second mate to confirm that they "will have no problem with that ship," that they would clear it. At the same time, SP-57B was about 0.7 miles on the vessel's starboard bow bearing 174°.

The master then asked the second mate for the distance from the other vessel, and the mate replied, "One mile bearing 175°." At 0440, after first remarking that it looked like the ship was "closing in," the master asked the second mate what the ship was doing, to which the second mate replied, "She is speeding with 5.3 knots at this moment."

At the same time, Atina was making a speed over ground of 5 knots. About 0441 the master asked the second mate for the name of the ship, and the second mate replied, "Leader, sir, at starboard." [Leader was an offshore supply vessel in the vicinity].

The master replied, "This is not a ship, it is a platform."

About 0442, parametric data obtained from the tanker's VDR showed the rudder went from midship to 32° to port.

At 0444, the master stated, "We are hitting," and, according to parametric data from Atina's VDR, at 0446 the starboard side of Atina struck the northern side of SP-57B at 3.8 knots.

After notifying the company and Southwest Pass pilot station of the strike, the tanker went to anchor in the Southwest Pass Fairway Anchorage.

Post accident alcohol and other drug testing was conducted with negative results for all crewmembers.

According to the 96-hour work/rest history form for the master, he had no sleep in the 24-hour period before the accident and 19 hours of sleep during the 96 hours before the accident.

Ninety-six-hour work/rest history forms for the second mate, helmsman, and lookout indicated that all were in compliance with work/rest requirements.

## Navigation

At the time of the accident, there was a current at about 247° and a drift of about 1.5 knots.

Atina's radar displays showed the wind out of the northeast at 25 knots.

The master told investigators that he was aware of the 25-knot wind.

Atina's VDR information included data from the S-band and X-band radars. At the time of the accident, the S-band radar was set to a 3-mile range.

The S-band radar screen showed the offshore supply vessel "Leader" as an

automatic identification system (AIS) target.

The alarm "AIS COLLISION" was visible in red text under "AIS ALERT" on the S-band radar screen.

The X-band radar was set to a 1.5-mile range and did not show any alarms or AIS information.

The second mate told investigators that an alarm was activated on the radar he was referencing in the time leading up to the accident.

## NTSB analysis

NTSB's analysis and assessment was that the bridge team lost track of the platform's location, as they were heaving the anchor to comply with the change request. Based on the VDR audio, it appears that the master believed the platform was another vessel.

When the master asked what the vessel at 6 cables was doing (platform SP-57B was at that approximate distance), the second mate gave the master distances and information for the offshore supply vessel Leader, which was located 1.5 miles away from the tanker, 0.9 miles beyond SP-57B.

The S-band radar was the only radar that included vessel names and the only radar showing an alarm.

Because the second mate informed investigators that an alarm was activated on the radar he was using, it is likely that the second mate was looking at the S-band radar.

The S-band radar was set at a scale of 3 miles, making platform SP-57B difficult to see because it was lost in radar clutter close to the Atina.

The master was likely looking at the X-band radar, on which the scale was set to 1.5 miles, making the SP-57B easily visible at 0.5 miles.

Also, the master did not adequately account for the westerly setting current and north-easterly wind that pushed his vessel toward the platform.

"Likely preoccupied with bringing the anchor in clear from the hull, the master ordered hard starboard rudder while the platform was on the Atina's starboard quarter and with the wind coming from dead ahead," NTSB said in its report.

"By doing so, he ended up pivoting Atina toward SP-57B and putting the wind and current on the Atina's port side, which caused the vessel to set toward the platform."

"As the platform's relative position to Atina shifted from the tanker's starboard quarter to the starboard bow and the ship pivoted about the anchor chain, the combination of set and Atina moving ahead brought the tanker in contact with the platform as the amount of chain in the water lessened and the ship gathered speed."

# Ship management news from BSM, Thome and Columbia

**BSM training crew in Africa, Thome's new courses, Columbia's co-operation with the French navy. Some news highlights from the ship management sector**

an Beveridge, CEO of the Schulte Group (parent of Bernhard Schulte Shipmanagement, BSM) believes that the quest for well-trained seafarers will be one of the greatest challenges facing the maritime industry in the coming years.

"In many traditional seafaring nations, the seafaring career has already lost attractiveness, so that maritime academies struggle to fill their classes. The extremely poor treatment of seafarers during the ongoing COVID pandemic will exacerbate the shortage," he wrote in the company Highlights magazine January 2022 issue.

"We need to make a seagoing career more attractive for young people. We also need to provide a career track to young people in countries with favourable demographics, and where people are open to the opportunities a seagoing career can provide."

"Here we see great potential in Africa, and we strongly encourage our ship management customers to support us in employing African cadets, ratings and officers."

BSM has been investing in training of African seafarers since 2012, by establishing a local representative office and a cadet programme in Ghana in collaboration with the Regional Maritime University. Since 2012, more than 1500 seafarers have graduated. Today the programme employs 470 seafarers, mostly from Ghana, but also from Nigeria, Cameroon, Gambia and Sierra Leone. Intake is expected to increase to 1,000 by 2025.

In October 2021, BSM entered a cooperation with Korea Institute of Maritime and Fisheries Technologies (KIMFT), a maritime education and research institute operated by the government of South Korea to boost careers at sea, within the framework of the "Global Employment Project for Young Korean Seafarers".

There may also be a war for talent for shore roles. "Historically our industry has relied on seafarers coming ashore and taking over key shipmanagement roles. Since the seafarer pipeline for many nationalities, including European, Japanese, Taiwanese, Chinese is dwindling, at least in these countries it will be

necessary to either recruit foreign ex seafarers. Or to adjust our perception that certain roles can only be fulfilled by ex-seafarers," Mr Beveridge said.

## Vaccination

BSM has continued to expand its efforts to provide access to COVID vaccinations for all shore and sea-based personnel worldwide.

Its vaccination campaign in Ghana worked in collaboration with Ghana Health Service to vaccinate more than 70 BSM seafarers before they started their next employment.

BSM's Crew Service Centre in India conducted vaccination drives in Mumbai, Calcutta, Cochin and other locations for all employees and their immediate families.

Other company-wide vaccination campaigns were carried out at BSM locations in Myanmar and the Philippines.

## Vessel performance

BSM has developed an app with a company called Signal, to explore how

providing personalised performance feedback to its Masters and Chief Engineers can impact their behaviour in selecting the optimum speed for the vessel.

More than 60 Masters and Chief Engineers on 28 vessels are taking part in a six-month pilot project that began at the end of August 2021. Each participating crew member receives individualised targets via the Signal app which are calculated based on the crew's recent performance. Participating seafarers receive weekly updates on personal milestones and achievements.

"Currently, the tests are still running. So, we don't have the final evaluation of the results yet. But the app is well received by the participants and changes in behaviour are already noticeable," says Nick Topham, Managing Director at BSM Germany.

## Thome seafarer welfare award

Thome Group has been presented with the

Mission to Seafarers 'Secretary General award' (Dec 2021) in recognition of the Group's sustained efforts in improving seafarers' welfare both at sea and ashore.

It provides crew with a 24/7 helpline in partnership with ISWAN (International Seafarers' Welfare & Assistance Network) where seafarers could call specially trained counsellors for help and advice.

Thome also introduced a telemedical service linking again with ISWAN and The International Radio Medical Centre (CIRM) which provides medical advice to seafarers.

It offers "Fridate" (Friday date) to keep in touch with seafarers under quarantine using Zoom calls to maintain morale. Also, a Livewell@sea programme designed to encourage social engagement activities onboard to promote positive interaction amongst the crew.

## Thome training

In 2021, the number of subject areas covered by in-house courses was increased from 10 to 40. New topics include exhaust gas scrubbers and ballast water treatment systems.

Thome also increased the number of courses being delivered from each of its regions. In previous years most courses were being delivered from Manila.

## Columbia naval co-operation

Columbia Shipmanagement (CSM) signed a voluntary naval cooperation protocol with MICA Center (the Maritime Information Cooperation and Awareness Centre run by the French Navy) under which CSM will report any suspicious activities to the MICA Watchkeeper.

"Working with CSM merchant vessels will allow us to gather valuable information and in return will allow us to contribute to greater finesse in the development of our analysis and recommendations in matters of maritime safety to all the shipowners, charterers and operators participating in this protocol," says Commander Jérémy Bachelier of the French Navy, in charge of the maritime security in South-East Asia Seas (ALPACI).

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# How are we getting on with decarbonisation?

## DNV webinar

**At a DNV webinar “The Fuel of the Future”, speakers from Sea Cargo Charter, JP Morgan, Odfjell and others were asked what has been achieved so far with maritime decarbonisation, and if we are going in the right direction**

**J**an Dieleman, President of Cargill Ocean Transportation, Cargill, was asked what he thinks the impact of the Sea Cargo Charter has been, and what the next steps are. He was speaking at a panel session at a DNV online event “The Fuel of the Future.”

The largest single gain so far is that emissions are increasingly being taken into account in chartering decision making, he said.

Sea Cargo Charter “was launched nearly 2 years ago, we are close to 30 people now. We wanted to set a standard and create a common language. It is a journey, it’s a starting point. We’re trying to create visibility and accountability around carbon emissions from shipping.”

Reducing emissions won’t be a straight line, he said. “Last year will be a bad year, the fleet has been speeding up. We had a lot of interruptions.”

There have been a number of services and products developed around the Sea Cargo Charter, such as to help people to report, he said.

So far, Sea Cargo Charter has aligned its carbon reduction trajectory to the one set by IMO for the global fleet. But most people who

have signed up to the Charter have set higher ambition levels themselves, he says.

Mr Dieleman believes that IMO needs to start addressing lifecycle emissions [over the lifetime of a ship] rather than just operational emissions as it does now. “That is something that is going to be on the table,” he says.

One issue is that the vessel performance discussion has become too ‘atomised’, with too many forums and discussions, while nobody knows what the guiding star is going to be, suggested Julian Bray, editor of Tradewinds, moderating the discussion. “It is a fair call out,” Mr Dieleman agreed. “Everybody has a business to run.”

“It’s a little bit in the start-up phase. I would think, over time, the boundaries will be a bit clearer. It is good the institutes are talking and working together.”

Mr Dieleman was asked about whether there should be more exceptions or variations to the reporting allowed, such as for cruise ships which did not move during the pandemic but still consumed fuel in their onboard generators.

It is important that people do not see the Sea Cargo Charter as a system to generate league tables, because it could never be fair to all the nuances between businesses and operations, he

replied. “Let’s be clear, this is a complex topic. We have ships stuck in a trade war in China for 9 months.”

“You need to step away from the one offs and look at it as a journey, look at where is the industry at, what are its plans.”

Mr Dieleman noted that when it comes to introducing new fuels, there’s a limit to what companies can do on their own, because they do not yet have a clear business case.

### Andy Dacy, J P Morgan

Andy Dacy, Global Head of Transportation with bank J.P. Morgan, and formerly its global head of shipping, noted that it is getting very hard to put investment opportunities forward to investors, if they don’t have ESG as a component.

So, if shipping companies are seeking investment from now on, “I don’t think you’re going to be able to not include the ESG fuel transition.”

“One of the challenges we have, if we think about the destination as opposed to the route, the destination can be overwhelming,” he said. “We need to “continuously push the envelope forward and bring this out of the discussion process and into the implementation process.”

JP Morgan has been developing a number of technologies working together with Shell, including a design for LNG powered inland waterway barges, with capacity to be battery powered.

Mr Dacy was asked what impact the Poseidon Principles have had so far. The Poseidon Principles is a framework for lenders, for integrating climate considerations into lending decisions.

So far there is not enough difference in benefits between a bank which is Poseidon compliant and one which isn’t, he acknowledged. “Those benefits have to improve.”

“Banks have to say, ‘I’m going to charge a lot more for [lending for] a ship that does not meet these emissions requirements.’”



**Top row, left to right:** Kristian Mørch, Odfjell; Rebekka Glasser Herlofsen, Ferdinand Invest AS; Knut Ørbeck-Nilssen, DNV; Julian Bray, Tradewinds (moderator).

**Bottom row, left to right:** Jan Dieleman, Cargill; Sveinung Oftedal, Norway Ministry of Climate and Environment; Melissa Williams, Shell; Andy Dacy, J.P. Morgan Asset Management.



“I think that’s another example of the industry moving in the right direction,” he said. “Poseidon Principles is one piece - but a smaller piece.”

The biggest impact it will have is indirectly, on the chartering side, if it pushes charterers to “think long and hard” about what type of ship they are chartering.

“Older ships cannot meet new regulatory standards going forward. We’re going to see choices being made.”

Mr Dacy was asked about how he finds a way through the complex range of sustainability standards, and whether yet another scheme will make any difference.

“You’ve given me the hard question Julian,” he replied.

“The end result is the crucial one. With a new proposition, I’m not sure it’s going to solve all the different issues that are out there. There’s a lot more stuff. Whether it will be enough, I don’t know. We’re in Phase 1 of a multi stage process. We’re not there.”

In terms of whether or not investors would ultimately pay for decarbonisation, Mr Dacy said,

“I am confident, I just don’t think it’s going to happen immediately. I think we have a lot of educating [to do]. We’ve done a good job in the industry of tabling these topics.”

### Kristian Mørch, Odfjell

Kristian Mørch, CEO of chemical tanker operator Odfjell, was asked if there was a need to better connect company boards, who are often keen on decarbonisation, with operations staff, who may be fully engaged with the challenge of keeping ships running, and do not have time for it.

“I don’t think there’s any disconnect in what happens in boardrooms and executive management and the rest of the organisation,” he replied. “We have been working diligently on reducing energy consumption.”

“We have invested heavily in fleet renewal, we have invested \$30m in energy saving devices.”

However, some charterers have not yet shown much inclination to pay more for better performing ships, he said, although they are happy to make statements about their desire to reduce emissions. “When you start offering ships which are more efficient than those of our competitors, that’s something which frustrates us quite a lot.”

One challenge is the different reports each customer asks for. “We have 600 customers in any given year - they all have different reporting,” he said. “There’s no doubt that reporting is a true challenge.”

“The sooner we know what we are going to be measured on the better. We calculate and report on all the different ones.”

But the most important aspect is not the

means of reporting itself, but what is underneath it, the efforts to minimise fuel consumption. “The reporting might change, and requirements might change, but [what’s important is] you burn as little as possible and figure out a way to reach the targets.”

### Rebekka Glasser Herlofsen

Rebekka Glasser Herlofsen, an independent board member in a number of companies including Wilhelmsen and Klaveness Combination Carriers, said that “ESG is no longer a side show for companies.”

“We’re having real discussions and it is all about capex, transparency and setting targets. So much has happened in the last few years.”

One example is Equinor, Wilhelmsen and DNV, together developing a design for a liquefied hydrogen bunker vessel, she said.

Klaveness Combination Carriers signed one of the first ever sustainability linked contracts in July 2020, for financing two of its “CLEANBU” vessels, which are claimed to be “the world’s most environmentally friendly deep-sea vessels.”

“I think this fits very well with the customer [charterer] need to engage and work alongside shipowners,” she said.

“I think it is really important to work with customers on sustainability linked contracts, the trajectory that the company has to meet.”

### Norway Ministry of Climate

Sveinung Oftedal, Specialist Director with Norway’s Ministry of Climate and Environment talked about how collaborations were shifting into contracts. “That is where we want to go,” he said.

Asked about the legacy of COP 26, he noted that shipping is not part of the COP negotiations, since the Paris agreement is about state obligations, but international shipping is covered separately under IMO frameworks.

### DNV

“If you only go a couple of years back it was a different sentiment,” said Knut Ørbeck-Nilssen, CEO Maritime with DNV. “People were saying, ‘it is difficult to do something.’”

“Whilst now - we see a true willingness and ambition to do something. It’s not only having strong declarations [for] a long way into the future, but actually getting down to doing something.”

### Shell

Melissa Williams, VP for Marine Decarbonisation, Shell, and formerly global leader for Shell marine and bunker sales, said, “we’re working with our customers to help them understand the potential change in the landscape and how it may impact the future fuel

supply.”

“We’re looking at vessels and infrastructure to get the fuel to market.”

Ms Williams was asked what impact she sees the various industry initiatives having.

“Our customers [shipowners buying Shell marine fuels] are having discussions and coming to the table to talk about reducing their emissions, because they are getting it from their customers,” she said.

“We’re on an early part of the journey, but at least shipowners are coming and having that discussion. It is also the end customer, the regulatory bodies, the government.”

### How to spend \$100m

As a closing question, all speakers were asked how they would spend \$100m on decarbonisation, if these funds were made available to them.

JP Morgan’s Andy Dacy said, “\$100m isn’t what it used to be unfortunately. It’s a start. I think one interesting area [is] carbon capture, let’s do a bit more there. That may be a solution to some of the transitional issues that we have.”

“We’re not sure what ships we’re going to build today, but we are going to have a lot of ships built yesterday. [Find out] the extent their emissions can be limited through carbon capture application.

I would put methane capture into that bucket as well.”

Shell’s Melissa Williams suggested that for existing vessels, “the quickest bang for the buck is energy efficient technology, retrofitting vessels sees immediate return.”

“The next aspect is investing in the new fuels projects. I would invest in alternative fuels.”

Cargill’s Jan Dieleman suggested that the money should go into research into wind power. “Wind is there, wind is free.”

Odfjell’s Kristian Mørch suggested investing in alternatives to the combustion engine. “How do we scale up fuel cells?” he asked.

Sveinung Oftedal from the Norwegian government said that the way to get most value would be “go to developing countries, focus on developing transition, you need to ensure there’s a female CEO or project manager, or a project team of mostly young, clever people. One grumpy person asking all the difficult questions who has no power to decide.”

Board director Rebekka Glasser Herlofsen said, “I think we need to go from all the talking to demonstration projects. I would like to see one involving ammonia as the future fuel.”

The event was on Jan 12, called “DNV Conference – The Fuel of the Future.” The full recording is online here

<https://www.dnv.com/maritime/webinars-and-videos/on-demand-webinars/fuel-of-the-future.html>

# CMA CGM and LR on next steps for decarbonisation

Speakers from container ship operator CMA CGM, and class society LR, shared perspectives on how to move further with decarbonising shipping, including concerns about availability of future fuels

**W**hile the shipping industry has made clear commitments to press ahead with decarbonisation, it will be judged by whether it actually happens, not what people say, said Espen Poulsson, chair of the International Chamber of Shipping (ICS), in his introduction to the ICS webinar, "Next steps for shipping's decarbonisation post COP26", held on Jan 26 2022.

Christine Cabau Woehrel, CEO of CMA ships, head of fleet at CMA CGM, and previously CEO of Port of Marseille, said that by the end of 2022, CMA CGM will operate 24 LNG propelled ships, and "up to 44" ships by the end of 2024. CMA CGM is the world's 3rd largest container shipping company, based in Marseille, France.

"We believe LNG is the first step, we are working with our partners for the next alternatives."

One direction is making biomethane from waste and then liquefying it, to replace the LNG. Synthetic methane, made from renewable electricity to make hydrogen and combining it with otherwise emitted CO<sub>2</sub>, is another step.

"Both raise the subject of scalability [availability of fuels in large enough volumes], this is going to be the main challenge," she said.

"We have a partnership with ENGIE, a French energy producer who is extremely active in the field of producing synthetic methane."

The partnership with ENGIE is seen as a way to work together to accelerate production of new fuels at big scales, she said. Engie can develop the fuels in the knowledge that they can be sure of the 'offtake' (sales).

"Probably we need to stop arguing which is the energy of the future,

I sincerely believe there will not be one energy of the future there will be several."

"We need to give to our customers the proper tools that they can calculate their own carbon footprint, so they know what they are emitting in bringing a product from A to B.

Ms Woehrel imagines that customers in future may be offered choices such as between a faster transport, or a slower one which emits less carbon. "Let the customers choose depending on their constraints and alternatives," she said.

## Nick Brown, LR

Nick Brown, CEO of class society Lloyd's Register, said he thinks the maritime industry had more of a "single industry voice" at the United Nations COP meeting in November 2021 than many other industries.

But "we will now be measured on action," he said. "It is essential to have more CEOs and leaders developing their own resources and people's expertise towards action."

"We see (all) groups all working together on concepts for demonstrator projects, for new technology. These remain critical to demonstrate that zero shipping carbon can be

safely achieved."

"It is also fantastic to see banks, charterers, insurers showing great interest to support these pilot projects."

"Some in the industry are perhaps a little bit confused that we have too many decarbonisation pathways to choose from," he said.

"I think we need to be very careful as we move forward with pilot projects, demonstrator projects, to ensure all the safety protocols of today [are followed] and safety records are improved. And [we manage] maintenance, toxicity, explosivity risks that will come along with this transition."

"I really want to [use] the opportunity that the Clydebank Declaration for green shipping corridors gives us, to support putting large scale demonstrator ships into service."

Shipping companies are very keen to see "scalability", or signs that future fuels will be available in larger scales.

"The biggest thing [is] clarity about when the fuel is going to be available, [and] in what kind."

"Scalability comes with commercial readiness," he said. "This is the only topic shipowners, shipbuilders, equipment manufacturers want to discuss with me. They don't want to discuss too many other topics."

Shipping companies are trying to plan how to renew their fleet over the next 10 years, with new regulations like CII which may impact charterability of higher emitting




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**Screenshot from the ICS webinar.**

**Top row:** Nick Brown, LR; Katrin Harvey, Ban Ki-moon Centre for Global Citizens; Christine Cabau Woehrel, CMA Ships, CMA CGM,

**Bottom row:** Esben Poulsson, ICS; Rolf Thore Roppestad, Gard AS

vessels, he said.

“They are trying to make decisions about modifications and improvements on existing vessels, or whether to recycle and build the next generation of vessels.”

“The biggest task is trying to get greater clarity of some form of the cost of emissions,” he said.

It will be helpful “when we have some kind of idea of what the trajectory of increasing costs will be year after year, whether a levy or whatever it would be.”

There will be “billions of dollars of investment decisions.”

“The role for class is that we keep all options open, we share learnings across the class societies. We’re in the perfect position to act as independent trusted advisors.”

“We don’t want to close off any solutions too soon. What works on a cruise vessel carrying 6,000 passengers is going to be very different to what works on Christine’s fleet [CMA CGM container ships]. We’ll have a different solution for shortsea shipping.”

“The area I’m most concerned about is co-ordinating land based investments with investments in ships. We have all witnessed a so called chicken and egg situation on LNG. First movers had to do a huge amount of work to be able to get the fuel in place for specific liner routes.”

“I think we can expect similar challenges in the next generation of fuels.”

A video download of the meeting is available at: <https://attendee.gotowebinar.com/recording/8091806767253932289>

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# Ecochlor's chlorine dioxide ballast water treatment

**Ecochlor has IMO and USCG type approval for its ballast water management systems using chlorine dioxide treatment. This is different system to electro-chlorination systems, and can be used reliably without a filter**

**E**cochlor, a ballast water treatment systems (BWMSs) manufacturer based in the United States, has developed a system using chlorine dioxide (ClO<sub>2</sub>), which has a much different chemical process than electro-chlorination (EC) sodium hypochlorite ballast water treatment systems.

The Ecochlor systems are easier to manage on board than EC systems due to their simple design and powerful ClO<sub>2</sub> treatment technology, the company believes. Also, the system is approved to operate without a ballast water filter.

ClO<sub>2</sub> has a long history in land-based applications. It is primarily known as a disinfectant for municipal drinking water, the treatment of water in oil and gas products and pulp mills, and as a sanitizer for the food industry.

Despite chlorination and chlorine dioxide having chlorine in the name, there is a vast difference between the two chemicals.

The EC system uses electricity in salty seawater to produce sodium hypochlorite solution (NaOCl) and hydrogen gas. The sodium hypochlorite reacts with any organic

matter — both living organisms and organic (dead) material that may be present in the water.

As the sodium hypochlorite reacts with the organic matter it is consumed or 'used up'. This means that a high dose of chlorine is required in order to ensure that there is always sufficient disinfectant left over to 'kill' the living organisms, especially in heavy challenging waters.

The Ecochlor system reacts mostly with living cells, and to a much lesser degree organic compounds, and as a result requires a significantly lower chemical dose than EC systems.

"Sodium hypochlorite reacts with everything, it is not very selective," says Andrew Marshall, CEO of Ecochlor. "It reacts with any biological matter that it sees, which might include lots of mud."

For the vessel crew, estimating how much sodium hypochlorite the system has to produce can be difficult, he says, if indeed they have any control over that at all. If the dose is too much it may damage the pipelines and tank coatings. If you dose too little, the organisms may survive.

On the one hand, there has to be an upper limit of how much sodium hypochlorite the system will generate in order to avoid the risk of damage to the tanks. But then without a filter the crew can't be sure of meeting the legal ballast water treatment requirements in extreme conditions such as "dirty" or turbid water that have a high load of living organisms and non-living organics, Mr Marshall says. So the best way to be sure in with an EC system is to use filters.

In contrast, with the Ecochlor chlorine dioxide system, you don't have these concerns, so you don't need the filter," he says.

To demonstrate this, the Ecochlor system is dosed at 4.25ppm (parts per million) in a system with a filter, and 4.6 ppm in a system without a filter. Whereas a filterless EC BWMS could dose as high as 20 to 30ppm

to ensure it has effectively treated the ballast water.

Chlorine dioxide technology is much more adaptable to different types of water allowing for more flexibility with varying trade routes.

Another benefit is that any 'left over' chlorine dioxide in water will naturally turn back to sodium chloride (salt). Thus, it can be discharged to the ocean safely once you have reached the maximum allowable discharge concentration (MADC). This means that the Ecochlor system has no requirement for a neutralisation procedure prior to discharge.

It is possible to gravity ballast, even from bulker topside tanks (TST) — a very useful feature for operators of those vessels.

With a sodium hypochlorite treatment solution (EC), surplus sodium hypochlorite needs to be neutralised by another chemical before the water can be released to the ocean, Mr Marshall says. Any non-neutralised chlorine would be just as destructive to the marine environment outside the vessel as it would be to ballast water organisms, so this is a very important step.

A further benefit of the Ecochlor systems is that they use much less power than EC, typically averaging 4 - 10 kW, compared to 400 - 600 kW for EC. For EC systems, these power requirements increase depending on operating conditions (water temperature, salinity etc.), whereas the power requirements for the Ecochlor system is unaffected and constant.

Since ballast water systems are normally running when a ship is in a port, and using other power-hungry systems, this can put into question the sufficiency of electric power available on board. Increasingly ports are pushing ships to adopt cold ironing processes.

This involves taking grid electricity from the port and turning off ship diesel generator set so as to lower CO<sub>2</sub> and other noxious emissions. But it means that the shipowner needs to pay for all that extra BWMS power requirements at port electricity prices.



Andrew Marshall, CEO of Ecochlor



## Ecochlor's system

Ecochlor has a series of options of BWMS - with filters, a system with no filter, and a hybrid system, which can run either with or without a filter.

Ecochlor's EcoOne filterless and hybrid systems received type approval from IMO in September 2021, and US Coast Guard (USCG) approval in December 2021. This followed extensive testing to ensure that it can work effectively as a single-step treatment, without a filter, under all operating conditions in brackish water (river estuaries) and marine waters. It complies with USCG's "Standards for Living Organisms in Ship's Ballast Discharged Waters, Final Rule."

The work to obtain type approval for the EcoOne was done with the oversight of DNV and with Independent Labs (ILs) Golden Bay Research Centre (San Francisco) and DHI A/S, a Danish company which offers verification tests for ballast water compliance. Shipboard testing was completed on two Maran Tankers.

Today, 80 per cent of Ecochlor's new business is with the EcoOne systems. "This shows you, as a practical matter, the desirability of filterless operations, and the confidence that the shipowners have in EcoOne's ability to run a successful filterless ballasting operation without jeopardising tank coatings," he says.

## How it works

Chlorine dioxide is generated on demand using two precursor chemicals, sulphuric acid and EcochlorBlue BWT. The precise formula of Ecochlor's EcochlorBlue BWT is confidential, but Mr Marshall can say that broadly it is a known chemical system, with sodium chlorate and a small amount of hydrogen peroxide.

When the ballast pump is started, a small amount of each chemical is dosed from the precursor chemical tanks, into a mixing chamber "the size of a fist". Using a small amount of motive water, a ClO<sub>2</sub> solution is formed and then immediately injected into the main ballast water stream. When treatment is no longer required, the treatment system is thoroughly flushed with water to remove all ClO<sub>2</sub> from the system while it is idle, until the next ballast uptake.

Most organisms die in the next few seconds, so 80 per cent of organisms are dead before they even enter the ballast tank, the rest are killed within a few hours. All chemicals are supplied by Ecochlor, and the shipowner is not required to look for supplies.

Ecochlor operates a 'Vessel Delegate System' so each ship is monitored for its BWMS performance and chemical levels



**The EcoOne Generator, for providing ClO<sub>2</sub> onboard**

with the help of crew feedback. When chemical resupply is needed the customer is contacted and arrangements are made.

"The company has four chemical resupply hubs and multiple satellite operations located around the world from which it is able to resupply the chemicals. On board the vessel, chemicals are pumped directly into custom-built storage tanks.

Chemical resupply is handled twice per year by Ecochlor Service Engineers or Authorized Service Partners handling the logistics for delivery to the vessel. This means that the vessels also benefit from regular expert maintenance review visits in order to ensure that the systems are operating perfectly. This helps to explain the very high reliability rate of Ecochlor systems," says Mr. Marshall.

## Talking about filters

Nearly all the ballast water systems on the market use filters – Mr. Marshall estimates that about 40 of approximately 45 approved systems do.

"By not using a filter, you save money, you need less power, there's less maintenance and it is simpler for crew to run," Mr Marshall says.

If you have a hybrid system, the vessel crew retains the ability to choose. "You, as the captain, are able to say, I want to run with a filter or without a filter. In fresh [river] water, you run it with the filter. In brackish or marine, you can decide to run with or without."

Filters come with their own problems, in that they need to be cleaned and maintained. They can also limit the flow rate – so if you are loading ballasting water at the same speed as discharging cargo, to keep the vessel stable, this limits the speed you can discharge cargo, something no tanker operator wants.

"If your system is approved to be used with a filter, this does mean that it only complies with ballast water regulations if the filter is operating. When shipping companies are taking on ballast water with a lot of sediment, there can be a temptation to bypass the filter, because it easily gets blocked and needs cleaning out, or it will force you to reduce the flowrate of cargo you are loading," Mr Marshall says. But if you by-pass the filter in those circumstances, you have immediately invalidated the treatment and you will not be compliant!

Any BWMS manufacturer using a filter needs to have their ballast water treatment process certified by the IMO and may possibly require USCG Type Approved certification. If it was certified using a filter, then you must use a filter.

Most filters have 40-micron screen. If your system is designed with a filter its 'kill process' will be tuned to kill anything that fits through that screen. "In our case, when we removed the filter - we needed to re-tune the chemical dose ever so slightly from 4.25ppm to 4.6ppm, but this is still comfortable below the 5.0ppm that some claim is the safe limit for tank coatings."

Another benefit of not having a filter is that the ability to gravity ballast on intake. Some bulk carriers and tankers are set up for gravity ballasting - you cannot gravity ballast on intake if you have a filter, nor can you gravity deballast on discharge if you need to neutralise (EC) or retreat (UV) the ballast water. "With a chlorine dioxide-based system, once you've verified that chlorine dioxide has achieved MADC, you can discharge the ballast water."

"Of course, if you are using a UV (ultraviolet) ballast water treatment system, you have other reasons for needing a filter, the filters they remove dirt from the water, which can block the light from getting to the organisms, so all credible UV systems use a filter," Mr Marshall says.

One supposed argument in favour of filters is that they prevent sediment going into ballast tanks, which later needs to be cleaned out. The truth is that a filterless BWMS does not have a large impact upon sediment build-up since most sediment material found in ship's ballast tanks are fine-grained particles under 35 microns and most filters use a 40-micron screen.

Mr Marshall points out that while there may be some additional sediment, it is not a new problem, companies have been doing it since they have had ballast tanks. "The knowledge is all there, shipowners do it all the time," he says. "For shipowner that are concerned about sediment we offer an EcoOne Hybrid options which would allow the crew to either use the filter or go filterless dependant on water conditions."

# Shipshave's In-Transit Cleaning of Hulls

Shipshave of Stavanger has developed a system for cleaning hulls during a voyage, using a semi-autonomous robot tethered to a winch

**S**hipShave of Stavanger has developed a relatively low-tech device for cleaning vessel hulls during transit, which has already been extensively trialled by Klaveness, an operator of tanker/dry bulk combination vessels based in Oslo.

The system is called In Transit Cleaning of Hulls (ITCH).

Its device could be roughly defined as a brush on a rope, with fins, rudder and camera attached. The “long brush” is about 1.5m long, weighing 5kg.

It is tethered via a rope and a winch on the ship's forecastle deck.

A fin attached to the brush means that the water flowing over the whole device, as the vessel moves through the water, pushes the brush onto the hull in a controlled manner.

A rudder causes it to move up and down the hull vertically. This rudder is controlled by signals from a pressure sensor. It will move upwards until reaching a water depth of 1.5m, and will move downwards until it detects the curvature in the hull above the bilge keel.

The rope is gradually released using a winch, so that the vertical side of the hull is cleaned.

The device is fitted with a video camera, which can record an image of the fouling on the hull, and the fouling being removed by the brush. The video is stored onboard the device for viewing later. The camera is “4k” (4 x HD resolution).

It can be supplied to the vessel in a pack of components, to make it easier airfreight. The components can be put together by a crew member, involving 3 bolts and one nut.

The whole cleaning is managed by crew, no specialists are needed.

The equipment is only used in transit, not in port.

The brush stiffness has been chosen so it will remove micro fouling with the expected pressure of sea against a vessel at 10-15 knots, while not damaging the antifouling coating. The lifespan of the brushes will depend on how often it is used and the condition of the hull.

The device works best on vessels with a high block coefficient hull shape, which most tankers have.

## Usage so far

The device has been tested or used on 31 vessels so far, with lengths of 70 to 335m, up to 3 years after the last hull cleaning, at speeds of 7-19 knots.

15 systems have been delivered so far as a commercial arrangement, including 4 repeat sales, where customers were pleased enough with the results on one vessel, they bought the system for another.

In the tanker segment, customers include operators of chemical tankers, product tankers, VLGCs and combination carriers.

While most shipping companies like to keep their cards close to their chest, Eirik Eide, sales and marketing manager, is able to mention Norwegian combination (wet/dry) vessel operator Klaveness, which is using the system on four vessels. This includes a vessel trading between Europe and South America. Also, Odfjell has once again been an early mover.

Another customer has used the device only on the starboard side not the port side, so it could compare fouling growth when in dry dock after approx. 3 months of use.

“Very convincing images have been obtained from the vessel in question,” Mr Eide says.

After applying a fresh coat of paint, it will now use the device on both sides of a vessel, where it can compare with a sister vessel on the same trade, not using the device.

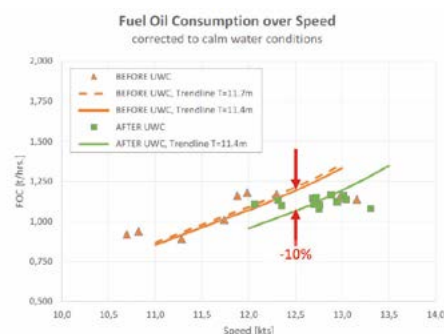
A verification test was recently conducted on a bulk carrier verified by DNV.

“We need more user data to convince evaluators sitting on the fence, today we don't have enough of that,” he says. To sell to large fleets we need to present hard data. This is a step of paramount importance to meet our sales targets.

## Operating it

To use the device, you need to secure a portable winch to a strong point, such as a bollard on the forecastle deck such as with a rope. It does not need to be bolted to the deck. It can be removed and stored between operations. The winch weighs 50kg.

For vessels carrying explosive cargoes



**DNV verified data showing how fuel consumption of a bulk carrier changed with speed, before cleaning (orange data) and after cleaning (green data). UWC = underwater cleaning**

which cannot use an electric winch on the deck, a pneumatic winch, powered by the vessel's compressed air supply, can be used.

In operation, there is normally one person operating the winch, and another person monitoring progress along the side.

The winch is let out slowly but continuously while the cleaning is taking place to ensure overlapping vertical movements. Typical speeds are 1-3 metres per minute. This would enable the device to groom one side of a 190m vessel, with 11m draft, in an hour.

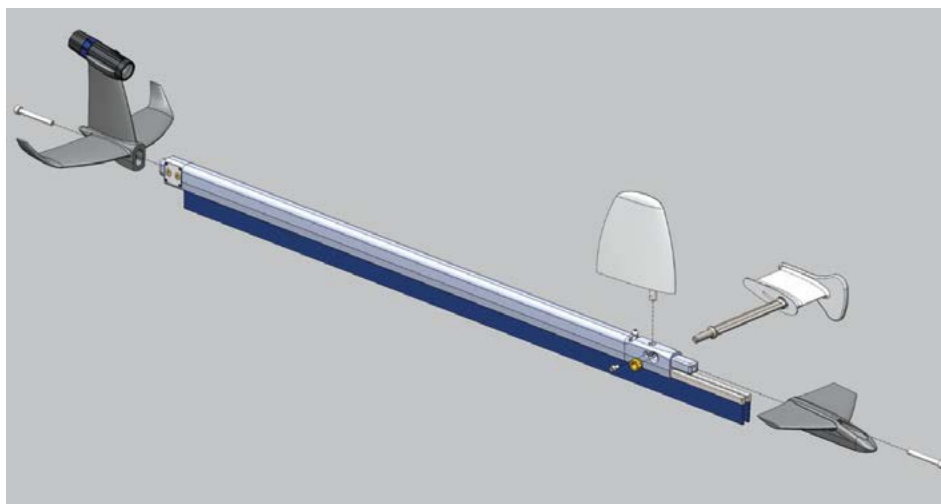
Once you have completed cleaning one side of the ship, you bring the device in using the winch, and then launch it off the other side of the ship.

Some companies have expressed concerns of dangers or serious damage if the device should become detached from the rope and then caught in the propeller.

Mr Eide says that provided all mitigating measures in place fail, the device would quickly get crushed in the propeller and offer little resistance which may damage the propeller. “It is made with aluminium, so thin you could split it with a hand-held axe,” he says.

But of course, this should never happen, the device is attached by a rope to the winch, and the rope length should be limited so that it will never be able to reach the propeller even if the whole rope was let out.

Shipshave first tried using the device using the fairlead on the side (exit point mounted on the boat to guide a rope) used for vessel



#### The ShipShave device

mooring but found that with the mooring fairlead typically used for the spring line, it was limiting the device's coverage in the foreship.

Now we are promoting the use of the "Panama fairlead" (an exit point in the centreline of the vessel) and is achieving improved coverage.

#### When it is used

It is designed to be used in calm seas, although it has been used in swell with long periods of up to 3-4m high.

The system is designed to be used proactively at micro level fouling – this point is important because if fouling has reached the point where it is having a large impact on fuel consumption, there is probably too much fouling for it to be removed with this device. We are testing alternative brushes and other mediums to be able to remove macro fouling for ITCH v.2, says Eide.

Perhaps it can be understood in the concept of kitchen cleaning, it is the equivalent of a soft sponge rather than a scouring pad.

Shipping companies are used to using

aggressive cleaning equipment on hulls. But if the hull is never allowed to get dirty to begin with, the aggressive cleaning equipment is not required, just as you can wash up all of your dishes using a soft sponge (it would be a different matter if you did not wash them for a year of heavy usage).

A light cleaning system is also good for your ship hull. Powerful cleaning systems can be damaging, like cleaning your home saucepans regularly using scouring pads. For ship hulls, this means paint roughness and increased drag.

The system cannot be used when the vessel is stationary, because it relies on the hydrodynamic force between the vessel and the water to push the brush onto the hull, and this force is only present when the vessel is moving.

The system is designed for vessel speeds of between 10 and 15 knots. At these speeds, the device has a high enough pressure against the hull to remove slime.

At a higher speed, the pressure the brush makes against the hull is higher, making it difficult for the ITCH to sweep uninterrupted in a controlled manner. Although Shipshave is currently experimenting what may be possible,

since container ships often go at higher than 15 knots.

You may know the rule of thumb that a vessel's fuel consumption is the cube of its speed. A similar rule of thumb can be used for the pressure the vessel makes on the water. This is the same pressure which 'pushes' the brush onto the vessel. So, at higher speeds, the pressure on the brush gets much higher. "This is why we can't accommodate 20 knots per today – the pressure is too great," he says. But with introduction of IMO's CII the days of steaming at such high speeds could be passé.

The system is designed to be used around 12 times a year, but the best frequency will depend on how fast fouling is growing. This depends on the temperature of seas the vessel is operating in, how much time it is stationary, and what anti-fouling coating it has. A vessel trading in the norther hemisphere may have to groom the hull at a lower frequency than a vessel trading in "hot spots" not limited to Brazil, West Africa and India.

#### Future development

Shipshave is developing supplementary tools to cover other parts of the vessel, such as a device to clean the propeller in port. It is also developing devices for removing small barnacles, up to 10mm, using rollers rather than brushes. A pilot customer is currently testing this tool on an ITCH.

The company is exploring how ITCH could be used with paints more susceptible to mechanical wear such as silicone coating, working together with manufacturer Hempel.

The system does not contain any data analytics technology which could calculate or determine when the hull cleaning should be done. But this may come in future versions.

It does not have any inspection / hull evaluation technology, but the company is exploring ways to do this with a laser to be able to establish the hull's roughness of a moving vessel.

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# Svitzer HPS – managed assessment of hull fouling

**Would you take out a service which monitors the level of fouling on your vessel's hull with underwater drones around the world, and advises you on the most economical time to clean them, perhaps all for an annual fee? Svitzer is developing this service**

**M**anaging hull fouling is a complex task for tanker operators. If a subscription-based service was offered, where your hull was inspected by drones so you know exactly the best time to clean it, would you take it?

Maritime services company Svitzer, owned by A P Møller Maersk, is developing this service, called Hull Performance Services (HPS).

For the inspections, Svitzer is working together with Notilo Plus, of Marseille, France, a company specialising in underwater robotic equipment, known as a 'drone' or 'remote operated vehicle' (ROV).

Divers may be used to supplement the robots, for parts of the hulls which are difficult to access with machines, says Henrik Sanglen, CEO of Svitzer HPS.

A pilot project for the service has been running over 2021.

The service is currently available in Panama and Algeciras, and shortly coming online in Rotterdam. Singapore will be the next priority.

The company is currently evaluating different options for a business model. While a single price subscription model may be simplest, tanker operators may prefer to make a payment every time a cleaning is done, Mr Sanglen says.

A rule of thumb is that a vessel which does not have its hull regularly cleaned can pay 5-10 per cent more for fuel, Mr Sanglen says. Regular propeller polishing can typically lead to 1-2 per cent efficiency gains.

A full inspection and cleaning can cost a shipowner \$10k to \$20k.

Svitzer is part of Danish company Maersk, which owns Maersk tankers and container shipping Maersk Line, and it is "very much in dialogue" with both shipping companies. "They are guiding us on the primary locations," he says.

"We're in dialogues with a number of big tanker operators that are evaluating the services to see if we can offer enough value to sign long term contracts."

## Predicting fouling

A by-product of the service is that tanker operators can develop a much better idea of which waters, and operating conditions, are likely to lead to fouling, and how much.

We already know that if a vessel is not moving for a few weeks, or is transiting warmer waters, the fouling will be increased, but it is hard to translate this knowledge directly to make a calculation of whether it is worth doing a clean.

"We can aid in the decision-making process of whether to clean right now or to postpone to a later stage," Mr Sanglen says.

If the charterer is paying for the hull cleaning, and they are only using the vessel for a limited period of time, it makes it harder to justify paying for the clean. The analysis can show whether or not this is worthwhile.

Better data can help tanker operators answer questions like, 'how much extra fuel consumption can they expect due to fouling if a vessel has been idling in warm waters for 3 weeks, considering the coating that it has.'

## Inspections and algorithms

For the inspection equipment and data analytics, Svitzer works with Notilo Plus of Marseille, France, a company which leases drones (otherwise known as remote operated vehicles / ROVs) and provides services to handle their data.

In the inspection, the ROV follows a pre-programmed "flight path" around the vessel, at a consistent distance from the hull, recording a video. Video images from the robot are streamed up to the cloud, and analysed by algorithm by Notilo Plus.

Having all video recorded at the same distance from the hull means that the video is much easier to algorithmically analyse than diver images, which are likely to be at a varying distance from the hull.

This also means that the fouling analysis is standardised from one port and one inspection to another, so it is much easier to compare one inspection with another, or one vessel with another.

This requirement favours the use of automated equipment. "This is something that can be difficult for divers with handheld units," Mr Sanglen says.

Divers will still play a role in the cleaning process for the foreseeable future, particularly for areas of the vessel which cannot be accessed by the cleaning ROVs – they are 4-5 metres long and weigh more than a ton, so cannot get everywhere around a vessel.

The inspection drones send data as a live stream video image, which a customer can see directly, so they can "take part in the underwater inspection".

The video analytics algorithms can determine factors such as the coverage percentage, thickness, and the type of fouling (barnacles may be the worst). For example, it may say "hull is 78% fouled by barnacles".

"While already very accurate, these algorithms are expected to continuously improve and evolve as more data is processed through them, Mr Sanglen says.

"They are already accurate enough to replace manual assessment with the additional benefit of being non-biased with standardized output, regardless of where in the world the images were captured."

## Standardised

Tanker operators particularly appreciate the standardisation of measurement, Mr Sanglen says.

"That's something the market has been telling us over and over again," the need for a "standardised cleaning service."

"No matter where the vessels stop they should get the same level of reporting submitted to them, the same nonbiased assessment of hull fouling.

There are a number international standards for levels of fouling, including some papers published by BIMCO with a way to interpret fouling on a scale, and some standards developed in New Zealand which are "slightly more analogue," he says.

# 40 percent marine sales growth for APC

**Advanced Polymer Coatings, a US company which makes a special polymer coating for chemical tankers and other industrial tanks, reports a 40 percent growth in business to the marine sector during 2021, driven by an increased effort to increase cargo cycling, reduce tank washing time and related emissions.**

**A**dvanced Polymer Coatings of Avon, Ohio, reports a 40 percent growth in its maritime sales over 2021, largely driven by companies wanting to speed up tank cleaning times and related emissions.

It calculates that by using the coating compared to a zinc coating, on a typical ship, customers will save 48 hours of vessel time with each clean. A vessel cleaning 10 times a year would free up 20 days to carry another cargo.

For each tank clean, there would also be a reduction of 83.6 tonnes of CO<sub>2</sub> emissions, 26.4 tonnes of fuel, and \$9.6k in cleaning chemical (calculation outlined below).

The coating was applied to 56 ships in 2021, with over 750,000 square meters of coating applied. The coating is on over 700 ships altogether. Key markets include China, the Gulf, Croatia, and Turkey.

About 50 percent of the new applications are on newbuild vessels; the others are on existing vessels, typically when a customer finds that with their current coating, they are not able to switch from one cargo to the next one easily.

It is normal for a chemical tanker to carry 85 different chemicals a year in its 16 cargo tanks. The tanks need a lot of cleaning to make sure that one cargo cannot contaminate the next one, says Capt. Onur Yildirim, global marine manager with MarineLINE.

## Charterers getting involved

The company says it is increasingly seeing charterers take an involvement in decisions about tank coatings or specifying that they are looking for a vessel with a certain coating, Capt Yildirim says.

“A couple of decades ago charterers were just the cargo owners. Right now, what we see is that charterers have a lot of influence on decisions taken in new buildings.”

“When one of the major chemical companies recently decided to time charter a certain spec of vessel, they approached owners [and asked] ‘do you want to build this spec, then I can guarantee you a time charter.’”

A further connection with charterers is the

emissions reports which tanker operators are increasingly asked to file about voyages. The emissions relating to tank cleaning are getting large enough to make a significant part of these.

## Calculating the benefits

To calculate the benefits in terms of heating for tank cleaning from using MarineLINE vs another coating such as zinc, APC uses data provided by UK tank cleaning consultant Guy Johnson of L&I Maritime.

Mr Johnson calculates that a typically sized zinc coated vessel will need 56 hours of hot water washing, based on cleaning 4 tanks at once and 16 tanks on the vessel. To make this heat, the auxiliary generators will emit 106.4 (metric) tonnes of CO<sub>2</sub>.

A MarineLINE coated vessel of the same size will need 12 hours of hot water washing, emitting 22.8 tonnes CO<sub>2</sub>. So a reduction of 83.6 tonnes. There will also be a fuel saving of 26.4 tonnes, Mr Johnson calculates.

The total cleaning time (including cold water cleaning) is 64 hours for the zinc coated vessel, and 16 hours for the MarineLINE coated vessel. So, a total time saving of 48 hours. This is when cleaning 4 tanks at once.

If the vessel costs \$18k per day to the shipowner, the 48-hour time saving equates to \$36k. If the tank is cleaned 10 times a year, it means it may be possible to fit in another voyage.

Further, a zinc coated cargo tank will typically need 200 litres of cleaning chemicals, Mr Johnson says, while a MarineLINE tank will not need any. A typical cost of cleaning chemical is \$3 a litre. So, cleaning the zinc coated vessel, with 16 cargo tanks, costs \$9.6k in cleaning chemical (200 x 16 x 3).

If you have an epoxy coating, it will perform a little better than zinc, but closer to zinc than to MarineLINE, Captain Yildirim says.

## About the coating

The coating system protects the substrate from corrosion and chemical attack. It is polymer based and suitable for chemical and product tankers. The system is also marketed to other industrial applications including rail transport,

tank containers, tank storage and terminals, chemical processing, refining, power generation and concrete.

The coating proves particularly useful for tankers carrying methanol. “Phenolic epoxy coating absorbs methanol,” Captain Yildirim says. “They need a time to desorb the methanol. It takes up to 2 weeks, depending on the cargo.”

“What is most important [to the owner] is turnaround time.”

## Online information

APC has a range of services to help tanker shipping companies understand how to get the most out of their products. This includes advice on how to maintain the coatings properly.

“We can’t afford to say we’re done right after the delivery of the vessel,” says Captain Yildirim. “We engage continuously. We try to solve the problem together. We try to create this information pool, together with Guy and other experts.”

“We’ll follow up and make sure they are satisfied with what we’re providing them,” says David Keehan, president of APC. “It’s a regular communication channel between APC customer care department, owners and charterers.”

“APC looks to develop a partnership with the owners and charterers so that we can provide solutions to the challenges they may encounter. Our role with our customers really starts after MarineLINE is applied,” he says.

## About the company

APC’s head of marine, Captain Yildirim, is a former chief officer onboard Aksay Shipping chemical tankers. He has been with APC since 2006 as technical inspector and global technical manager.

New staff members and advisors joining in 2021 include Captain Tore Svensen, a chemical tanker specialist and former head of fleet at UACC in the Gulf; and Kenneth Rogers, a former head of Aurora Tankers in Singapore, who has also held senior positions with Carnival, SEACOR and Seabulk.





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