

TANKEROperator

NOVEMBER - DECEMBER 2022

www.tankeroperator.com



★ MOBILITY

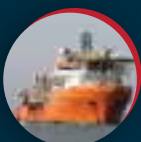
★ SUSTAINABILITY

★ CREATIVITY

MIDDLE EAST FUJI

Provides complete range of maintenance, repair & operations (MRO's), chandlery and provision supplies for our customer vessels trading in Middle East & HOA Region.

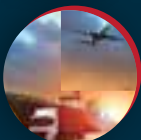
MARINE SUPPLY
& SERVICES



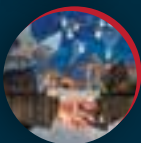
MARINE
ENGINEERING



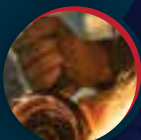
LOGISTICS
MANAGEMENT



INTERNATIONAL
TRADING



INDUSTRIAL
SOLUTIONS



UAE

OMAN

QATAR

SAUDI ARABIA

KUWAIT

BAHRAIN

DJIBOUTI



AL QUOZ 3, DUBAI, U.A.E,
P.O. BOX NO. 19227



E-MAIL : info@mef.ae
WEB : www.mef.ae



TEL : +971 4 3474444
FAX : +971 4 3472771

Continuously working hard to be able to deliver the ideal ballast water treatment solution - for any vessel.

- One of the most reliable and flexible systems available
- Brand new, simple and competitive EX d solution
- Deck House - plug and play option for tankers
- No downtime with Optimarin's system redundancy



Contents

OPENING

- 02** ■ **Acid Accident investigation** - a seafarer suffered 9 percent body burns due to a spray of sulphuric acid, when a cargo line containing acid was being cleared out by compressed air



- 05** ■ **OCIMF news** - becoming a more agile organisation, safety of onshore power, supporting West and Central Africa, vessel hardening

SEAFARERS / TRAINING SYSTEMS

- 07** ■ **OTG and behavioural competency** - e-learning for senior seafarers and office staff on how to assess behavioural competency of ship crew, a complex, perhaps unsettling, but very important concept
- 09** ■ **Mariner Skills and 'true e-learning'** - seeking to re-define what 'true e-learning' means in the maritime sector, with numerous short courses or 'modules' which a motivated learner can work through



- 11** ■ **Vikand's asset management' approach to crew** - why do we take an 'asset management' approach to our equipment, but with crew it is 'fix it when it breaks'?

GIBRALTAR

- 13** ■ **Gibraltar maritime developments** - possible LNG bunkering expansion, collision with a bulk carrier and LNG tanker, expansion at Sandvik Electronics

DECARBONISATION

- 14** ■ **What can bio-LNG do for shipping** - promise of a nearly zero emission fuel which can immediately replace LNG fuel. A new study looked at how much might be available for shipping
- 18** ■ **Waterfront Shipping and methanol** - 18 tankers using methanol as fuel, part of their fleet of 30 tankers for carrying methanol as cargo



COATINGS

- 20** ■ **Tanker coatings news** - a way to calculate a revised 'reference speed' for a coating; creating a standard for hull cleaning; contracts and approvals for MarineLINE

BALLAST

- 22** ■ **Ballast water treatment technology news** - treat ballast actually in the tank; growth in 'ballast water treatment as a service'; inspecting a full ballast tank with robots
- 24** ■ **BWTS fuel consumption** - making sure it does not have too much impact on your CII score

TECHNOLOGY

- 27** ■ **How Marine Shaft fixed a damaged chemical tanker propeller** - a new shaft coupling and laser metal deposition



- 28** ■ **EPE's cloud management tool for hazardous materials** - manage and monitor the Inventory of Hazardous Materials (IHM) onboard a ship

Accident investigation: seafarer burns by acid

A seafarer suffered 9 percent body burns due to a spray of sulphuric acid, because a cargo line containing acid was being cleared out by compressed air, a valve was closed, and its gasket became broken

An able seaman onboard chemical tanker MTS Central Park suffered 9 per cent burns on his body, with second degree chemical burns on his back, the back of his neck, arms and face, due to contact with a mist of sulphuric acid.

He was transported to the hospital for medical treatment. Thankfully only a “small minority” of injuries were identified as potentially resulting in scarring, these burns were small and did not require surgical treatment, and the seafarer’s eyesight was not damaged.

The source of the acid was a valve on deck which was thought to be open but was in fact closed. Seafarers were relying on an automation system to manage valves. When compressed air was pumped through a cargo line to clear out the previous cargo, and hit the closed valve, the valve’s gasket became damaged, and the acid sprayed out.

Most of the valves on the vessel were being operated from the control room by an automation system, but the deck valve was not controlled by the automation system.

The issue was complicated by two tasks being done at the same time on the vessel, taking samples and clearing cargo lines. Staff were distracted by paperwork, according to the investigation.

A risk assessment for the task of ‘accompanying the surveyor taking samples’ determined that standard personal protective

equipment was sufficient, rather than a hazmat suit. The risk assessment did not consider other activities happening at the same time.

This article is based on a report by the Belgium Federal Bureau for the Investigation of Maritime Accidents. The full report, 2021/003857, is available with the link below. The incident took place on June 3, 2021, and the report was published on Oct 1, 2022.

The vessel is a 12,145 gt chemical tanker, built in 2015, MTS Central Park, managed by Zodiac Maritime.

The story

On Jun 3, 2021, at 6.30am, the vessel had completed loading of a cargo of sulphuric acid in the Port of Antwerp, Sea Tank terminal, berth 322.

A Bureau Veritas surveyor boarded the vessel to take cargo samples. The surveyor was wearing a hazmat suit, as he had to take samples of the corrosive cargo.

An able seaman was assigned to assist the surveyor and hand him the sample bottles. He was wearing only a coverall, a helmet, safety shoes, a face shield, goggles and chemical resistant gloves.

While the samples were being taken at 9am, an air blowing operation of used cargo lines into cargo tank number 1 commenced.

The pump man opened a valve to release pressurised air into the cargo lines.

A hammering noise was heard, and a mist of sulphuric acid was created at the master valve of cargo line Number 1P (port side tank).

The able seaman was standing at a safe distance from cargo tank Number 2, and 10m downwind from the master valve of cargo line No 1P.

After encountering the mist of sulphur acid, the able seaman ran to the emergency shower on deck to wash off the chemical.

The Pump Man made an emergency call to the cargo control room at 9.10am; an ambulance arrived at 9.30am and departed to hospital at 10.10am.

It was noted that the upper Teflon gasket of the master valve of cargo tank 1P was damaged. It was also found in a closed position and should have been in an open position during line blowing. This valve was identified as the source of the acid mist.

After the accident, sampling and line blowing was continued and the vessel disconnected at 11.20am.

Leading up to the accident

There had been a cargo operations meeting on May 31st at 10am, in the cargo control room, organised by the chief officer and attended by all crew involved, 3 days before the incident.

The vessel was scheduled to load 18,000 mt of sulphuric acid, destined for the port of Jorf Lasfar, Morocco. The tanks used were

TANKEROperator

Vol 20 No 7

Future Energy Publishing Ltd
39-41 North Road
London N7 9DP
www.tankeroperator.com

PUBLISHER / EDITOR / EVENTS

Karl Jeffery
Tel: +44 (0)20 8150 5292
jeffery@tankeroperator.com

ADVERTISING SALES

David Jeffries
Only Media Ltd
Tel: +44 (0)208 150 5293
djeffries@tankeroperator.com

PRODUCTION

Very Vermilion Ltd.
Tel: +44 (0)1253 812297
info@veryvermilion.co.uk

SUBSCRIPTION

1 year (7 issues) - £195
Subscription hotline:
Tel: +44 (0)20 8150 5292
sub@tankeroperator.com

**“THE BLUE MBA HAS TRULY
BEEN A PHENOMENAL
JOURNEY. IT HAS
ALLOWED ME TO REFLECT
ON THE INDUSTRY,
DISSECT THREATS AND
OPPORTUNITIES, AND
ANALYSE CHALLENGES
TO BETTER SEEK OUT THE
RIGHT SOLUTIONS.”**

EXECUTIVE MBA IN SHIPPING AND LOGISTICS (THE BLUE MBA)

A unique industry needs a unique MBA. Take your career to the very top international level by joining the world's premier Executive MBA designed specifically for shipping and logistics professionals.

Find out more details from Programme Director, Irene Rosberg
Visit cbs.dk/bluemba or email ir.mba@cbs.dk

bluemba.cbs.dk





The coverall worn by the injured seafarer, showing how it was burned through by sulphuric acid

numbers 1, 2, 4, 5, 7 and 8. Loading was completed at 6.30am on June 3rd. The cargo surveyor's role was to take samples from each cargo tank separately. The samples were taken by lowering a cage containing a sample bottle through the tank's main hatch into the cargo.

By 8.50am, sampling of cargo tanks 1S (starboard) and 1P (port) was completed. The AB escorted the surveyor to tanks two, to continue sampling. The AB stayed at a safe distance from the surveyor during the sampling.

At this point the chief officer and officer of the watch were in the cargo control room, occupied with the ship's administration.

At 9am the terminal reported to the cargo control room that everything was in place to start blowing through of cargo line No 1. This line could not be drained by gravity.

The Pump Man and an AB were sent on deck, to open the manifold valves of tank No 1, valves P and S. The air pressure in a common line was built up to 5.5 bar. The cargo remnants would be blown into tank No 1. It had been agreed with the terminal that air pressure should not exceed six bars.

When the pressure in the manifold had reached five bars, the Pump Man informed the cargo control room. After confirmation from the chief officer, the manifold valves of tank No 1 were opened and pressurised air led into the cargo line.

The opening of the valves was followed by a hammering noise. The Pump Man

opened the manifold valve of tank No 4 to release the pressure from the cargo line and informed the terminal loading master to stop the line blowing operation.

It was at this point that the Able Seaman escorting the BV cargo surveyor was exposed to sulphuric acid mist.

Factors behind the accident

The position of the valves for air blowing operations was executed by remote operation in the cargo control room. The physical position of the valves on deck were not operated by remote control and had not been checked beforehand.

The control of the valve was part of the air blowing procedure, but as both the chief officer and the officer of the watch were occupied in the cargo control room, nobody was present near the valve to check the actual position of the valve on deck, as foreseen in the company's procedure.

The task of escorting the BV surveyor during sampling had not been assessed as a risk requiring high level personal protection equipment such as a hazmat suit. It had been assessed as a low exposure risk. This risk assessment did not consider that other cargo operations were ongoing when samples were being taken.

However, air blowing had been separately assessed as a critical operation, with a high exposure risk.

The protective equipment worn by

the able seaman escorting the BV cargo surveyor was not sufficient to be protected during line blowing operations. Line blowing commenced when cargo sampling was still going on.

Investigators' analysis

The cause of the accident, according to the investigation, was the closed master valve of cargo line 1P causing a steam hammer effect when pressurised air was released into the partly filled cargo line.

The 'hammering' is caused by a sudden loss of pressure in the line, such as from steam coming into contact with condensate in a pipeline. It can create a large, destructive force, in this case big enough to break the valve seal.

A second cause was that the AB was standing in the vicinity and downwind of the cargo line being drained, while wearing clothes which were not resistant to corrosive acids. Under company rules, a coverall could only be worn "if no contact at all with corrosive cargo was possible."

Another contributing factor was staff attention being distracted by paperwork. So there were insufficient personnel on deck to occupy all stations as prescribed in the company's procedures, and no-one noticed that the valve was closed.

There was also no verification of the indicator of the position of the valve inside the cargo control room after remote operation of the valves.

Post incident

Following the incident, the company renewed and updated its "PPE Matrix" to highlight different levels of PPE for different cargoes and different operations.

The company QHSE manager and superintendent conducted a briefing with the master and chief officer, where it was highlighted that planning of simultaneous operations, especially during a critical operation, must be properly evaluated. Also, during line blowing operations, one senior officer must be in charge and a deck officer should be on deck to supervise the operation.

The full report is online here

https://mobilit.belgium.be/sites/default/files/resources/files/report_mts_central_park_1.pdf

OCIMF news

Topics tackled by OCIMF and reported in its newsletters included becoming a more agile organisation, safety of onshore power, supporting West and Central Africa, vessel hardening, inland barging, human factors

OCIMF's work has evolved into a more 'agile and inclusive process', said Karen Davis, director of OCIMF, in her introduction to OCIMF's September newsletter.

Its workshops have generated 96 suggestions for improvement, including committee plans and internal business improvement recommendations.

The list of potential work includes 46 Publications and Advocacy actions and ten Programmes projects for its committees. Plus 19 separate projects to improve OCIMF systems and business rules, she said.

Piracy decline

OCIMF was pleased to observe that global piracy is reaching low levels, based on International Maritime Bureau (IMB) data. This detailed 90 incidents of piracy and armed

robbery against ships in the first nine months of 2022, the lowest 'first nine months figure' for three decades.

Of these 90 incidents, 13 were in the Gulf of Guinea region, compared to 27 over the same period of 2021.

However the number of incidents in the Singapore Straits continues to increase, with 31 reports in the first nine months of 2022, compared to 21 in the same period last year. Vessels underway, including several tankers, were boarded in all reports. In most cases ship stores or property were stolen. Weapons were reported in at least 16 incidents involving large bulk carriers and tankers.

Onshore power

OCIMF's Onshore Power Supply Working Group met on Sept 30. The Group includes subject matter experts from INTERTANKO, the International Association of Classification

Societies (IACS) and the International Electrotechnical Commission (IEC).

The Group is planning a publication which will detail standard practises for Onshore Power Supply (OPS) alongside a berth for tankers, including standard practises for the terminal and the interface.

It will address the following threats and risks: Compatibility with existing tankers; ignition sources, such as a high voltage connection in the vicinity of the cargo manifold; the effects of shore power on emergency response and egress; sudden loss of power; faults caused by voltage dip during start-up; cyber security threats; insufficient pier strength for the equipment needed; personnel injury while handling the heavy shore power equipment; electric shock; voltage and frequency incompatibility resulting in equipment damage; adverse operating conditions



MUSASINO

Musasino Radar Level Gauging

Smart Measurement Technology

Easy Maintenance

Simple Installation



Musasino X-Radar

Head Office (Tokyo) +81-3-3726-4412 sales@musasino.co.jp

International Sales Office (Singapore) +65-6776-2827 limhl@musasino.com.sg



OCIMF's Onshore Power Supply Working Group

West and Central Africa

Karen Davis, director of OCIMF, represented shipping industry associations at a meeting in London of 25 ministers of transport from west and central Africa.

These ministers were representing the Maritime Organisation for West and Central Africa (MOWCA). They were in London for a meeting with the IMO.

Discussion topics included piracy, oil spill preparedness and response. MOWCA requested support to address marine safety in west and central Africa, enhance learning from incidents, and help to eliminate marine pollution, including plastics. There is no government-industry collaboration forum for this part of the world.

Publications and questionnaires

OCIMF reports that the transition to the 6th edition of the Harmonised Vessel Particulars Questionnaire (HVPQ6) is "progressing well", since its release in July. The new versions now account for 10.5 per cent of all published HVPQ documents in SIRE. After 9 January 2023, submissions in the previous format HVPQ5 will no longer be allowed, to both CDI and SIRE databases.

The second edition of OCIMF's inland barging guidance, "International Safety Guide for Inland Navigation Tank-Barges and Terminals (ISGINTT)", is going through final review stages. It will be translated into Dutch, French and German.

OCIMF has updated its paper "Guidelines to Harden Vessels." The paper recommends a layered defence methodology to help mitigate risks from identified security threats. The main focus is on vessels when underway, but measures are also examined for vessels at anchor and alongside.

Around the world

In Malaysia, OCIMF's Training and Accreditation Manager Ajay Gour and Offshore Adviser Graham Coles were in Kuala Lumpur delivering a new inspector course for the OVID programme and visited the offices of MISC Maritime Services (MMS).

In South America, OCIMF organised an event to share its current and future work with the central and south American marine community in Cartagena, Colombia on 4 October.

An 'OCIMF day' was held just before the annual conference of the Latin American Society of Marine Oil Terminals and Monobuoy Operators (SLOM).

In Norway, OCIMF attended INTERTANKO's European Panel Meeting in Bergen, on 12–13 September, where the topics were maritime decarbonisation, ESG reporting and maritime anti-corruption.

The decarbonisation discussions looked at green fuel availability, and what could be achieved with technical and operational efficiency measures which are already available.

There was a presentation from the Maritime Anti-Corruption Network (MACN), a network of 165 companies established in 2011. See <https://macn.dk/>

In London, OCIMF attended the second IMO Symposium on low and zero carbon fuels for shipping on October 21. Discussion topics included overcoming barriers to global access to low-and zero-carbon marine fuels; opportunities of the fuel transition for developing countries; how to accommodate a 'just and equitable' transition towards low-carbon shipping; price consideration of future fuels; shipping's future energy demand; fostering renewable energy production in developing countries.

Also in London, OCIMF attended the Society of International Gas Tanker and Terminal Operators (SIGTTO) General Purposes Committee (GPC) meeting.

SIGTTO's environmental Sub-committee has been restructured to an independent Environmental Committee (EC). The Human Element Committee (HEC) has become a Human Factors Focus Group (HFFG). All remaining HEC projects are now moved to GPC as projects.

People

Captain Andrew K Cassels, a former Managing Director of OCIMF, has been awarded a Merchant Navy Medal for services to the Merchant Navy Welfare Board.

Captain Iain Macneil of Witherbys, who publish OCIMF's books, has received a medal for services to maritime safety and technical publications.

Saurabh Sachdeva, director of publications and advocacy with OCIMF, has been appointed as chair of the "Ethnicity in Maritime Network", part of Maritime UK's focus on diversity. The programme is focused on ensuring that the future maritime workforce across the shipping, ports, services, engineering, and leisure marine industries is as diverse as possible.

Sach Sharma, currently on secondment from Equinor, took on the role of Quality Assurance Manager with OCIMF from 1 September 2022. He was formerly a Quality Assurance Officer with OCIMF.

At Statoil/Equinor, he was responsible for Equinor's marine risk management activities, including SIRE inspections and Tanker Management and Self-Assessment verification audits.

Human factors committee

OCIMF's Human Factors Committee met in September. Discussions included updates on OCIMF activity and IMO topics related to human factors. IMO topics included enclosed space entry, diversity and women in maritime, and an IMO / ILO working group to develop international guidelines on abandonment, bullying and harassment of seafarers.

The Maritime Professional Council Summary Report on Kind Leadership (August 2022) was discussed.

This article is a summary of OCIMF's September and November newsletters. The full text is online at www.ocimf.org

OTG – training to assess behavioural competency

OTG has developed e-learning for senior seafarers and office staff on how to assess behavioural competency of ship crew. This is a complex, perhaps unsettling, but very important concept. Here's what it means

The purpose of behavioural competency assessment is to identify specific areas of improvement to help improve a person's performance.

OCIMF's guide to "Behavioural Competency Assessment and Verification for Vessel Operators" (BCAV) cites six 'competency domains' - teamwork, communication and influencing, situation awareness, decision making, results focus, leadership and management.

BCAV was launched in 2020, as a best practice guideline of how to assess a seafarer's non-technical skills against a coherent and consistent framework of competencies. Both OCIMF and INTERTANKO recommend that tanker operators follow it and actively assess behavioural competence.

Determining that a colleague's level of behavioural competence sounds easy enough. Making judgements on people's behaviour is something that many of us do everyday, even subconsciously. But it is much harder to give it an objective grading.

Changing behaviours is hard and sometimes impossible. First you have to tell the person, and they have to accept what you are saying. They may not respond positively to being informed. If they do accept it, and have a desire to improve, it does not mean they will.

Having people with good behavioural competency is very important if you want

a working environment with good decision making, communication and leadership.

Behavioural competency is typically assessed while people are doing technical tasks, such as mooring, navigation or cargo operations.

It is important that the assessment is done as objectively as possible, in order to get a real sense of what the competency levels are, and so people can be more easily persuaded to accept the result.

After doing the assessment, companies can start to see where improvements can be made. So the next step might be understanding the support people need. 'Soft' skills training can be used to target areas that need work.

OCIMF

OCIMF is keen that assessing and improving behavioural competency is seen as a component of the broader efforts to reduce risks and build competency in all areas.

Behavioural competency is an important part of the 'human element', which is a big area of focus from OCIMF, says Raal Harris, chief creative officer with OTG. It is part of a broader effort of looking at factors which might affect people's ability to operate safely in operations or to make the right decisions.

It also fits with OCIMF efforts to support continuous improvement of tanker operations, rather than just setting minimum standards. The problem with having a minimum standard is that it can encourage people to aim at the minimum. The tanker industry has gone further with schemes such as TMSA, to encourage operators to aim higher, and give them an incentive to do so.

While the competency assessment system has been developed in the tanker industry by INTERTANKO and OCIMF, there's no reason that companies operating other sorts of ships would not be interested, Mr Harris says. A number of OTG clients have used it across all their fleets.

The last stubborn part

Behavioural competence is important to OCIMF because it is seen as one of the last 'frontiers' in

improving safety.

The industry has done a great deal to improve safety in all other areas, such as with the equipment and structure of the ship, procedures, and training. But we are still left with people, whose work and behaviour make a big difference, positive and negative, to safety, Mr Harris says.

People select careers in shipping, and are chosen by recruiters, usually for their technical skills, not their behavioural skills.

One reason for this is that behavioural skills are very hard to assess, in comparison with a technical skill, he says. For example, if you ask someone to set up an ECDIS, the success criteria is very clear, you can see if they did it or not.

Some people use the term 'soft skills' for behavioural competency. But this term can imply that behavioural skills are not as important as technical skills. This is why the term 'non-technical skills' is starting to be used, Mr Harris says.

OTG's course

Ocean Technologies Group (OTG) announced its new e-learning course for assessing behavioural competency in October 2022. It is called "Behavioural Competency, An Introduction".

The course is designed for shipboard and shore-based staff, to help them understand the concept of behavioural competence and why it is important. Then it covers how best to set up and conduct assessments onboard a ship.

It is designed for people who want to get better at evaluating behaviour, particularly if they are implementing BCAV.

The course will assist compliance with the general provisions of STCW Section A-I/6, Training and Assessment, which states that "Any person conducting in-service assessment of competence of a seafarer... shall have received appropriate guidance in assessment methods and practice.

Note that the training course is to help people understand the subject and the concepts in assessing behaviour, not to train people



Raal Harris, chief creative officer, OTG



MARINERSKILLS.COM

Online Maritime Training and Certification

Our Online Courses Are Accessible

- Anytime
- Anywhere
- Accredited
- Affordable

Flag State Approved Courses

- Advanced Dangerous Liquids
- Marine Environmental Awareness
- Basic Training Polar Code
- Tank Ship Liquefied Gases
- Engine Room Resource Management
- Vessel Personnel with Designated Security Duties

Let us help build your Training Matrix to meet ISO, ISM and QHSE requirements



ABS Approved Training Provider

Mariner Skills
43 Danbury Road
Wilton, CT 06897
+1 203 939 1514

to become more behaviourally competent, or as a tool to directly assess behavioural competence.

There have been efforts to make digital behavioural assessment tools in other industry sectors, such as we do with psychometrics. Digitally assessing human behaviour is “a very thorny thing,” Mr Harris says. “That would be very difficult to do.”

Doing the assessment

The assessment is typically done by a senior officer onboard, assessing other crew members. It can be easier if it is someone who also works and lives onboard the ship. This is also how technical competency assessment is typically done.

The assessors will look at how people behave across a range of factors, how they encourage others, their awareness of their environment, their decision making and how they manage their work, Mr Harris says. The assessors can look at people’s ability to communicate, for example.

People are usually given a grade, not just a pass or fail. This is recommended in BCAV.

Challenges with assessment

“Any performance appraisal can be a bit uncomfortable to do,” Mr Harris says. “People often struggle with them. This is similar.”

“It is one thing to say, ‘come and perform this technical task’, like undertaking onboard oil analysis. Something where you can clearly see whether someone did it or didn’t do it properly.”

“That’s not likely to be a big flash point, the candidate can see themselves if they did it properly.”

“Once you introduce an element of subjectivity, there’s is potential for disagreement, ‘I think I did a great job, and you don’t’. You can have a misalignment between the assessor and the person being assessed. The person can have an entirely different perception of where they’re at. That can be an uncomfortable conversation.”

“It is therefore something people need to be prepared to do and to manage. There are ways to do that tactfully and not fudging it, making sure that you talk about the good things and the bad things, and talk about it in a way that’s non threatening.”

It is about “trying to remove the emotion from that, trying to create a framework by which you can try to be objective, or as objective as possible and as fair in your evaluation as possible.”

Some people in the shipping industry have said it is impossible to make an objective evaluation of another human being, Mr Harris says.

“Everybody has a different perception of what’s risky and what’s lazy. And once you start assessing people, it becomes extremely difficult to not judge people favourably who are a bit like you, who have the same attitudes as you.”

Cultural differences can play a role, when different cultures have different norms of behaviour, such as about when to question authority.

It is also not easy for the person being assessed. “If you tell someone their behaviour is going to be assessed that can make people quite uncomfortable, quite nervous.”

Another dimension of behavioural competency management is that people often need to be stretched, to see a real reflection of how they behave.

It follows that to assess people’s behavioural competency, you may need to have an opportunity to see how they perform under pressure.

Or to put it the other way, people may be very well versed in procedures but less able to think for themselves when called upon to go off script.

“This is another area where assessing behaviour can be helpful, and why it’s important assessments are conducted alongside the technical skills,” Mr Harris says.

TO

Mariner Skills – redefining what ‘true e-learning’ means

Mariner Skills is seeking to re-define what ‘true e-learning’ means in the maritime sector, with numerous short courses or ‘modules’ which a motivated learner can work through in their own time

The basic structure of maritime learning, including e-learning, is unchanged for 50 years with videos and classroom training, says Dr Anush Ramachandran, Training Director at Mariner Skills, an ABS-approved maritime training company based in Wilton, Connecticut.

In-person training is probably still the most effective way of delivering training. It relies on having an expert trainer, with high costs and complex logistics. Training providers have resorted to the use of synchronous lectures piped over the Internet as an alternative to classroom training.

Video-based training is less expensive. Onboard ships, training has evolved over the past few decades from watching a video in the crew mess to accessing videos on digital devices provided by a central server over the ship’s network. The quality has improved with narrated PowerPoint presentations and animations, Dr Ramachandran says.

But showing someone a video is not training, he says. We don’t retain everything we watch on a video, just as we could not remember all the details from any movie or a PowerPoint presentation we have seen, especially if videos are longer than a few minutes.

Typically, training companies make videos that are 30-60 minutes long. If, for example, someone is asked a specific question about an

issue explained during a 30-minute tanker safety video about how some aspect of tanker safety is managed, they are likely to not remember the relevant information.

Some video-based online systems are set up so people can only complete a test and go to the next level when they finished watching the video. To circumvent this, people may just leave the video running on their computers and do something else until it has finished, he says.

The Mariner Skills approach

The Mariner Skills approach starts on the basis that the seafarer doing the training is a motivated learner. They are interested in learning continuously, whether on a vessel or on leave, to improve their overall knowledge, day-to-day performance, and safety.

Mariner Skills takes a ‘Modular Learning’ approach, with individual modules a student can work through.

A typical training module is delivered through an e-book, that is organized through a table of content. eBooks are content rich, with text, illustrations, animation-based short videos and supporting reference material. Self-assessment quizzes are provided to reinforce the learning.

The reading is designed to be as short and precise as possible. The videos are generally between 1 and 5 minutes, and only a handful go longer than that. The video aims to deliver the important points, usually through animations.

There are courses which

go in-depth into the subject matter and wherever practical, case studies are included to discuss real-life situations and provide opportunities for the reader to learn from them. If the training is about accident prevention, “case studies become very relevant,” Dr Ramachandran says.

Mariner Skills background

Mariner Skills began making its training courses focused on the individual mariner, thus covering a wide range of mandatory training aligned to STCW modular courses. In addition, their portfolio includes professional development courses. It offers flag state (USCG) approved STCW modular courses and Certificate of



Dr. Anush Ramachandran, Training Director at Mariner Skills



The Marshall Islands Registry
Leads the Way with Unrivalled
QUALITY and **INTEGRITY**



IRI International Registries GmbH
in affiliation with the Marshall Islands
Maritime & Corporate Administrators



hamburg@register-iri.com
www.register-iri.com

Competency courses either fully online or through 'blended' training to individual seafarers with a mix of online and classroom learning.

In early 2022 Mariner Skills started serving shipping company customers. It released its competency-based training programs, aligned to HSQE goals, to the maritime corporate sector for onboard delivery, without the need for internet, and fully hosted cloud-based delivery of courses which mariners can take any where they have internet access.

Dr Ramachandran's interest in computer-based training grew from his prior work in the nuclear industry. He has a Ph.D. in nuclear engineering and formerly worked as an engineering analyst for New York Power Authority and then as a nuclear consultant.

In 2005 he was involved in developing an online learning portal for the Singapore Polytechnic's Singapore Maritime Academy (SP-SMA). Over the past 15 years through

numerous collaborations and partnerships with academic institutions worldwide, he has continued to develop a large portfolio of courses.

In 2013, he co-founded Learn America, a USCG-approved Online Training Provider servicing mariner licensing in the USA and expanded partnerships with many US-based maritime schools, such as, MITAGS and San Jacinto College.

Mariner Skills was launched in 2015. Mariner Skills and Learn America are currently merging their businesses, so that Mariner Skills can offer ABS and USCG approved courses, with training to both individual mariners and to shipping companies.

Regulatory approvals

Mariner Skills is offering over 20 STCW modular courses, for specialized ships, approved by the US Coast Guard.

There are around 20 courses which are

approved by class society ABS for specific aspects of shipping, such as LNG as fuel, or taking a vessel through polar routes. Many of the ratings-to-officer courses are approved by Class NK.

Some of the courses approved by the Liberian flag state. Mariner Skills is working with LISCR and other flag states to setup processes and pathways for endorsements. Its USCG-certificates are accepted across 170+ white listed flag states.

Accepting online learning

The pandemic helped maritime regulators make steps towards acceptance of online learning, Dr. Ramachandran says. Before that, many companies and regulators believed that courses needed to be delivered face to face.

"The [US] Coast Guard allows everything to happen online today, from training to course completion examinations," he says. The USCG has approved specific service providers and technology for "Remote Proctoring" – a process that allows candidates to take their exams from anywhere under the watchful eyes of a secure browser, camera and microphone, and recorded videos of test-taking.

A requirement for the student to be physically present is only included when there is a specific reason for it, such as firefighting training. Even then, it is blended learning, with much of the training still provided online, he says.

Technologies

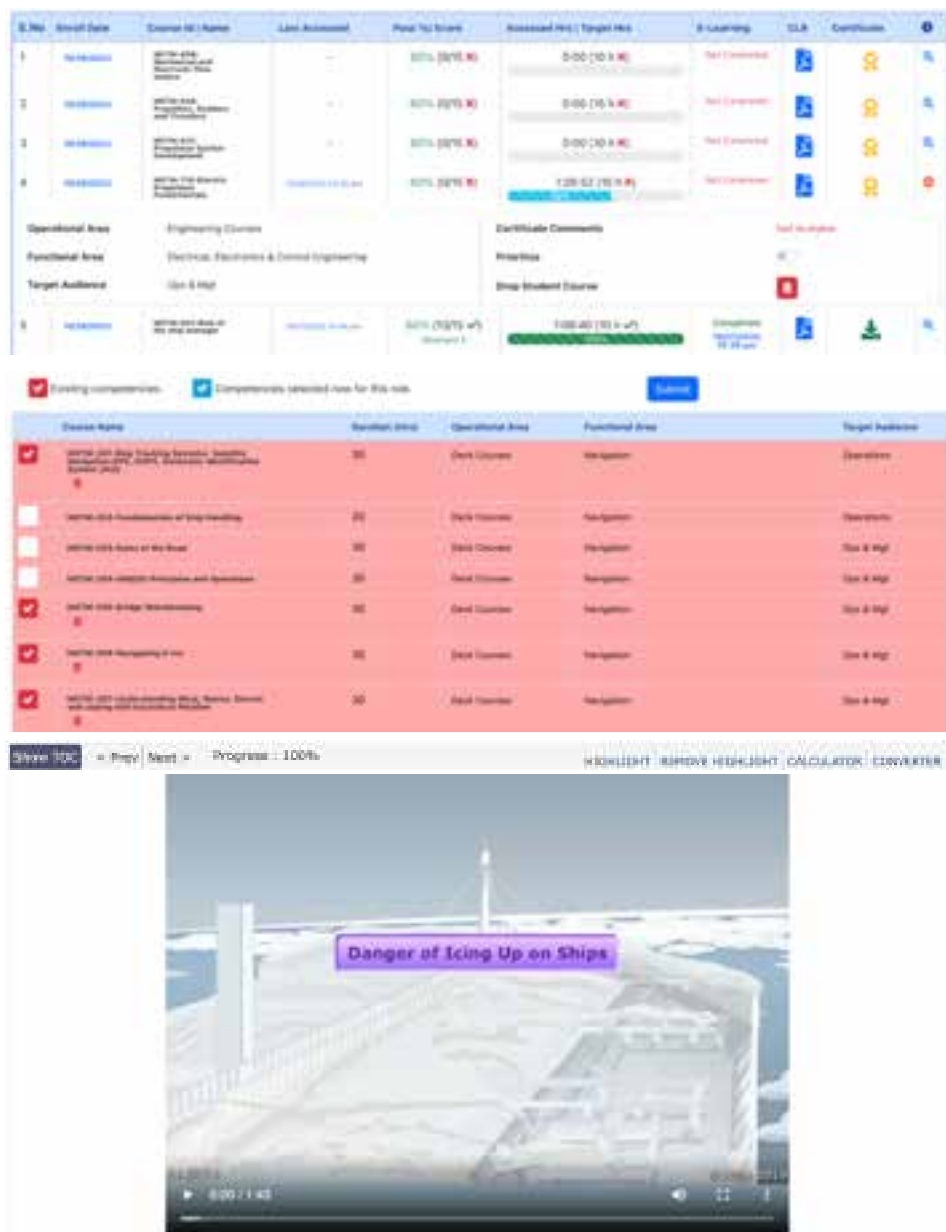
The Mariner Skills digital platform includes content publishing tools for organisations to host their internally developed courses, a learning management system, and a competency management system. They are all web hosted and charged on a per-vessel basis for unlimited use.

The entire portfolio is stored on the cloud.

Mariner Skills is collaborating with a major maritime simulation technology company to bundle cloud-based simulation with its eLearning courses. Cloud simulations will be included for engine and bridge simulations.

The engine room simulators simulate events relating to engineering operation of vessels where the user can turn a valve and see its impact in engine room operation. The full-bridge simulator will let one practise navigating through specific parts of the world, such as the Singapore Strait, New York Harbour, navigate a Polar Route, watching your radar and the ECDIS. These training tools would normally be accessed via a desktop PC and will now become part of a cloud-based experience for a mariner.

Mariner Skills is exploring augmented and virtual reality technologies to integrate more hands-on training into its courses.



Screenshots from Mariner Skills software

VIKAND – an ‘asset management’ approach to crew health

Why don't we take an ‘asset management’ approach to our crewmembers health, when we try to take an ‘asset management’ approach to our equipment? VIKAND wants to help tanker operators make this step

Talking about an ‘asset management’ type approach to our crew health may sound a little callous. But it gets an important point across.

For our shipboard equipment, we try to avoid ‘reactive maintenance’, or a ‘fix it when it breaks’ mode of working. We know it works out less expensive over the longer term to monitor our equipment’s health, because if something fails to the point where it can no longer be used, it can be very expensive and disruptive.

But with seafarer health, typically we only do something (as shipping companies) when there is a serious problem. So that’s the equivalent of a ‘fix it when it breaks’ approach.

Meanwhile, companies are rejecting a large number of experienced seafarers from working onboard because they have a minor long-term health problem (a chronic disease) such as diabetes. With a little care, they could be safely deployed without ever putting themselves or anyone else in harm’s way, says Peter Hult, founder and CEO of maritime medical and public health specialist service provider VIKAND.

VIKAND provides a range of support services to crewmembers and their employers including around long-term illnesses like diabetes and high blood pressure, to help companies manage their crew as valuable and essential ‘assets’ which we must support and make sure we take a proactive approach to their welfare and reducing unnecessary disembarkations.

It sets a goal of maintaining healthy crew and therefore also a commercial goal reducing the costs of urgent healthcare interventions by providing better support before anything goes seriously wrong. It aims to reduce the amount of urgent healthcare needs for crew by 75 per cent and reducing the number of necessary ship diversions (to enable a sick seafarer to leave a ship urgently) by a third.

Not many shipowners actually know the real costs of healthcare problems, which can be very large if they involve remote support, delays or diversions to the ship, and bringing in replacement crew.

“What we’re trying to do is change the dynamic with how we’re dealing with healthcare in the maritime industry,” Mr Hult says.

All tanker operators may benefit from taking an ‘asset management’ and predictive maintenance approach to their crew, whether or not they use VIKAND’s service, he says.

VIKAND has been most active in the cruise sector until now and is bringing this experience to the commercial shipping. It employs around 400 medical specialists globally supporting the maritime industry.

Mr Hult is a former shipboard crew steward and crew co-ordinator with Silversea Cruises, and former head of onboard human resources with “The World”, the world’s largest privately owned residential yacht.

Crew with chronic diseases

The maritime industry commonly rejects crew who have a “chronic disease”, defined as a long-term illness commonly associated with age, Mr Hult says.

“If you have a little alleviated blood pressure or diabetes, you will generally not be able to come back on board the ship,” he says. “With

that, [the company] loses a lot of experience.”

Mr Hult estimates that 10,000 seafarers are rejected every year due to pre-existing conditions – but it would be possible to retain 9,500 of those with a small investment in chronic disease management. This would make a big difference to the seafarer shortage.

“Many times, it is people with mid-level and senior positions onboard. Their value to the shipowner is profound.”

THE FOUNDATION FOR SAFETY OF NAVIGATION AND ENVIRONMENT PROTECTION SHIP HANDLING RESEARCH AND TRAINING CENTRE ILAWA



Our Training Centre offers you: SPECIALIZED COURSES IN HANDLING OF LARGE TANKERS!

- Two fully equipped manned models representing tankers of capacity 150 000 DWT and 280 000 DWT are available;
- STS operations, approaching SBM and FPSO are included in the programme;
- Harbour manoeuvres are supported by manned models of large ASD and tractor tugs.

For further information please contact:
Ship Handling Research and Training Centre,
Ilawa, Poland

tel./fax: +48 89 648 74 90 or +48 58 341 59 19

e-mail: office@portilawa.com

www.ilawashiphhandling.com.pl

“We would never have a crew member return if they were a danger to themselves, or the vessel,” he says. “But many times, it is not a danger to the vessel. It is the thought process in shipping, ‘you cannot bring them back on board’”.

“If a crew member is losing their job because of a small chronic disease issue, his whole family is harmed. His mum and dad may not be able to pay the mortgage, his sister may not be able to finish dialysis, his brother may not be able to go to private school anymore.”

“It should not be, ‘your crew member had a high blood pressure let’s get him off the ship.’”

“Your risk profile is going up from losing an experienced crew member.”

Heart attacks are a cause of 80 per cent of all illness related deaths on ships, Mr Hult says. But the risks can be managed. “When you know what the healthcare issues are, you can develop programs to address those. We work with crew members that have chronic diseases to help them improve.”

VIKAND’s service

Under VIKAND’s service, crewmembers can call VIKAND medical staff whenever they want. The company employs 400 maritime medical staff, all of which are ex-seafarers. Ships are assigned specific medical staff

members, so that crewmembers are not talking to someone different every time they call.

There is a harassment hotline, for reporting harassment, witnessing harassment to someone else, or a sexual assault situation. VIKAND staff can also advise about gathering evidence and provide counselling.

“When we see that there’s a serious case - we let the captain and medical person in charge know, rather than the other way around.”

It is important not to discourage people to get in touch with medical specialists if they have concerns. “Early intervention in healthcare is really important,” Mr Hult says. So, if people have access to specialists at the point when they are starting to feel sick, they can reduce the overall healthcare risk.

VIKAND’s staff will also call the ship captain, or whoever is responsible for medical issues onboard, to have a general discussion once or twice a month, about anything they may be concerned about – including accidents, illnesses, and mental health challenges.

VIKAND’s service also draws on data from human ‘condition monitoring’ devices which weren’t available 6 years ago, such as wearable devices or devices in a smart phone. These devices can also be used to communicate data to a specialist.

VIKAND can also manage the “medical

chest” (onboard drugs supply) and medical equipment, and its batteries.

The shipping company pays a flat fee for the service, for unlimited telephone contact.

Mental health

On the topic of mental health, Mr Hult observes that many shipping companies provide their crew with helplines, although these helplines are often only used when someone is in some kind of a mental health crisis. “Our view is we need to engage much sooner,” he says.

Seafarers should develop their own ‘mental wellness’ strategy, and VIKAND can help with this.

Seafarers should understand the alignment between physical and mental wellness. For example when a person feels physically tired, their stress levels can rise.

The company can provide advice about how long-term health problems, diet and mental health can interact. For example, a combination of diabetes (which many seafarers have) and high blood sugar (which many seafarers have, particularly if they eat rice every day), can make someone “go a little crazy”, Mr Hult says. This problem cannot be diagnosed by a psychologist alone. Captains are not mental health professionals, so remote support can be welcome.

TO



GIBRALTAR PORT AUTHORITY
THE LARGEST BUNKERING HUB IN THE MEDITERRANEAN
GIBRALTAR
www.gibraltarpport.com

What's on offer?

- Quality fuel management delivered by experienced operators
- Globally recognised Bunker Code of Practice
- Fuel logistics audit trail
- Quick turnaround times
- Excellent location for crew changes
- Competitive anchorage fees

+350 20046254
gpaenquiries@port.gov.gi
 12 Windmill Hill Road, PO Box 1179, Gibraltar GX11 1AA

Gibraltar maritime developments

Maritime news from Gibraltar from 2022 includes possible LNG bunkering expansion, the collision with a bulk carrier and LNG tanker, and expansion at Sandvik Electronics

Several firms are entering an application for an LNG bunker supply license in Gibraltar, says John Ghio, CEO and captain of the Port of Gibraltar. New licenses are “likely” to emerge in 2023, he said.

Shell is still the only company with a license, as of November 2022.

Gas tanker - bulk carrier collision

An LNG gas tanker and bulk carrier loaded with steel collided under 1km from Gibraltar on Monday August 29. Nobody was hurt, and the gas tanker was undamaged, but the bulk carrier took on water and was deliberately run aground to prevent sinking.

Its hull subsequently broke in two and some fuel leaked out. Some oil seeped around the Rock into the western shore, in the Bay of Gibraltar.

Oil from the ship's machinery reached beaches in the nearby Spanish town of La Línea de la Concepción. The oil was contained by surrounding the vessel with a boom.

By Friday Sept 2, all of the bulk carrier's 250 tonnes of diesel had been removed, and work to remove 215 tonnes of heavy fuel oil was starting.

The port issued a “Wreck Removal Notice” to the owners, requiring complete removal of the wreck and its contents by May 30, 2023.

There were media reports that the bulk carrier had failed to comply with instructions from the Gibraltar Port authorities via the VTS system, and clipped the LNG tanker, and the captain of the bulk carrier was arrested.

Sandvik Marine Electronics expands

Sandvik Marine Electronics of Gibraltar reports that in 2022 it took on 2 more technicians and an additional service company co-ordinator.

It is working as an agent for Headway Technology Group of Qingdao, China, supplying its ballast water treatment system.

In 2022 it began fleet electronics maintenance contracts with a number of Wilhelmsen gas ships and Odfjell Chemical Tankers, taking care of bridge equipment.

It has managed a number of maritime electronic installations and maintenance during

dry dockings for its clients during 2022, mainly in the far East and Middle East, with the rest in Poland/Spain.

“2022 has been one of our best years on record,” says John King, World Service Manager with Sandvik.

There have been challenges obtaining electronics spares, much of this due to delays in microchip deliveries from the Far East. Delivery times for certain parts are still long, he says.

GAC new office in Algeciras

Ship agency company GAC Group has opened an office in Algeciras, Spain, a port which is just across the Bay of Gibraltar. This is three years after it opened GAC Gibraltar.

The Algeciras office will offer a range of ship agency, husbandry and spares logistics services for vessels. GAC Gibraltar will provide vessel repair services and bunker fuels to ships docking at Algeciras.

Government news

The Governor of Gibraltar, Vice Admiral Sir David Steel, visited Gibraltar's dry dock facility, Gibdock, on October 18.

The visit took place to mark the acquisition of the shipyard by ocean engineering specialists Balaena Group, based in Cornwall, UK.

Balaena plans to use the yard to manufacture and operate its “Island Utility Platforms,”

which provide fresh water, sewage treatment and renewable energy for island and coastal communities.

Gibraltar organised an event in London in September 2022, “Gibraltar Maritime Day,” to showcase the Gibraltar Maritime ‘product’ around the world.

Participation was led by the Gibraltar Maritime Administration, Gibraltar Port Authority and the University of Gibraltar.

“This is part of our ambitious marketing strategy for the Port and for Gibraltar's maritime sector in general,” said Gibraltar's Minister for Tourism and Business, Vijay Daryanani.

TO



SANDVIK
MARINE ELECTRONICS

Sandvik Marine Electronics
Gibraltar - Tel +350 200 79003
Spain - Tel +34 956 099101

24 Hr Service
Navigation - Communications Equipments
Surveys for Safety Radio - S/VDR - AIS - EPIRB
Shore Based Maintenance Agreements
Fleet Management Contracts
Complete Maintenance of Bridge Equipments
Authorised Service Agents for the world's leading manufacturers

Sales - Installations - Service
email: sbm@sandvikservice.com
www.sandvikservice.com

What can bio-LNG do for shipping?

Bio-LNG – making LNG from biofuels – promises us a nearly zero emission fuel which can immediately replace LNG fuel. A new study looked at how much might be available for shipping

Bio-LNG – LNG made from biofuels rather than fossil gas – would be a nearly zero emission fuel, with total lifecycle emissions reductions of up to 80 per cent compared to marine diesel. Vessels designed to run on fossil LNG fuel could switch to it when it is available.

Is this the future of shipping?

The big question is how much is available and the cost. While plenty of waste biomass exists, the question is how much of it could be gathered and processed. So it is a logistics and scaling up challenge.

A new study by Singapore researchers commissioned by shipping industry group SEA-LNG found that bio-LNG could cover 3 per cent of the energy demand for shipping fuels by 2030, and 13 per cent by 2050.

If shipping companies were to use a blend of 20 per cent bio-LNG with 80 per cent fossil LNG, this blend could cover 16 per cent of the energy demand in 2030 and 63 per cent in 2050.

But in that case, the decarbonisation level would be only 20 per cent as much. So that is far from a ‘net zero by 2050’ pathway but on the way there.

But it may achieve what shipping companies want most, to stay on the net zero trajectory, but without decarbonising more than they need to for each year, to manage costs.

Further progress to net zero could be achieved by using ‘electro’ LNG made with renewable electricity.

The study also forecasts that the average cost for delivered bio-LNG will fall by 30 per cent by 2050 compared to today’s costs, mainly driven by the reduced cost of producing biomethane in large-scale anaerobic digestion plants.

The study says that bio-LNG will be “one of the cheapest sustainable alternative marine fuels.”

The level of bio-LNG available will also depend on how much it is used in other industry sectors.

We may see bio-methane being injected

into national gas grids, and a global ‘certificate of origin’ scheme to enable biomethane to be traded.

SEA-LNG sees that the viability of the entire LNG pathway for shipping depends on volumes of bio-LNG and e-LNG being made available, their costs, in comparison with other low carbon fuels.

For bio-LNG to work as a low carbon fuel, full carbon accounting is essential. If maritime emissions are calculated only on a tank-to-wake basis, then bio-LNG looks the same as fossil LNG, because the CO₂ through the vessel’s exhaust stack is the same for both.

The study

The study was commissioned by SEA-LNG, a shipping industry group whose members “work together to demonstrate the benefits of LNG as a marine fuel throughout the entire value chain.” Members include shipping companies, ports, LNG suppliers, bunkering companies, infrastructure providers, equipment manufacturers, class societies, banks and brokers.

It was conducted by the Maritime Energy and Sustainable Development Centre of Excellence (MESD CoE) at Nanyang Technological University, Singapore (NTU Singapore).

The results were presented at a press conference in Singapore on October 5 during the 22nd Singapore International Bunkering Conference and Exhibition (SIBCON).

The Maritime Energy & Sustainable Development Centre of Excellence was launched in 2017. It is jointly funded by Singapore Maritime Institute (SMI) and Nanyang Technological University (NTU). It has a focus on the maritime transition to low carbon, looking at emissions, alternative energy and sustainable maritime operations.

Research areas include alternative energy adoption pathways, bunker fuel safety, cost benefit analysis, shipboard data collection, lifecycle assessment, simulation, technical and economic analysis.

What Bio LNG is

The molecule, methane, is exactly the same in biomethane and fossil methane in its chemical composition (the molecule CH₄) and can replace it in a ship’s engine with no changes to anything. In both cases the methane is cooled to liquefy it, forming liquefied natural gas (LNG).

The difference is how it is produced. Biomethane comes from biological sources alive today, fossil methane comes from biological sources millions of years ago.

The carbon in biofuels is taken from the atmosphere when plants are grown, so the CO₂ emitted in combustion does not increase the amount of CO₂ in the atmosphere overall.

There is still carbon emissions associated with biofuels, including in the growing of crops, transport and processing.

Bio LNG is already being produced in small quantities in Europe and the US. It is already being added to gas grids as a ‘drop in’, says Steve Esau, COO of SEA-LNG. So it is established that it works in existing engines.

Sources of bio energy

The research project only looked at bio-LNG from energy sources which do not compete with the food supply chain, to avoid the accusation that the shipping industry is taking food away from someone’s plate to make its fuel.

There are four main types of feedstock – forestry waste, energy crops which don’t compete with food (such as algae grown on the sea), animal / agricultural waste, and municipal (human) solid waste.

Energy crops are still an area for research. But the researchers believe that there is enough agricultural, forestry and human waste in the world to meet many multiples of the total energy demand for shipping. The question is whether it could be collected, processed and supplied.

Gathering animal waste (manure) does not necessarily mean someone walking through a field with a spade – big animal farms generally have a lot of manure collected in one place, said Bruno Piga, Research Consultant for MESD centre of excellence,



Bruno Piga, Research Consultant for MESD centre of excellence, NTU Singapore; Steve Esau, COO, SEA-LNG; Dr Xiao Zengqi, research fellow at the Maritime Energy & Sustainable Development Centre of Excellence. [Screenshots from the study launch press conference]

NTU Singapore. Many farms already collect it for processing. Manure actually works out to be one of the cheapest sources of ‘bio-supply’, with costs usually below \$30 or \$40 a tonne.

The proportion of agricultural, municipal and forestry waste may work out to be roughly the same, Mr Piga said. North America and Europe may have higher volumes of forestry waste. Southeast Asia and South America may have particularly large unexploited potential for using their agricultural waste.

“There are many uncertainties on availability,” he said. The study looked at what supply levels may be possible, although the shipping industry cannot take all of it.

Making bio LNG

The main way to make bio-LNG is through anaerobic digestion – micro-organisms breaking it down. Mr Piga sees this as a “well understood and very mature field”.

On average, biodigesters today handle 200-300 cubic metres an hour. These are generally on small farms producing biogas for local use. If we can develop much bigger plants, handling 1500 m3 an hour, it will help to reduce the unit cost. Such large plants have not been needed up to now, because the smaller plant is adequate for the local demand.

For now, the cost of bio-LNG with standard digesters is expected to be around \$30 per GJ, compared to about \$4 per GJ for fossil gas, at the time of writing. The cost would reduce with a larger plant.

There are methods to produce a feedstock with a higher energy density, so it is easier to handle, said Dr Xiao Zengqi, research fellow at the Maritime Energy & Sustainable Development Centre of Excellence.

Another issue is that a large plant will need a larger supply of biomass, which means they need to be gathered from a larger area, and so transported further. So making bigger and bigger plants may not be the right economic path.

Mr Esau sees parallels in biogas and

renewable electricity, where we achieved lower prices by scaling up in size, but not scaling up indefinitely.

There is also the option of converting biomass to methane via gasification, which involves heating it to temperatures typically above 700 degrees C. This enables a larger scale of production, but is “significantly more expensive,” Mr Piga said.

A further option for the future is that LNG is made using hydrogen from renewable electricity reacted with CO2 which would otherwise have been emitted to the atmosphere. This is known as an ‘e-fuel’ or electrofuel. This would be better than biofuels from a CO2 emission standpoint. But this will only be possible when we have plenty of renewable electricity available, and more than we need for our electricity requirements.

Competition to use it

The analysis looked at what other sectors of society would compete for biomass.

It found that one of the highest priority users would be industries which directly use biomass materials, such as wood and paper production, and other sectors using biomass to replace plastic.

Aviation is expected to be a high priority user, because it needs low carbon fuels with a low energy density, and biodiesel has a better energy density than other alternatives such as ammonia and batteries. The trucking sector can also use biomethane.

“We found that shipping is a kind of medium priority sector,” Mr Piga said. “It can get a slice of the cake. It is possible to get enough biomass to support shipping.”

In order to expand further, SEA LNG would like to see better government policies supporting it, national plans, and general awareness.

Emissions savings

Calculating the full ‘well to wake’ emissions from biogas, and comparing it to alternatives,

is a challenge because many factors are very hard to calculate. For example, the CO2 absorbed from the atmosphere by growing the biomass which would not have been absorbed if the land was used for an alternative purpose; the methane would have been emitted if the biomass was left to rot; any gas which leaks to the atmosphere during the production and delivery chain; the amount of methane which slips through the ship’s engine uncombusted (‘methane slip’).

The result of the calculation will change greatly depending on the assumptions you make, Mr Piga says.

The “80 per cent reduction” figure is based on methane leakage and methane slip being minimised, he said.

There is possibility for arguably negative emissions, on the basis that some of the biomass would otherwise rot on the ground and emit methane, but in a ship engine it would be combusted and emit CO2, a less potent greenhouse gas.

‘Offset’ deliveries

It would help a great deal if it was not necessary to deliver the same gas molecules from the digester to a liquefaction plant and to the ship, but instead use an offset scheme.

Gas from a digester could be added to the nearest fossil gas grid, and then the shipping company can take gas from the same gas grid elsewhere, but pay the price for biogas rather than the standard fossil gas price.

Any gas needs to achieve a certain purity specification in order to be injected into the national gas grid, whether from fossil or bio sources. But once that is achieved, the molecules are treated as interchangeable.

There would need to be an accepted ‘certificate of origin’ scheme, certifying that the gas being added to the grid is biogas, so an equivalent amount can be removed from the grid elsewhere and paid for as biogas. “That will enable a deep and liquid market for bio-LNG,” Mr Esau says. “That’s a key thing that needs to happen”.

Government

Mr Esau would like to see regulators around the world paying bio-LNG more attention.

There are government initiatives to foster the use of biogas, including in Europe, North America and Canada.

“Something is moving,” he said. “We believe that in the next year we will have a stronger explosion of biomethane. The shipping sector needs to be focussed on it.”

Waterfront Shipping and methanol

Waterfront Shipping of Vancouver, a subsidiary of Methanex Corporation, has 18 tankers using methanol as fuel, part of their fleet of 30 tankers for carrying methanol as cargo. We asked them about their experience

If you are interested in learning more about methanol fuel for tankers, one of the best companies to learn from is Waterfront Shipping of Vancouver, which has been running vessels on methanol fuel since 2016, with over 117,000 operating hours on methanol fuel (13.3 vessel years).

Waterfront is commercial operator for 30 vessels, between 3,000 and 50,000 dwt. The vessels are owned and technically managed by a select group of companies.

They are chartered to its parent company Methanex Corporation, the world's largest producer and supplier of methanol, and several majors, traders, and chemical companies.

Since the vessels are carrying methanol as cargo, they do not have problems finding methanol for fuel.

Attraction of methanol

The biggest attraction of methanol fuel today is probably the reduction in tank to wake CO₂ emissions of 10 to 25 per cent, according to various studies by IMO/DNV, Stena and MAN. Perhaps 15 per cent is typical. This is because the methanol molecule has a higher hydrogen: carbon atom ratio than the oil molecule.

Waterfront's original move to methanol was for an alternative fuel that improved air quality and one that supported a low carbon future. At the time, one of the biggest attractions of methanol was its ultra clean burning properties, with reduced emissions of sulphur oxides, particulates and NO_x compared to conventional marine fuel, says Paul Hexter, president of Waterfront.

Sulphur oxides and particulate emissions are reduced by 95 per cent and NO_x by up to 80 per cent. No aftertreatment or SCR/EGR are needed to meet NO_x standards. A methanol engine also has a 1 to 2 per cent higher efficiency than a diesel engine.

Compared to ammonia, hydrogen and LNG fuel, methanol has the big operational advantage of being liquid at ambient temperature and pressure, where the others are gases and need cooling. This makes it comparably easy to transport, store and bunker, just like current



Paul Hexter, president of Waterfront

liquid fuels. Also, the costs of handling it on shore are lower compared to fuels which need cooling or pressurisation.

Methanol has a higher energy density than liquid ammonia – ammonia stores 11.5 MJ/litre, while methanol stores 15.6 MJ/litre. Although this is still much less than diesel, which stores 32 to 40 MJ/litre.

Methanol has been assessed as the lowest risk alternative marine fuel, compared to LNG, hydrogen, and ammonia. If it is spilled, it biodegrades or dissolves in water rapidly, Mr Hexter says.

Methanol so far

The journey to methanol fuelled vessels started in 2015 when shipping company Stena partnered with engine manufacturer, Wärtsilä and Methanex to convert one of the world's largest ferries, the Stena Germanica, to operate on methanol.

Waterfront, a subsidiary of Methanex, put the first 7 methanol fuelled tankers in operation in 2016. Then, four more were delivered in 2019, and 8 more ordered in 2020. 7 of these 8 are in operation as of Nov 2022, one more is still to be delivered.

So as of October 2022, it has 18 vessels in operation which can run on methanol fuel. Many of the vessels in the fleet are fitted with nitrogen generation capability, so nitrogen can be used to inert the cargo tanks without compromising the cargo.

Although the vessels are carrying methanol

as cargo, whether they use methanol as fuel will depend on the price of methanol relative to conventional maritime fuels. But methanol has been cheaper in 2022.

"It made sense to be running on methanol for much of this year," Mr Hexter says.

The vessels can be bunkered at the same time as they are loaded with methanol cargo, at Methanex's production sites. This includes New Plymouth, New Zealand; Geismar, USA; Trinidad; and Punta Arenas, Chile. Methanex also has methanol production in Canada and Egypt.

It has also bunkered in ports where it does not produce its own methanol: Ulsan, South Korea (where some ships were built); Houston, USA; Rotterdam, Netherlands, where there was a bunkering demonstration in May 2021 using a bunker barge; Onsan, South Korea and Taicang, China. Methanol is available in about 120 ports now, Mr Hexter says.

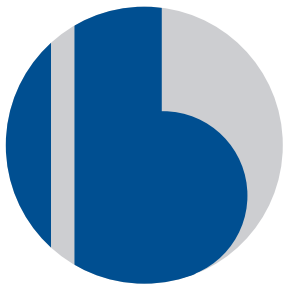
The Rotterdam bunker barge demonstration showed that methanol barge bunkering was no more challenging than any other bunkering, he says. It used a standard bunker barge. This showed that the procedures for conventional marine fuels do not need much adaption to be used for methanol.

We are now in the third generation of methanol fuelled ships. Over the past 7 years, many guidelines have been developed to support the safe use of methanol, including by the IMO.

Other shipping companies, including Maersk, CMA CGM, Proman Stena Bulk, X-Press Feeders, COSCO are ordering methanol fuelled vessels, Mr Hexter says.

Going forward

As of November 2022, there are about 20 methanol fuelled vessels in operation in the world, including the 18 in Waterfront's fleet; the company envisages there will be "close to 100 dual-fuelled methanol vessels on the water by the 2026/27 timeframe", Jason Chesko, Director, Global Market Development and Head of Methanol Marine Fuels at Methanex Corporation says.



becker marine systems



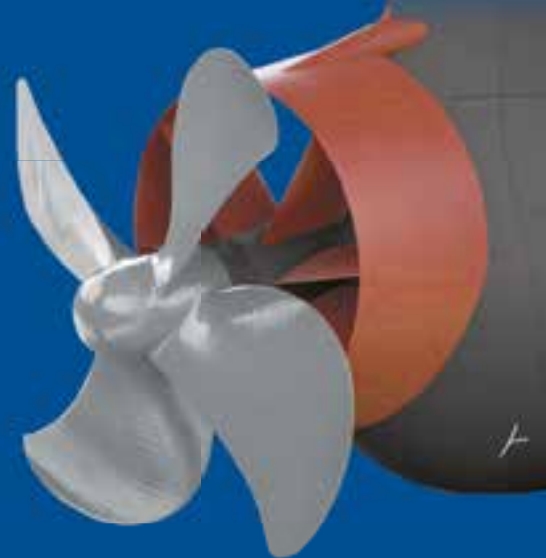
Picture © Alf van Beem

ENERGY SAVER



The easily installed **Becker Mewis Duct®**, for vessels with a high block coefficient, reduces SO_x, NO_x and CO₂ emissions. The device is placed in front of the propeller, has no moving parts, reduces noise, and saves energy by 6% on average.

Above: 49,000 DWT Tanker *TRF Bergen*
Owner: *TRF Shipmanagement*
Becker Mewis Duct® (retrofitted)



Manoeuvring
Systems



Energy-Saving
Devices



Daggerboard

www.becker-marine-systems.com



Jason Chesko, Director, Global Market Development and Head of Methanol Marine Fuels at Methanex Corporation

Many engine manufacturers are developing methanol dual fuel engines including Wärtsilä, Rolls-Royce/MTU, ABC, Caterpillar and WinGD.

Methanex is involved in several other initiatives to support the commercialisation of methanol in shipping, including FASTWATER, a consortium of 14 companies which recently launched a pilot boat demonstration in Sweden and a harbour tug demonstration in the Port of Antwerp-Bruges.

Despite its enthusiasm for methanol, the company does not envisage all ships in the world using it in future. “We’ve always talked about it being part of the solution, there’s a capacity for multiple solutions,” Mr Hexter says.

Waterfront’s operations

Waterfront does not own all the vessels in its fleet, some are time chartered in. They are managed by other companies, including Fleet Management, Thome Group, MOL Tankship Management, and NYK Bulkship Asia.

There are “5 or 6” technical managers involved in total, Mr Hexter says.

NYK Bulkship Asia won a “Green Ship of the Year Award” from the Singapore Maritime and Port Authority (MPA) in 2021, for methanol fuelled vessel Takaroa Sun. This was also the vessel used for the Rotterdam bunkering from a barge demonstration.

Reducing carbon further

The negative to methanol fuel, compared to ammonia or hydrogen, is that it still contains carbon. Reducing emissions by 10-25 per cent, by itself, will only take companies 10-25 per cent of the way along their net zero journey.

But if this fuel is made from CO₂ which would otherwise been emitted to the atmosphere and had no possibility of sequestration, the whole ‘well to wake’ chain is carbon neutral.

This can be done if the methanol is made from biofuel (which absorbs CO₂ from the atmosphere as the plant is grown), or using renewable electricity, electrolysis water to make hydrogen, and reacting that with captured CO₂ which would otherwise have been emitted.

In this case, CO₂ is still emitted from the vessel’s stack because the molecule contains carbon, but it is carbon removed from the atmosphere upstream.

The bioenergy could come from agricultural waste, municipal solid waste, or wood pulp mills.

Methanex has the capability to produce bio-methanol at its plant in Geismar, Louisiana, with renewable natural gas (biogas) as a feedstock. This is certified by International Sustainability and Carbon Certification (ISCC).

There is a possibility of ‘blue methanol’ where a small amount of CO₂ emitted in the process of making methanol from natural gas is sequestered rather than emitted – but this would only make a small impact.

Methanex was an early investor in Carbon Recycling International (CRI), a company based in Iceland, which is developing technology to react CO₂ (taken from a large CO₂ emitter, such as a steel plant) with green or recovered hydrogen to make methanol.

CRI is exploring several ways of doing this, including taking energy from a geothermal power plant, which is relatively easy to build in Iceland. The commercial viability will depend on the cost of electrolysis (to make hydrogen from water), the cost of power, and the availability of concentrated CO₂ sources, as well as government incentives.

According to Methanol Institute tracking, supply of green methanol is likely to rise from a “few hundred thousand tonnes” a year now to 8m tonnes a year by 2027, based on projects being under consideration today. Other studies have shown potentially hundreds of millions of tonnes of production.

There could be many different possible

grades of bioenergy content. “You can go from completely conventional to completely green – and anywhere in between,” Mr. Chesko says.

Using methanol

Converting an existing ship engine to run on methanol just requires “minor modifications”, Mr Hexter says.

Some engine manufacturers have produced kits to add a methanol fuel system to a basic diesel engine and adapt the valves and injector to deliver methanol fuel.

A small pilot light is needed to ensure controlled methanol combustion. This requires an electronically controlled engine, which is common for dual-fuel engines.

You also need a new fuel delivery system. Some minor changes to the vessel infrastructure are needed including additional fuel storage, double-walled piping, and a methanol fuel supply system.

In port, established diesel tanks can be used to store methanol with only minor modifications needed, Mr Hexter says.

Crew need to be given training required under the IGF Code (International Code of Safety for Ship Using Gases or Other Low-flashpoint Fuels) which came into force in January 2017.

All seafarers responsible for designated safety duties associated with the care, use or emergency response to the fuel onboard ships receive Basic IGF Training.

Masters, engineers, officers, and any other personnel with immediate responsibility for the care and use of fuels and fuel systems on ships receive Advanced IGF Training.

Crew also learn about emergency and contingency plans.

Waterfront also recommends that chief engineers, second engineers and electrical officers using a ship with MAN’s “LGIM” engine take MAN’s engine simulator training, available through its Primeserv Academy.



Fuelled by methanol – the 50,000 DWT Savonetta Sun



Jotun Protects Property

JOIN THE
REVVHULLUTION

Jotun Hull Skating Solutions

Always clean hull – For the most challenging operations



Tanker coatings news

Tanker coatings news this year includes a way to calculate a revised ‘reference speed’ for a coating; creating a standard for hull cleaning; contracts and approvals for MarineLINE

NEDA Maritime Agency was able to find out how the vessel’s ‘reference speed’ would change if an ultra-low friction paint was applied to a vessel, without needing a new sea trial.

The reference speed is an important input of the EEXI calculation, calculated as 75 per cent of the speed of the vessel at its maximum continuous rating (MCR), the maximum power that the engine can produce continually and safely.

The re-assessment was made by DNV for Aframax tanker M/T Suvretta.

It was based on a figure supplied by paint supplier International Paint, for the expected change to the frictional resistance co-efficient of the vessel, as a result of using its ultra low friction paint.

It found that M/T Suvretta’s ‘reference speed’ increased by 0.17 knots to 14.87 knots.

NEDA Maritime Agency is based in Piraeus and manages 26 large tankers and bulk carriers.

Jotun and standards for hull cleaning

Tanker coating and hull cleaning company Jotun has partnered with environmental organisation Bellona to launch the ‘Clean Hull Initiative’, a project to develop and implement an industry wide standard for hull cleaning.

It would like the standard to be recognised by the International Standards organisation (ISO) and is submitting a proposal for the standard to ISO in December 2022.

The standard would enable requirements from nations and ports about ship hull cleaning to be harmonised, making compliance less complicated for shipping companies.

Nations and ports are increasingly considering regulation about hull fouling and cleaning, because they are concerned that fouling can move biological species to parts of the world where they are not native (the same problem which ballast water treatment tackles).

At the same time they know that requiring hull cleaning would lead to CO2 emission reductions, because fouling can increase a vessel’s fuel consumption by as much as 40 per cent.

Jotun sponsored a conference on Port Inspection and Cleaning (PortPIC) in

Hamburg in September 2022, to discuss the matter. There were papers from representatives for the Port of Antwerp-Bruges and Bremen Ports, about their positions and requirements and the need to establish best practises.

Jotun has a commercial reason to be interested in cleaner hulls – as well as motivating companies to spend money on fouling-resistant coatings, Jotun has a robotic hull cleaning product called HullWiper.

Underwater robotic cleaning is seen as very important if companies are going to have cleaner hulls, being safer and less expensive than using human divers, often the only other option.

At a separate event about the Clean Hull Initiative at Nor-Shipping in Oslo in June 2022, Angelika Brink, senior surface scientist at Jotun, noted that there can be big differences between predictions or computer modelling of fouling, and the actual biofouling. It is common for fouling to be higher than it was predicted to be, she said.

It is also very hard to quantify fouling coverage based on observation, particularly when different types of fouling are present. Some theories show that it is the type of coverage which matters more than the extent – a single large barnacle can have more impact on performance than many smaller ones, she said.



Applying MarineLINE coating on a chemical tanker

Also in Oslo, Luc Van Espen, technical manager environment at the Port of Antwerp, stressed the importance of a standardised approach to cleaning in ports. He said he was in favour of a standardised cleaning approach, “because it’s not feasible to use different approaches in different ports”.

A joint policy on underwater hull and propeller cleaning in the Flemish ports has been launched by partner ports in the region, he said.

Shell approves MarineLINE coating

Advanced Polymer Coatings report that its “MarineLINE 784” cargo tank coating system is now on Shell’s approved list for carriage of monoethylene glycol (MEG) cargo, alongside stainless steel.

Previously, commercial operators and technical operators of vessels chartered on behalf of Shell were told they could not load MEG into any lined tank, due to the risk of contamination.

The change has been made following a study by Shell’s chemists.

MEG is an ingredient for polyester fibres, film, PET resins and engine coolants (antifreeze). It is used in kitchenware and packaging, fabrics, drink and food containers.

The problem with many tank linings is that

they absorb the cargo, and so it contaminates the next one. But MarineLINE does not absorb.

A cargo with a particular problem being absorbed into tank linings is benzene, and this can also contaminate MEG if mixed with it.

In a test, panels lined with MarineLINE were immersed in benzene, washed according to the onboard procedure, then immersed in MEG at different temperatures to see if any benzene could be detected. UV scans show there was no benzene detected in the MEG.

Advanced Polymer Coatings coats third BSM vessel

Advanced Polymer Coatings (APC) has won its third deal with Bernard Schulte Shipmanagement (BSM) to recoat 15 cargo tanks on the 25,583-dwt chemical tanker Reinhold Schulte. This is 19,000 m² of coating. Work began in October 2022 in the IMC Shipyard in Zhoushan, China, with a completion date in late November.

It follows similar deals this year to recoat the 25,581 dwt Rudolf Schulte and the 25,620 dwt Rebecca Schulte. The contract with signed with BSM's office in Singapore.

APC's coating was used when the three tankers were newly built in China in 2011 and

2012, so has lasted for 10 years.

"MarineLINE protects cargo tanks from more IMO approved chemicals than any other coating in the world," says Capt. Onur Yildirim, marine manager of APC.

APC grew its maritime sales by 40 per cent in 2021, with 56 ships coated, equating to over 750,000 sqm of MarineLINE applied. APC reports it now accounts for more than 11 per cent of the global cargo tank coating market, with more than 700 vessels coated worldwide.

Chugoko's antifouling coating

Chugoko Marine Paints (CMP) announced the release of an ultra-low friction 'hydrolysis' antifouling coating "SEAFLO NEO SL M", available since January 2022.

It uses silyl methacrylate as the antifouling ingredient.

CMP first launched a silyl acrylate antifouling in 1995 under the name SEA GRANDPRIX, to replace TBT antifouling coatings, which were found to be toxic to marine life.

CMP launched the "SEAFLO NO SL" in 2011; in 2014 it launched silyl methacrylate antifouling with the "SEAFLO NEO SL Z", applied to 800 ships to date.

It uses "TIPSMA" technology to resist fouling – there is a 'minimal average leach layer' and a self-polishing mechanism.

"SEAFLO NEO SL M" is a technical improvement also using TIPSMA. Chugoko promises customers a maximum average speed loss of 2.5 per cent over a 60-month operational period, and a 7.5 per cent reduction of CO₂ emissions.

Hempel coats 3000 ships with Hempaguard

Coatings company Hempel reported in September that it had coated 3,000 ships with its 'flagship' antifouling hull coating, Hempaguard. It estimates that its customers will reduce emissions by 27m tonnes in total from using the coating on the 3,000 ships.

The 3,000 ship to be coated was a 335m container ship, while dry-docked at Beihai Shipyard in China.

"This year alone, we have seen sales of Hempaguard systems grow by 82 per cent," said Alexander Enström, Executive Vice President of Marine at Hempel.

Customers include bulkers, tankers, containership and cruise operators.

T



OUR BALLAST WATER SOLUTIONS ARE PURE AND SIMPLE

We will help you to clear things up! UniBallast can retrofit your vessel(s) by building in a ballast water treatment system. Or just install our Universal Ballast Water Port Connector (UBPC) for easy discharge of your ballast water to any treatment facility according to the latest USCG/IMO standards. Just contact us for conclusive advice and a simple & effective solution. Whatever fits your needs. www.uniballast.nl



Ballast water treatment technology news

Developments with ballast water treatment technology include technology to treat ballast actually in the tank; growth in ‘ballast water treatment as a service’; inspecting a full ballast tank with robots; and Great Lakes scientists verifying it does actually all work

Scienco/FAST InTank – treatment while underway

US company Scienco/FAST InTank has developed a ballast water treatment system where the treatment is completed while the vessel is underway, rather than during cargo operations, as most ballast water treatment systems do. The treatment is from dosing chemicals.

The system has been installed in tankers of all sizes from medium range to VLCCs.

Moving treatment from port to the voyage takes away the pressure of ballast treatment during the time-sensitive activities in port.

InTank is able to treat all types of unfiltered waters, automatically adjusting treatment intensity to the specific challenge of the ballasted water, so the crew do not need to be concerned with this.

Any remaining chemical can be neutralized in the tank before discharge. The vessel operator can be sure that the concentration of the active substances (measured as the ‘Total Residual Oxidant’ level or TRO) is low enough to discharge the ballast water into the sea.

Also, since the system operates during the voyage, any issues that might arise during the ballast water treatment can be fixed at sea without any impact on port operations.

Only a small circulation pump and dosing module is required to be installed in the pump room, no filter is needed. Having less and smaller equipment means lower explosion risk, the company says.

Also, by not having filters, the problem of filters getting blocked when ballasting in port, during cargo unloading operations, is avoided.

No power is needed for ballast water treatment when in port, which is very different from most other ballast water treatment systems.

If the vessel is on a long voyage or at anchor for a period, the operator can treat the ballast water immediately before discharge, so be sure that there is no regrowth of organisms, and the vessel is in compliance with D2 regulations.

For smaller vessels, InTank produces the ‘FITT’ system with a ground footprint of just

half a square meter (see photo).

Currently, discharge compliance (D2 and TRO) is not being enforced by the US Coast Guard or other administrations, but it will be,



With a footprint of 0.5m² - the Scienco/FAST InTank FITT BWTS

thinks Giles Candy, business development executive for InTank BWTS at Scienco/FAST.

“The IMO is approving discharge compliance verification tools and USCG is moving towards discharge compliance enforcement,” he says.

Ballast water flushing ‘works’

Research by Anthony Ricciardi, Professor of Biology, Redpath Museum & Bieler School of Environment, McGill University and Hugh MacIsaac, Professor at the Great Lakes Institute for Environmental Research, Ontario, Canada, showed that ballast water treatment appears to be working in reducing the number of new non native species found in the Canadian Great Lakes.

From 1959 to 2006, one new invader was

discovered established in the Great Lakes basin every six to seven months on average, they report. No other freshwater system on the planet has been invaded as frequently.

In 1993, regulation was introduced requiring ships to exchange fresh water ballast water with saltwater before entering the Great Lakes, but it did not work - new non-native freshwater species were found in the Great Lakes for 10 years after the regulation was introduced.

But the majority of ships were declaring that they were not required to do the ballast water exchange because they had no pumpable ballast on board. Although they did have an average of 47 tonnes of residual water and 15 tonnes of sediment in their “empty” tanks, the academics said.

In 2006 (Canada) and 2008 (US), regulations were introduced for ‘saltwater flushing’, demanding that partially filled ballast tanks contained water that matched the salinity of the ocean before entering the Great Lakes. This was verified with inspections.

Researchers analysed the number of new species found during three periods of 1981-1993 (no regulation), 1994-2006 (partial regulation), and 2007-2019 (stricter regulation).

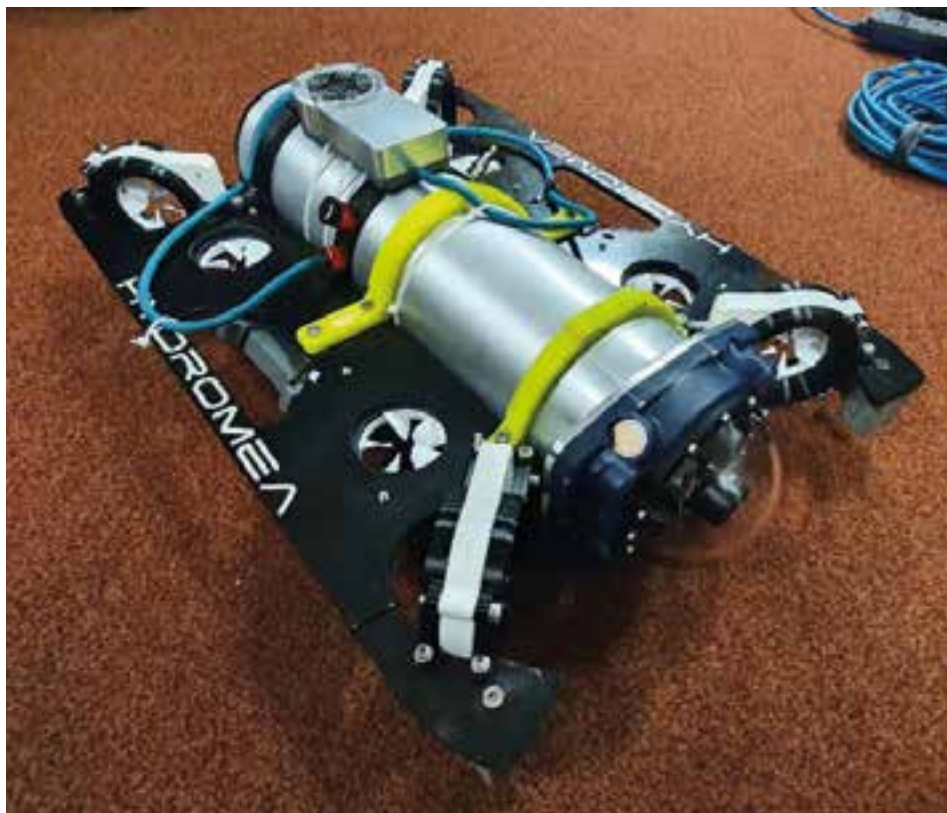
it found 19 new species in the first period, 26 new species in the second period, but then only four new species in the third period. Since 2008 new species declined by 85 per cent. The changes cannot be accounted for by other means, such as changes to water temperature, search efforts, and volume of ship traffic.

Ballasting as a service

Bawat Technology Services and Freedom Ballast of Carnegie, Pennsylvania, USA, provided the first “3rd Party Ballast Water Treatment as a Service” project in June this year.

In Louisiana, a customer with multiple offshore support vessels (OSVs) saw their ballast water treated using a mobile, containerised ballast water treatment system (BWTS) provided by Bawat Technology Services, based in Denmark.

The vessels were being brought to a US



A robotic submarine vehicle (ROV) used to inspect a full ballast tank on an FPSO

shipyard for repairs and surveys, and had 3,500m³ of residual ballast water. The customer realised that the water could not be discharged unless it had been treated, to be compliant with ballast water discharge regulations. But the shipyard was asking for a very high disposal fee, and the vessels did not have any onboard BWTS.

Freedom Ballast was able to bring its mobile, containerised system onsite, to support the customer.

“We are thrilled to be part of this ground-breaking first movement to facilitate ports and yards with ballast water reception technology in the US,” said Marcus Peter Hummer, CEO of Bawat.

“With our US based partner Freedom Ballast, we expect to place more hardware and facilities across the US, to service an increasing demand for both planned and contingency ballast water treatment jobs.”

Ballast free bunker vessel

LNG technology company GTT announced that it had received ‘Approval in Principle’ from Bureau Veritas for its concept for a ballast-free LNG bunker and feeder vessel.

The vessel design is 18,700m³ capacity, with two membrane tanks. It has a V-shaped hull, rather than the square shaped mid-ship sections traditionally used for LNG carriers. The design was tested in the HSVA Hamburg tank test facility.

A ballast water free vessel should have lower operating costs, simpler operations and less corrosion, GTT said.

Tank inspection by ROV

Inspecting the condition of a ballast tank may be easier and safer to do when the tank is full, using a robotic submarine vehicle, than when the tank is empty, using people.

A trial using such a device, known as a ‘remote operated vehicle’ or ROV, was

carried out in the North Sea, on the tanks of an FPSO operated by TotalEnergies.

The device was provided and operated by inspection automation company Hydromea of Renens, Switzerland. The project was funded by the Net Zero Technology Centre of Aberdeen, Scotland.

The device collected visual data (from a camera). The pilot was able to control the vehicle and see a real time, 1080 pixel video image. Since no communications tether is needed, the risk of the cable getting tangled is eliminated.

Høglund and Knutsen Technology

Knutsen Technology is providing its in-house ballast water treatment system to outside customers, in a partnership with control systems technology company Høglund.

The Knutsen technology is based on pressure treatment and ultraviolet light. In the pressure treatment stage, the water’s pressure is quickly reduced from 2 bar to a vacuum, which destroys all large organisms. Smaller organisms such as algae and bacteria are then eliminated in the ultraviolet chamber.

It is possible to treat 3000m³ an hour of ballast water, with a device with a footprint of only 9m² of deck space.

Knutsen developed the technology to use on its own shuttle tankers. It has been working together with Høglund since 2020, because it wanted an automation system to help with remote troubleshooting.

Høglund developed software to control the pumps and valves for the system. The ballasting can be controlled from a single operator station and integrated into the vessel’s automation system. There is a “playback” system, where an operator can see all the alarms and events which have happened.

The system has already been installed on 25 Knutsen vessels in addition to 4 vessels owned by external shipowners. There are 11 ongoing projects for 2023-24.

“We are keen to reach out to shipowners across the globe looking for a filter and chemical free system with few movable parts, that is fully automated, intuitive and easy to operate”, says Jorunn Seglem, CEO and director of Knutsen Ballast Water.

TO



DEN-JET
Water Blasters
New Improved MasterMariner 500



Safe operation
onboard tankers





Den-Jet Marine

+65 6268 1238

denjetmarine@denjet.com

www.den-jet.com

BWTS energy and your CII

The fuel consumption to run your ballast water treatment system (BWTS) can be large enough to make a difference to your CII score – so it may be worth considering fuel consumption when you are purchasing a system. Ecochlor's Panos Smyroglou explains

By Panos Smyroglou, VP Sales and Marketing, Ecochlor

A vessel will always produce some greenhouse gas (GHG) emissions when in anchorage or at port during ballasting or de-ballasting, for example, through auxiliary engines.

While this might not seem like much compared to voyage movement, these small segments of emissions add up.



Panos Smyroglou, VP Sales and Marketing, Ecochlor

The importance of reducing GHG becomes very clear with the onset of the Energy Efficiency Existing Ship Index (EEXI) reporting regulations and the mandatory monitoring of Carbon Intensity Indicator (CII) in 2023.

CII ratings are determined by the amount of fuel consumed for each voyage passage versus the vessels' capacity. Ratings range from A to E with penalties expected on owners of ships scoring in the lower rating scale of D and E.

There are many ways to reduce emissions, such as slow steaming, automatic ShaPoi (continuous measurement of power, nautical data and fuel consumption), installing hull air lubrications systems or scrubbers, carbon capture and storage systems, or exchanging high-sulphur fuels with LNG, LPG, methanol, biofuel or hydrogen. But

looking at the energy efficiency of the vessel is also a good option for lowering GHG emissions.

The lower the energy demands needed for the equipment on your ship, the lower the fuel consumption and ultimately, carbon emissions; this includes any power consumed to operate a ballast water management system (BWMS).

Ask the questions

I suggest that when you get the BWMS equipment specifications from the system's manufacturer, you should not only review operating costs, but also ask the hard question regarding any power requirements associated with ballasting in "less-than-optimal" water conditions.

Oftentimes, power consumption increases significantly when the BWMS is operating in challenging circumstances. Manufacturers may only offer the power requirements for 'best case' scenarios.

For example, with UV systems, when operating in turbid or muddy waters, the system must increase the UV dose and in turn the power requirement.

Additionally, UV treatment requires the use of complex power supplies to drive their lamps and a second treatment is needed prior to discharge.

Using chemical injection

There are some nice GHG advantages for the Ecochlor EcoOne BWMS, filterless or hybrid variant, using the chemical injection ClO₂ treatment technology.

ClO₂ is highly effective in all water conditions and its efficacy is not affected by salinity, temperature or turbidity, so power requirements do not increase in varying water conditions.

Energy consumption for a system without a filter, on a ship with ballast flow rates between 500 to 3000 m³/hour, would range from 5 to 7 kW. With flow rates between 3,000 – 10,000 m³/hour the power requirements would range from a low of 10 to 15kW.

A factor further reducing power consumption is that treatment is only necessary on uptake [loading ballast water]. The system does not require neutralization at discharge.

Other possible problems

In the case of electro-chlorination or sodium hypochlorite-based BWMSs, when treating in challenging waters such as cold, low salinity or high sediment, each separate issue might significantly increase power consumption in order to overcome it.

If compounded, and in extreme circumstances, it's conceivable that there would be a higher carbon footprint along with questionable sufficiency of electric power during ballast operations and at ports during cold ironing.

Carbon emissions is one of the reasons why cold ironing is being promoted in a lot of ports. Vessels will have to draw power from a shore cable when in port to run their operations instead of running their own diesel generators.

If you have a BWMS that uses a lot of electricity and you are forced to plug-in while in port, that's electricity you're going to have to pay for, sometimes at a high cost. It will only be possible if the electric load from your ship can be covered by the port's electric power capacity in the first place.

Many manufacturers were not thinking about EEXI or CII when they initially engineered their BWMSs. So many of these technologies are inherently inefficient that way, and have very limited options to actually reducing their power requirements in a serious way.

In conclusion, when researching BWMSs I suggest you keep a focus on your objectives to meet future carbon reduction targets

Any extra energy use can have a real impact on your emissions over the long-term, turning that equipment into a distinct disadvantage in reaching those goals for the life of the vessel.





Ballast Water Management Systems

**The wait
is over...**

Filterless & Hybrid EcoOne® BWMS

Reliable

Simple to Operate

No TRO Sensors

Gravity Ballasting

Low Power

Low Maintenance

Low Cost

**IMO & USCG
Type Approved**



www.ecochlor.com/EcoOne

InVoyage™ + InControl™ = InTank®

- Ballast as normal with NO FILTERS
- Automatic dose monitoring and adjustment for biological compliance
- Treat *during* voyage and neutralize *before* discharge, assuring technical [TRO] compliance

- Treats 500 m³ – 5000m³ of ballast water
- Fits in a 8ft x 10ft container
- Measures 81cm L x 62cm W x 118cm H (32 in x 25 in x 47 in)



MarineShaft repairs chemical tanker propeller

MarineShaft of Hirtshals, Denmark did a repair of propeller equipment on a chemical tanker in October 2022, including providing a new shaft coupling.

The vessel had suffered an incident, which caused damage to the shaft coupling, a device connecting the propeller shaft to the gears. The coupling had rotated and seized onto the propeller shaft. This forced the tanker out of service. It was sent to a Swedish Shipyard.

The only option was to cut the coupling in half.

MarineShaft suggested welding the shaft and machining it to its original size. It had material in stock to make a new coupling, and it could be done in 12 working days.

There was also damage to the blade carriers (which holds the propeller blades). It was a controllable pitch propeller. Marine Shaft repaired this damage with laser cladding (laser metal deposition) using Inconel 625.

There was also damage to the shaft cone, where the propeller is attached. The damage

to the shaft cone were welded using MAG (Metal Active Gas) welding. MarineShaft has special class approval from ABS for this. Two layers of bronze cladding were applied to rebuild the hub's blade seal areas using laser cladding. After MAG welding, the welded areas were post-weld heat treated and machined to their original size.

The propeller blades were also controlled and polished.



The chemical tanker's propeller before the repair



MarineShaft manufactured a new shaft coupling



A polished and controlled propeller blade



The completed propeller equipment (without blades)

EPE – cloud management tool for hazardous materials

Environmental Protection Engineering of Piraeus, Greece, has launched a cloud-based tool for managing and monitoring the Inventory of Hazardous Materials (IHM) onboard a ship, as companies are required to do under some ship decommissioning regulations. It is called HAZDASH.

All Environmental Protection Engineering (EPE) clients, including a number of tanker operators, are being gradually transitioned to the cloud-based service, says John (Ioannis) Korovesis, Commercial Director at EPE.

Since 31 December 2020, existing vessels of 500 GT and above, that are flying the flag of an EU/EEA member state or calling at a port or anchorage of EU/EEA, must have an Inventory of Hazardous Materials (IHM-Part I) and a valid Certificate/Statement of Compliance onboard. Navy ships and domestic ships are excluded.

Inventory maintenance ensures that a shipping company closely monitors parts and components ordered for their ships to verify if they contain hazardous materials. This ensures there is always a full record of what is onboard during a ship's service life and whenever the ship is scrapped. For example, some older ships still have asbestos used in their construction, which needs to be recorded and properly managed in accordance with SOLAS Regulations.

Since 31 December 2018, all new builds flying the flag of an EU/EEA member state are required to have an IHM Certificate (IC) issued on behalf of the flag onboard.

Updating the IHM

Keeping the inventory up to date means that every time any item is brought onboard the ship and falls into scope of IHM maintenance (fixed equipment, painting and coating, and structure and hull containing materials) it should be accompanied by IHM documents, i.e., Material Declaration (MD) and a Supplier's Declaration of Conformity (SDoC).

A hazardous materials expert needs to review the IHM documents collected by the

respective suppliers and update the Inventory of Hazardous Materials. Shipping companies can maintain the inventory inhouse or appoint an external specialized company.

Environmental Protection Engineering (EPE) is an approved IHM service supplier under five Classification societies (ABS, DNV, LR, BV & KR) plus two flags (Liberian and Marshall Islands). EPE claims to be the first company worldwide to be approved as an IHM HazMat expert by DNV-GL and has highly experienced, IACS approved HazMat surveyors.

EU Ship Recycling Regulations form an important part of IHM management as there are two categories of hazardous materials. Items which their use or installation is prohibited or restricted, and items which are allowed to be installed onboard but need to be carefully monitored. The categories are known as Annex 1 and Annex 2 respectively.

Mr Korovesis explains that it can sometimes need specialist expertise to know which category a certain material falls into. "EPE has the much-needed experience to know and flawlessly identify which parts are

hazardous and which are not," he adds.

To add to the complexity, the category of an item can change if it is moved from the ship stores and used; for example, a gasket is classed as a 'spare part' when stored as a spare, but when fitted and integrated in a ship's structure it becomes part of the ship itself. So, the list may need to be updated when maintenance work is done.

"There are numerous important advantages to digitally maintaining your Inventory of Hazardous Materials with HAZDASH," says Mr Korovesis.

"With a digital service, much of the work can be automated. As a cloud-based platform, HAZDASH can be connected to the shipowner's Enterprise Resource Planning (ERP) system, so that it is notified of all new orders, and can automatically contact suppliers to request the hazardous materials documents. To assist with classification, shipowners will also receive alerts via HAZDASH regarding the installation of asbestos and other Annex 1 materials."

When goods are supplied, the supplier can easily upload the required documentation to the platform or alternatively generate a Declaration of Conformity or Material Declaration online. EPE's HazMat experts can then review the documents prior to submission.

However, some data from ship suppliers is provided automatically due to the integration between the platform and the suppliers' Enterprise Resource Planning (ERP) system which removes the need to upload documents manually and ensures all documentation is electronic and stored in a single platform.

"If a Port State Control inspector asks a captain, 'what was delivered last month and what was hazardous?', the answer is available immediately via HAZDASH," he says.



John (Ioannis) Korovesis, Commercial Director at EPE.

TO

“I RECRUIT COHORTS AS DIVERSE AS POSSIBLE, BOTH GEOGRAPHICALLY AND INDUSTRY SPECIFIC. I HELP BRIDGE THE GENDER GAP BY ENCOURAGING FEMALE PARTICIPANTS. YOU WILL LEARN FROM YOUR PEERS AND WILL JOIN A LASTING ALUMNI ASSOCIATION THAT MAKES LIFELONG LEARNING POSSIBLE.”

EXECUTIVE MBA IN SHIPPING AND LOGISTICS (THE BLUE MBA)

A unique industry needs a unique MBA. Take your career to the very top international level by joining the world's premier Executive MBA designed specifically for shipping and logistics professionals.

Find out more details from Programme Director, Irene Rosberg
Visit www.cbs.dk/mbs or email ir.mba@cbs.dk

IN URGENT NEED OF A REPAIR / REPLACEMENT?



We have the capacity, expertise, and class approval to assist you with any emergency request for your rudder stock or propeller shaft. Our fully equipped workshops are ready to repair or manufacture a new shaft or rudder stock.

Lathe capacity 27 meters.

DK-9850 Hirtshals
marineshaft.com

MarineShaft®