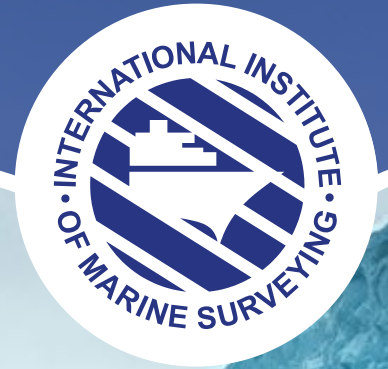


THE REPORT

SEPTEMBER 2021
ISSUE 97

The Magazine of the International Institute of Marine Surveying



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A special 26 page Report supplement

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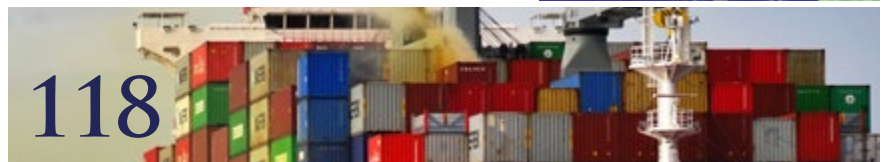
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EDITOR'S LETTER

Dear Colleague

Welcome to the September 2021 Report Magazine, edition 97, one that I hope will inspire, inform and provoke strong emotion as you turn its pages.

Unless you have been living in a darkened cave for the past decade, you cannot have failed to notice that the subject of climate change is omnipresent - and that the clamour to decarbonize in all aspects of our daily lives only grows shriller by the day. It is a well-known fact that the shipping and marine business has been a dirty industry and a major contributor to global emissions, which is why new technologies are being fast tracked at an extraordinary rate to meet both IMO and individual government targets. But are we already too late?

This edition carries a special 26 page Report Magazine supplement about COP26. Many of those I have spoken with have not heard of COP26, but if you haven't either, I promise you soon will. For in early November the UK, together with partners Italy, will host an event many believe to be the world's best last chance to get climate change under control. COP26 is the 2021 United Nations climate change conference. More than 190 world leaders will arrive in Scotland. Joining them will be thousands of negotiators, government representatives, businesses and citizens for twelve days of talks. Not

only is it a huge task but it is also not just yet another international summit. Most experts believe COP26 has a unique urgency. Starting from page 75 you can learn about the aims of COP26 and then read a series of articles, all of which have one thing in common - finding ways to reduce emissions in the shipping and boating arenas.

The miserable run of tragic incidents and accidents continues unabated, so I am grateful to Dr Claudio Bozzi, lecturer in law at Deakin University, for his permission to publish his article on one such recent event, entitled '*Could the X-Press Pearl Disaster Have Been Prevented?*' on page 118. The sad reality is that once turtles and whales start washing up dead on the shoreline, it's game over!

Recommended reading is the article on page 57, '*When accidents go un-investigated, more will happen in the future*'. It champions the requirement for transparent and open reporting by flag states following accidents after a series of incidents in recent years about which few lessons seem to have been learned.

Risk assessments are the bane of modern life for many, yet they are vitally important. Good friend, Jeffrey Casciani-Wood HonFIIMS, has authored a detailed article called '*An introduction to risk analysis*', (page 101), that includes a couple of sample risk assessment

forms to get you started if this is new to you.

Psst can I share a secret with you? I was genuinely surprised when I sourced the article '*New Zealand IS the innovation nation for marine technology*' (page 112). For a country with a small population, they certainly pack a punch well above their weight and, as you will read, their list of achievements and product development is impressive.

Oli Byles is the focus of '*The Day in the Life of*' feature from page 125 and it is refreshing to hear the views of a younger practitioner making his way in today's marine surveying world.

There seems to be a ton of news, safety briefings, member news and new products to complete this issue too.

Survey well.

Mike Schwarz,
Chief
Executive
Officer





THE PRESIDENT'S COLUMN

Dear Member

Regular readers of my President's column in the Report Magazine will know that I am not one to speak out particularly, or to create waves, but this month may be an exception.

I do not consider myself to be a 'tree hugger' as such but I have had a lifelong passion for the natural world in all its forms to which I dedicate much of my leisure time. With this in mind I am all too often horrified (not too strong a word) and certainly distressed by the actions of some of those involved in the disasters which befall some of the world's merchant ships. We have seen countless incidents where ships have collided, caught fire or run aground. Indeed, this edition of

the Report contains details of the latest of these - the recent X-Press Pearl accident - as covered by Dr Claudio Bozzi in his article.

The industry recognises that there is more often than not an element of human error in most disasters. In my personal experience there are usually three elements, one of which I accept will always be human error. However, the point I am trying to make is that the loss of the Braer in 1993 off Shetland in Scotland may have been due to water in the fuel causing the ship to drift helplessly and the fire on the X-Press Pearl was allegedly due to a leaking container; but the reactions of the ship owners, vessel operators, cargo owners and, in the case of the X-Press Pearl, the port operators, all played a part. Ultimately it was the environment,

local residents and the insurance companies that suffered the most. We also have a certain amount of responsibility as surveyors to ensure that the standards of maintenance and operation of these ships is kept at an acceptable standard. Being frivolous for a moment, here is a link to one of my favourite satirical takes on such a disaster which I am sure many of you have already seen and is recommended viewing. Go to <https://bit.ly/3rLXnEE>.

All too often because of the expected human element the crews of these ships are blamed for causing the environmental disasters, but ultimately, they most probably played the smallest part in the loss. After all, as they would be the most likely to suffer injury or death, surely they would

be the people who try hardest to prevent the incident in the first place? What responsibility is born by the persons who make the decisions whether to allow salvage, rescue and safe haven, or even debate liability and therefore the quantum of the loss? Surely the most important factor is to make every effort possible to prevent a potential environmental catastrophe.

To put this into context, would you stand at the roadside and debate liability for the cause of an accident and share insurance details while the vehicles and their occupants burn, or would you put out the fire, save lives, clear the road and then deal with the paperwork and the consequences afterwards?

Well now I have got that off my chest, I have an issue for small craft members in particular, although not exclusively, to ponder. As a member of our own Professional Assessment Committee, I realise that the qualifications and professional backgrounds of surveyors varies greatly with experience and time spent, as well as Continuing

Professional Development also being taken into account. Let us not forget we are Professionals operating within our sectors of the marine industry. You may well have spent five years studying at college and university, plus many years working in the field of marine surveying to reach the level of expertise that you have achieved only to have someone with little or no professional marine qualifications or limited surveying knowledge deny you of instructions from a client purely because the other person offers to charge half your quoted fees. 'You get what you pay for' I hear you say and quite right too, but what of those amongst you who enter into this price war? If you lower your fees by 25% to 50% are you also considering giving only that percentage of attention to the task in hand and, therefore, in the process are you not allowing the unqualified person to dilute your own professional standards?

For this - and many other reasons - my drive to have the marine surveyor professionally recognised and perhaps eventually given chartered or equivalent status continues, so that only suitably

qualified professional marine surveyor practitioners are allowed to trade as such.

Pleasingly, we are beginning to see the fruits of our labours in this respect. Recently I had an enquiry for Expert Witness with regard to a case involving a large yacht where the lawyer concerned had been advised that the best place to go to find one was the IIMS. In addition, feedback from small craft members is encouraging as some of the past old school prejudices are beginning to dwindle. IIMS members are being recognised where previously they were not. During a recent online 'Student Meet and Greet' I was also heart warmed to hear a student from half way round the world say that he had been told that if he wished to progress in the marine surveying industry he would need to complete the IIMS diploma and become a member.

For an example as to why this is important you only have to consider a parallel industry. The following is the advice given online to those instructing a building surveyor. "Building surveys are conducted by Building Surveyors. It's important to check that the surveyor you select is regulated by RICS (Royal Institute of Chartered Surveyors) as they set the guidance for surveyors and this will ensure that the advice you are getting is independent, expert advice from appropriately trained professionals".

But I must reflect on the costs of Building Surveyors who will charge £400 + for a small property and up to £2,000 for a larger family sized house. Indeed, our own building Murrills House was nearer the upper figure for an inspection which lasted less than two hours on site.

Finally, as hinted at in the CEO's column in the August News Bulletin, I have recently advised members in regard to foreign travel and have suffered the rigours of Covid travel myself on



a recent trip to survey in Portugal. I will give today's advice here, but then tomorrow some, or even all, of it may well be out of date. The only certainty appears to be uncertainty! And remember that different Covid rules and regulations will apply in your part of the world.

The secret to success I found is accepting that to be forewarned is to be forearmed. And for UK based surveyors the biggest weapon in your armoury is the Key Worker Exemption letter.

The latest version from Nautilus International & UK Chamber of Shipping dated March 2021 contained the following statements: "Key Worker exemption from mandatory quarantine and proof of negative Covid-19 test." And "The exemption from quarantine applies even if the holder of this letter has been in a country that is on the Government's Red List in the ten days prior to their arrival in England, Wales or Northern Ireland". It is applicable to Seaman and Masters, Maritime Pilots and Inspectors and surveyors of ships (quoting the relative sections of the Merchant Shipping Act 1995).

Plus, for those Certifying Authority coding surveyors amongst you an MCA logo headed letter with a letter of authorisation quoting the same exemptions and signed by a director of your own company can help. Also take a copy of MIN 612 Covid-19 MCA approach to survey and certification of UK vessels just for good measure.



- Other essentials to have with you:
- A Passenger Locator (immigration) Form filled out quoting the relevant exemptions.
 - A letter of instruction and/or invitation to conduct the survey or surveys.
 - A valid Covid-19 Vaccination Certificate.
 - A valid Covid-19 Negative Test Certificate (even if the paperwork says you are exempt).

In addition, a 'Don't question my authority' attitude seems to help and 'I work for the Government' also seemed to work at one time or another!

Paper copies preferably encased in plastic envelopes (for health reasons and repeated use) are essential. This proved to be a challenge for my long-neglected printer in Portugal with dried out

ink cartridges and lost and out of date software.

If all of this seems too much grief (which it certainly was for me) stay at home and sub-contract your out of territory work to a local IIMS member of which we now have over 1,000 worldwide. After all this is the advantage of belonging to the largest world-wide marine surveying Institute and network.

Stay well and stay safe and maybe one day we will all be enjoying a more normal life whatever that may be?

Geoff Waddington
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GREEK CUSTOMS AUTHORITIES ACKNOWLEDGE RIGHTS OF UK YACHTS TO RETAIN EU VAT STATUS

Following a complaint formally made to the European Union (EU) by the Cruising Association (CA) on the post Brexit VAT Status of UK yachts in Greece after returning from outside EU waters, the latest announcement received from the Greek Customs authority acknowledges the rights of UK yachts to return to Greek waters and retain their EU VAT Status.

Greek customs authorities have announced on 3rd June 2021 that, following a request to the EU Commission for clarity on this matter, they have

followed EU advice and will allow UK yachts returning from non-EU Countries to regain their Union Goods Status, provided they return within three years under the same ownership, with no changes to the vessel.

There is one area of clarity still needed, in that they ask for proof of the “yachts being in EU waters on the 31st December 2021”. This, the CA says, needs to be extended to anywhere in the world, excepting those in UK Waters on that date who now are UK VAT status.

Rules in brief:

- a) All UK yachts in Greece or the EU 27 will be treated as full Union Goods status and will therefore not require a Transit Log to be issued of any sort whilst they remain in Greek Waters, the yachts being “in Free Circulation”.
- b) On return to Greek Waters inside three years, UK yachts will need to apply for “Customs Procedures” (Returned Goods Relief) and provide proof of VAT payment in the EU 28 and proof of their “Presences in EU Waters on 31st December 2021”.

SHIPPING RISK SURVEY RESULTS PUBLISHED BY BDO

Traditionally, maritime risks have been relatively predictable such as human error, mechanical failures and natural disasters. The continual growth of international trade and the introduction of new technologies mean that shipping industry risks are evolving fast. But is risk management within the sector evolving to meet these challenges? The industry’s recent experiences, for example in managing the grounding of mv Ever Given in the Suez Canal and the COVID-19 pandemic, demonstrate significant embedded resilience within the sector.

However this does not mean that there are not opportunities to improve risk management practices in the shipping industry. BDO’s 2020 shipping risk survey results showed that where shipping industry leaders may once have viewed risk management as a box ticking exercise, COVID-19 has forced them to become more hands on, with an increasing number of senior managers becoming more actively involved in day-to-day risk management activities. However, a high percentage of survey respondents reported that while risk discussions are taking place, they are not being formalised or documented. Some businesses in the shipping industry do not yet have a sufficiently well embedded approach to risk management, and they need to do much more so as to formally identify, evidence and reduce their exposure in practice.

The pandemic has tested risk management processes across all industry sectors. Lessons are being learned and questions are now being asked regarding the fitness for purpose of systems and processes for risk management.

Read the story in full at <https://bit.ly/3gvV700>.



SHOULD REGULATIONS BE INTRODUCED FOR MASTS AND RIGGING IN THE LEISURE SECTOR?

That’s the opinion of marine consultant David Barrow who carries out surveys for MS Amlin and was director of Sparcraft for 20 years. “I’ve seen many bent and broken masts over the years. There’s no real regulation of masts and rigging in the leisure sector,” he said. “There’s no specific rule to change a boat’s rigging after ten years.”

And he pointed out that while superyachts are regulated under MCA regs and boats that have done a circumnavigation usually have a survey carried out, when it comes to other boats, owners often don’t see the need. If a boat had suffered a knock, this could affect the rigging without the owner knowing. If a boat was inspected very few years, there would be more chances to look at the mast. “It’s not the insurers’ job to regulate the rigging business; the insurer’s job is to behave according to the results of their surveys,” David says.



Maintenance

“There can be a mass of different reasons as to why masts fall down, but quite a few are because of maintenance issues. I’ve seen other masts where there have been technical issues with the masts themselves. This is particularly the case with carbon masts – a relatively new product when it comes to masts – where there could be gremlins within the manufacture and possible delamination. It’s pretty hard to get insurance for a carbon mast, especially in a race boat as insurers are not going to pay for their development any longer. Some insurers are calling for NDT inspections before the masts leave the factory. Regulations probably do need to come in.”

MCA TO CARRY OUT UNANNOUNCED INSPECTIONS OF FISHING VESSELS

Surveyors from the Maritime and Coastguard Agency are to carry out unannounced inspections of fishing vessels across the UK. The unannounced inspections are being carried out as part of ongoing work around fishing vessel safety in an industry recognised to be one of the most dangerous in the world.

Since November 2020, there have been eight deaths –that’s more than ten per cent of the total for the previous ten years. Between 2011 to 2020, the Marine Accident Investigation Branch (MAIB), reported 60 fatalities from UK fishing vessels. The MCA says it has worked solidly with the fishing industry, reinforcing the messages about the requirements of legislation around standards of safety for crew and for vessels. Surveyors regularly carry out surveys and inspections of fishing vessels and detain those that do not meet the requirement of the law, until those deficiencies are corrected.

The MCA has also worked with industry and other partners to drive home the message about wearing Personal Flotation Devices. However, MCA says it will take action where it feels advice is being ignored and safety not taken seriously.

“Fishing is one of the most dangerous industries in the world,” says Tony Heslop, assistant director, survey and inspection (South). “We’ve pushed the message for many years now about the importance of wearing life jackets and making sure that fishing vessels are fit for purpose under the survey and inspection regime.

“While education is important and we will continue to do that, enforcement is also needed for those who consistently ignore our message, to emphasize why this matters and why we take it seriously.”

MCA has now completed their random inspections and an update about the deficiencies found can be read at <https://bit.ly/3f4kUvm>.



KREISEL ELECTRIC TO SUPPLY THE BATTERY FOR EACH ELECTRIC RACEBIRD POWERBOAT COMPETING IN THE E1 SERIES

Using hydrofoil technology, the powerboats rise above the water's surface, giving minimum drag and maximum energy efficiency. Kreisel's bespoke solution features batteries with 150kW peak power and 35kW capacity, aimed at enabling the RaceBirds to accelerate speedily and go for longer between charges.

"E1 and Kreisel's shared vision to electrify future leisure craft made them the obvious choice as official battery partner for the championship," explained Rodi Basso, co-founder and chief executive of E1. "Electrification has a vital role to play in the decarbonisation of the ocean, seas and rivers and Kreisel's cutting-edge battery technology will allow us to deliver on our mission to revolutionise marine mobility."

Kreisel manufactures customisable lithium-ion batteries with patented immersion cooling technology which has applications in both electric motorsport and powerboating. The company is the exclusive powertrain provider of the FIA World RX1e Racing Kit, as well as developing the drivetrain for other marine projects. Kreisel batteries meet DNV's marine standard.

Markus Kreisel, chief executive of Kreisel Electric, said the collaboration allowed the company to showcase the batteries' power. "As the electrification of cars and commercial traffic is the new standard, we now must take the next steps towards sustainable marine solutions," he said.

The E1 series is due to start in early 2023.



SHARP INCREASE IN THE NUMBER OF COMPLAINTS TO THE UK WATERWAYS OMBUDSMAN

The UK Waterways Ombudsman and the Waterways Ombudsman Committee have seen a substantial rise in the number of complaints over the last 12 months. The UK Waterways Ombudsman scheme deals with complaints about the Canal & River Trust and the Avon Navigation Trust once its own complaints processes have been exhausted.

During the year 2020/21, the UK Waterways Ombudsman received 77 enquiries, up from 41 the previous year. Ten

new investigations were opened and the number of complaints resolved was eight. As before there was a very diverse range of complaints, and again the majority were about boating issues with a lack of communication being a common cause of conflict.

Pandemic problems

This is the second annual report of the UK Waterways Ombudsman, Sarah Daniel, who attributes the rise in complaints to the increased use of outdoor spaces as a result of the Covid-19 pandemic. "This past year has been unprecedented in terms of external world events," she said.

"A number of complaints were about the increased use of the towpaths by all and associated problems this brings. As more people enjoy the space around the waterways the trusts have to continue to work hard to make that possible."

FAIRLINE YACHTS SOLD TO HANOVER INVESTORS

The luxury boatbuilder, Fairline Yachts, says it is currently enjoying a buoyant global market and the sale to Hanover Investors capitalises on this.

“It is a testament to the hard work of the team here at Fairline, that a firm with the calibre of Hanover Investors has decided to back us,” said Peter McNulty, Fairline Yachts CEO. “It has an excellent track record of working with companies through its world class approach to integrating both investment and operations, with a particular focus on internationalising companies.”

Jason Carley, senior partner of Hanover Investors, was a board member at Fairline Yachts for nine months until March 2021. He was also senior portfolio manager at RiverRock that took a majority stake in the boatbuilder in 2020.



*Capt Andrew Moll, MAIB
Chief Inspector*

MAIB'S ANNUAL REPORT 2020 PUBLISHED

In 2020, the MAIB published two investigation reports into the collapse of container stacks on large container ships, both of which were transiting the North Pacific Ocean in heavy weather at the time. Such accidents are challenging to investigate due to the multiple inter-related factors involved and that critical evidence could be lost overboard during the accident. There have been more accidents involving large losses of containers since, the most notable being ONE Apus, and more general concerns about large container vessels were already being

raised before Ever Given grounded in the Suez Canal earlier this year. There is no doubt that accidents involving Ultra Large Container vessels will continue to receive intense focus, but it is too early to say what common themes might emerge from accident investigations and whether these could have wider implications for the sector.

On paper, 2020 was a safer year for the UK fishing industry, with only one accident (Joanna C, BM 265) resulting in fatalities. Regrettably, six commercial fishermen's lives have been lost already in 2021, meaning that eight commercial fishermen have lost their lives in the 6 month period November to May. While the investigations are ongoing, the indications are that five lives were lost as a result of small fishing vessels capsizing or foundering quickly. The MAIB is currently in the process of recovering the wreck of Nicola Faith (BS 58), the most recent small fishing vessel to founder, to establish why the vessel sank and its three crew lost their lives.

The accidents involving leisure and recreational craft that the Branch is investigating are quite varied, but two themes are worth mentioning. As the tragic accident onboard the motor cruiser Diversion demonstrated, lives are still being lost due to carbon monoxide poisoning (see Safety Bulletin 2/2020). There can be many sources of carbon monoxide on a cruising vessel, including the main engines, generators, heaters and cooking appliances. Whatever the source, the presence of carbon monoxide can be detected by a reasonably inexpensive alarm, which will provide ample warning that this odourless, highly toxic gas is present. Owners of craft with enclosed accommodation spaces are strongly advised to fit a carbon monoxide alarm suitable for use in the marine environment, and to test it regularly.

Two accidents involving Personal Watercraft (PWC) and Rigid Inflatable Boats (RIBs) show how vulnerable passengers are to injury when these craft collide or hit stationary objects while travelling at high speed. The collision between a PWC and RIB Rib Tickler, and the RIB Seadogz's collision with a navigation buoy are still under investigation, but both accidents resulted in fatalities that could have been avoided had a better lookout been kept and larger passing distances maintained.

Accident investigation continued throughout the pandemic, but it was far from business as usual. During parts of the year travel and quarantine restrictions severely curtailed the Branch's ability to attend accident sites. This resulted in heavy reliance on remote interviewing and third parties to collect physical evidence. Like many others, MAIB staff have become adept at remote working, but the constraints of the remote environment have hindered accident investigation.

Download the report at <https://bit.ly/3zfSve1>.

ZERO EMISSION SEAGLIDER CONCEPT BEING EXPLORED BY BRITTANY FERRIES

Brittany Ferries is exploring the potential for a new high-speed, sustainable, and more efficient form of ferry travel called a seaglider. According to the company, the concept which is a combination of a hydrofoil and flies like a plane, yet classed as a vessel, could provide the comfort and convenience of a ferry at greatly increased speeds.

Drawing on the concepts for wing-in-ground effect vehicle (WIG) advanced by Soviet and German engineers in the 1960s, a Boston-based start-up REGENT (Regional Electric Ground Effect Nautical Transport) is developing a modern, all-electric, WIG that could become zero-emission flying ferries according to Brittany Ferries. REGENT expects the first commercial passengers to travel on smaller electric craft by 2025.

Brittany Ferries has signed a letter of intent with REGENT, which could produce seaglidors with a 50-150 passenger capacity that could be sailing between the UK and France by 2028. The company said that the Seaglider would combine the convenience of passenger ferries with the comfort of hydrofoils, the aerodynamic efficiency of hovercraft, and the speed of aircraft. With the potential to connect existing ferry ports, the craft is expected to fly at speeds of up to 180 mph – six times faster than conventional ferries – with a battery-powered range of 180 miles. The voyage from Portsmouth to Cherbourg could be covered in as little as 40 minutes.



The design works by harnessing a concept well-known to pilots – ground effect. This is the cushion created by high-pressure air trapped between wings and the ground or water while flying at low altitude. Seaglidors are therefore akin to a hovercraft with wings, rather than a skirt. Brittany said that it believes it's a highly efficient mode of transport, capable of moving significant loads over long distances at high speed. Power will come from batteries rather than fossil fuels. Flight safety comes from redundant propulsion and flight control systems, with next-generation sensors detecting and automatically avoiding traffic at sea.

EVER GIVEN FINALLY RELEASED FROM THE SUEZ CANAL

The container ship Ever Given has finally sailed from her anchorage in the Suez Canal's Great Bitter Lake, ending a period of 106 days detention imposed by Egyptian authorities after her grounding in the canal's southern section.

Shipowner Shoen Kisen Kaisha and insurer UK P&I Club reached a settlement agreement with the Suez Canal Authority. After the grounding in March, the Suez Canal Authority (SCA) had obtained a court order allowing it to hold Ever Given and her cargo until Shoen Kisen paid for the effects of the six-day canal shutdown. SCA's initial demand totaled \$916 million, but it lowered its asking price to \$550 million after several rounds of negotiation. The final settlement amount was not disclosed.

"A deal that achieved justice and prioritized both parties' interests has been reached," said Lt. Gen. Ossama Rabei, the head of the SCA, speaking at a formal signing ceremony for the deal.

After the ceremony, Ever Given transited to the Port Said anchorage, where she underwent a dive survey before heading on to Rotterdam to discharge her long-delayed cargo.



Image credit: Suez Canal Authority

CHARGES OF CULPABLE HOMICIDE TO BE BROUGHT AGAINST OWNER OF TUG LOST IN TAUKTAE CYCLONE

Indian authorities have confirmed that charges of culpable homicide are being brought against the owner of the ocean-going tugboat that sank during a powerful storm off the coast of India last month. The barge P305 and the tugboat Varaprada were two of the vessels that found themselves caught on May 17 as Cyclone Tauktae passed offshore near Mumbai.

Both vessels were working for the state-run oil company operating in the offshore oilfields near Mumbai. The barge sank with 261 people aboard with 186 survivors. It captured international attention during the search and rescue operation staged by the Indian Navy. The storm had intensified with the winds reaching 110-mph. Media reports said that the crews had initially believed the storm would be far weaker and that they would be able to handle winds expected to be in the range of 25-mph.

The anchor handling tugboat Varaprada was bringing a construction barge, the Gal Constructor, loaded with 137 people back to Mumbai when the storm struck. The tug reportedly drifted in the high seas before separating from the barge, which would later run aground causing another search and rescue operation. The Varaprada, however, remained trapped in the high seas sinking with a crew of 13 aboard.

The Indian Navy rescued two of her crew members from the ocean and later divers located the sunken tugboat. The Indian Navy and Coast Guard recovered the bodies of the 11 missing crew members from the ocean along with 75 bodies from the barge.

A First Information Report was registered with the police in Mumbai on June 24 based on information provided by one of the survivors of the tugboat. Under Indian law, the charges were culpable homicide not amounting to murder, meaning that the owner of the tugboat is being charged with actions causing the death of the crew. The Hindustan Times is quoting the surviving second engineer, Francis Simon, as accusing the vessel's owner with poor maintenance and skipping necessary repairs contributing to the loss of the tug on May 17.



*Divers at the scene of the sunken tug.
Photo credit: Indian Ministry of Defence*

2020 RECREATIONAL BOATING STATISTICS

the number of non-fatal injured victims increased 24.7 percent (2,559 to 3,191). There is evidence that boating activity increased significantly during the pandemic, from reports of increased boat sales, insurance policies taken out, insurance claims, and calls for towing assistance. With the increased exposure (i.e., more boating hours), there was greater risk of deaths, injuries, and accidents. The Coast Guard is analyzing variables associated with boating activity to normalize this accident data.

Alcohol continued to be the leading known contributing factor in fatal boating accidents in 2020, accounting for over 100 deaths, or 18 percent of total fatalities.

U.S. COAST GUARD RELEASES 2020 BOATING SAFETY STATISTICS REPORT REVEALING A SURGE IN FATALITIES DURING THE PANDEMIC

The U.S. Coast Guard released its 2020 Recreational Boating Statistics Report Wednesday, revealing that there were 767 boating fatalities nationwide in 2020, a 25.1 percent increase from 2019.

From 2019 to 2020, the total number of accidents increased 26.3 percent (4,168 to 5,265), and

the number of accidents increased 26.3 percent (4,168 to 5,265), and the number of non-fatal injured victims increased 24.7 percent (2,559 to 3,191). There is evidence that boating activity increased significantly during the pandemic, from reports of increased boat sales, insurance policies taken out, insurance claims, and calls for towing assistance. With the increased exposure (i.e., more boating hours), there was greater risk of deaths, injuries, and accidents. The Coast Guard is analyzing variables associated with boating activity to normalize this accident data.

Download the report at <https://bit.ly/3qOAqA7>.



STEERSAFE PROJECT REPORT PROVIDES ANALYSIS OF SOLAS REGULATIONS ON STEERING AND MANOEUVRABILITY

The European Maritime Safety Agency (EMSA) has published a report, presenting the findings from the STEERSAFE project, conducted on its behalf by DNV.

EMSA - STEERING AND MANOEUVRABILITY STUDY

Final report

EMSA European Maritime Safety Agency

The STEERSAFE project aims to provide a holistic analysis of the SOLAS regulations and associated circulars related to steering and manoeuvrability, provide a consistent update of these and to propose practical and meaningful performance parameters in normal service and in failure mode.

More specifically, the first phase of the project aims to:

- Provide an overview of the current situation, in terms of a description of relevant steering and propulsion systems and the gaps and inconsistencies in the current SOLAS regulations for steering and manoeuvrability;
- Establish goals and functional requirements for steering and manoeuvrability.

Goals and functional requirements are developed based on a comprehensive hazard identification considering a review of casualty and incident reports of databases, recursive investigation of IMO provisions and an expert workshop.

Download the 305 page report at <https://bit.ly/3hqNus8>.

WORLD'S LARGEST YACHT SET TO HOST 39 LUXURY ONBOARD HOMES

The world's largest yacht Somnio will be launched in 2024, with a length of 222 metres (728 feet) and will host 39 luxury apartments starting at €9.5 million (c. \$11.2 million). A new category has been coined for the vessel, known as a 'yacht liner'.

The €500 million (c. \$600 million) luxury yacht will also host a 10,000-bottle capacity wine cellar and tasting room, a choice of restaurants and bars, and an onboard beach club featuring water sports facilities. The fully customisable apartments will be spread over six decks, and will potentially feature a personal kitchen, gym, a library, dining areas and distinct dressing areas.



A statement for the unveiling of Somnio said, "Somnio is the world's first "yacht liner", conceived to provide all the benefits of superyacht ownership and finished to the highest possible standards, with onboard amenities reflecting the service and offering only found in the world's finest hotels. World-class medical care will also be available onboard, providing apartment owners with the highest level of safety away from pandemics and other global risks."

Somnio is currently being built by Vard in Norway, which is part of the Italian shipbuilding firm Fincantieri. Powered by the latest clean engine technology, the yacht will also feature advanced on-board equipment to help scientists and marine experts conduct research into ocean environments, with the aim of offering solutions to key environmental issues.

PARIS MoU ON PORT STATE CONTROL UPDATES THE LIST OF WHITE, GRAY AND BLACK LISTS



The Paris MoU on Port State Control has updated its White, Gray, and Black lists and, from 1 July 2021, the 27 national maritime administrations that are parties to the agreement will be using an updated version of the list in targeting ships for inspections.

For several years the Paris MoU Committee has closely monitored the performance of recognized organizations (ROs), mostly classification societies acting on behalf of flag States. To calculate the performance of ROs, the same formula to calculate the excess factor of the flags is used. A minimum number of 60 inspections per RO is needed before the performance is taken into account for the list. In 2020, 32 ROs were recorded on the performance list.

Compared to last year’s performance level, says the Paris MoU, the RO performance level has slightly improved. The Paris MoU secretariat says it is noteworthy that, unlike in the past three years, no more ROs are categorized as very low performing.

The new list covers a total of 70 flags which are shown in the table as follows:

- 39 are on the White List
- 22 are on the Gray List
- 9 are on the Black List

In 2019 when the list was last reviewed, the total number of flag states was also 70 and split as follows:

- 41 were on the White List
- 16 were on the Gray List
- 13 were on the Black List

They have been risers and fallers on the lists as to be expected. Denmark now tops the list and has displaced the UK flag, which is now ranked at 13. The United States has moved up a few places from 33 to 40.

Download the new list in full at <https://bit.ly/3wfAgCR>.



MUD VOLCANO ERUPTS IN GIANT FIREBALL IN THE CASPIAN SEA

A mud volcano has erupted near an oil platform off the coast of Azerbaijan, sending a column of fire into the sky, which was visible across the region, officials and witnesses say.

According to a report by The Guardian, the state oil company Socar said preliminary information indicated

it was a mud volcano. The Azerbaijan Emergencies Ministry has also confirmed the cause was a mud volcano.

Socar said none of its oil platforms were affected by the incident and no injuries have been reported. Socar spokesman Ibrahim Ahmadov was quoted by the Azerbaijani news agency APA as saying the blast took place about 10km (six miles) from the Umid gas field, which is 45 miles (75km) off the coast of the capital, Baku.

Seismologists have reported that the region is home to hundreds of mud volcanoes, which erupt with mud and slurry rather than lava.

INDUSTRY CONSORTIUM PUBLISHES HANDBOOK FOR HYDROGEN FUELLED VESSELS

A consortium of 26 leading companies and associations, led by DNV, has launched the “Handbook for Hydrogen-fuelled Vessels” to address the uncertainties surrounding hydrogen as ship fuel. The MarHySafe joint development project (JDP) aims to create a knowledge base for safe hydrogen operations in shipping.

Green hydrogen could play a crucial role in the maritime industry’s journey towards decarbonization. Many in shipping recognize hydrogen’s potential as a fuel, but the barriers to realizing this potential are substantial. Led by DNV, a consortium of 26 partners and observers have come together in the MarHySafe JDP to examine these challenges. The Handbook for Hydrogen-fuelled Vessels offers a roadmap towards safe hydrogen operations using proton exchange membrane fuel cells (PEMFC). It details how to navigate the complex requirements for design and construction, and it covers the most important aspects of hydrogen operations, such as safety and risk mitigation, engineering details for hydrogen systems and implementation phases for maritime applications.

Some of the main challenges for hydrogen operations in shipping include the current regulatory framework, which is open to interpretation by different stakeholders, existing knowledge gaps on the safe handling, storing and bunkering of hydrogen, as well as the unique properties of hydrogen that make it challenging to work with.

“This handbook provides a comprehensive overview of what companies need to consider with a hydrogen-fuelled vessel, as well as areas that require further investigation and testing before this technology can be taken up on a larger scale,” said Nathaniel Frithiof, Senior Consultant, Environment Advisory at DNV Maritime and Project Manager for Phase II of MarHySafe. “But as MarHySafe progresses, we are working to ensure that the Handbook is much more than a static document, rather a knowledge hub that will be continually updated and will provide a basis for the future development of hydrogen rules.”



Download the handbook at <https://bit.ly/3jJFV1B>.



Transport
Canada
Canada

CANADA'S NEW VESSEL SAFETY CERTIFICATES AND INSPECTION STANDARD IS NOW EFFECTIVE

Transport Canada has published an overview of the new Vessel Safety Certificates Regulations and Canadian Vessel Plan Approval and Inspection Standard. These new regulations came into force on 23 June 2021, and the standard is now effective.

Applying to all Canadian vessels and any foreign vessels in Canadian waters, the regulations specify which vessels require certification and inspection. The standard (TP15456) outlines plan submissions and inspection standards for Canadian vessels requiring a vessel safety certificate.

The new Vessel Safety Certificates Regulations update and modernize old regulations and Canada’s inspection regime. The regulations explain the vessel safety certificate requirements for all Canadian vessels and foreign vessels that operate in Canadian waters.

The new Vessel Safety Certificates Regulations cancel and replace the old Vessel Certificates Regulations, and modernize the provisions formerly found in these regulations. To create a more modern and flexible process, the new regulations cancel the inspection requirements from several regulations and detail them in the new Canadian Vessel Plan Approval and Inspection Standard.

These regulations have been fully cancelled:

- Vessel Certificates Regulations
- Hull Inspection Regulations
- Classed Ships Inspection Regulations, 1988

The sections that deal with plan approval and inspection provisions have been cancelled from the:

- Marine Machinery Regulations
- Hull Construction Regulations
- Large Fishing Vessel Regulations

The Canadian Vessel Plan Approval and Inspection Standard (TP15456) is the standard for plan submission requirements and inspection details.

The standard:

- explains the inspection standards for issuing, endorsing or renewing vessel safety certificates; and
- harmonizes the types of inspections, terms, and certificate periodicity using the International Maritime Organization's Harmonized System of Survey and Certification (HSSC) guidelines, with some Canadian modifications.

Any vessel certificates issued under the old Vessel Certificates Regulations will remain valid until they expire.

Marine Technical Review Board (MTRB) decisions which refer to the repealed regulations mentioned above or repealed sections from such regulations are now invalid. Note that:

- Some of the previously issued MTRB decisions no longer apply to some vessels since inspection standards moved into TP15456 are modernized and largely reproduce what was in the MTRB.
- Transport Canada is reviewing all impacted MTRBs and will be contacting Authorized Representatives and Recognized Organizations to advise of any action that may be required.

And here are the key changes in the new regulations summarised as follows:

1. Definitions

- Added definitions for "inland voyage" and "inland waters of Canada"
- Updated the definition for "sheltered waters voyage" to expand the minimum distance from shore to 2.5 nautical miles

2. Structure

The regulations are split into 3 parts, and 2 schedules:

- Part 1 applies to Canadian vessels
- Part 2 applies to foreign vessels
- Part 3 includes the transitional provision, consequential amendments, related amendments and repeals, and the coming into force provision
- Schedule 1 for sheltered waters by province, and
- Schedule 2 for ferry routes

3. SOLAS Convention vessels from Canada

- Removed references to specific certificates names
- The new regulations refer to "safety certificates" or "any documents" attached to the certificates required by SOLAS
- Added text that requires certificates and related documents to be on board

4. Canadian vessels that are not SOLAS Convention vessels

- Removed the requirement for a vessel safety certificate based solely on the presence of a pressure vessel
- Clarified what types of vessels are not required to carry a safety certificate
- Added text to allow safety certificates to be endorsed
- Added ice conditions to the list of conditions on a certificate
- Provisions are added for the obligation to have certificate(s) and related documents on board

5. Reports and inspections (Canadian vessels only)

- Vessels are now required to report that a deficiency (issue) has been rectified (corrected) to Transport Canada, or a recognized organization
- Vessels are now required to report if they are modified, altered or damaged

6. Foreign vessels (operating in Canadian waters)

- Requirements for Safety Convention vessels to have SOLAS certificates and related documents on board and to be able to demonstrate that the vessel continues to be in compliance with requirements of the SOLAS Convention
- New provision for safety requirements of foreign vessels that are not Safety Convention vessels

7. Sheltered waters schedules

87 sheltered waters have been added.

Click here to read the new Vessel Safety Certificates Regulations: SOR/2021-135 at <https://bit.ly/3hW9Jqe>

Download the Canadian Vessel Plan Approval & Inspection Standard at <https://bit.ly/2WdUIYD>

NEW 228-BERTH MARINA FOR EGYPTIAN RESORT

Walcon Marine Australia is supplying a turnkey marina installation for one of Egypt's premier resort developments, Marassi, located 140km west of Alexandria on its Mediterranean coast. The marina is expected to be fully operational by the end of July.

The project involves equipping a new man-made inner harbour currently being completed with a range of berthing options. These combine finger pontoons mounted on piers with walkways running alongside the harbour walls for larger vessels. The 23 separate docks will accommodate up to 228 leisure craft (up to 45 metres in length), all in fully serviced berths.

"Walcon is delighted to have designed and supplied the marina infrastructure for this high-quality, luxury resort development," comments Walcon Marine Ltd managing director, James Walters.



FIRST NEW SHIPYARD FOR MORE THAN A CENTURY PLANNED FOR LONDON

As part of the revival of water transportation, plans are underway to launch the first new shipyard in possibly a century or more on the River Thames in London. The Port of London Authority (PLA) is seeking written expressions of interest from shipyard operators with proven maritime repair, maintenance, and build capability to develop and operate a new facility on approximately 3.3 acres located at Albert Island Royal Docks London.

According to the PLA, use of the Thames has been growing rapidly in recent years, with increasing passenger services, barge movements, and deep-

sea trade. The planned shipyard forms part of Albert Island, London & Regional's 25-acre, multimillion-pound industrial regeneration scheme in the Royal Docks. The whole area is undergoing significant transformation as London's only Enterprise Zone and presents a unique opportunity for a skilled maritime operator to develop dedicated facilities and highly skilled jobs for local people, serving the UK's busiest inland waterway.

"The Thames has been the centre of a river renaissance over the last decade, with continuing investment in new vessels and services of all kinds. This shipyard opportunity has major significance, as it will put the essential repair and maintenance facilities at the heart of the busy river," said PLA chief executive, Robin Mortimer. "Once developed, it will mean services can be provided swiftly, saving operators time taking vessels to yards off the river and minimizing downtime."

The development of a London shipyard is also in line with wider government moves to reinvigorate shipbuilding in the UK. The Boris Johnson government has outlined several plans and efforts design to reinvigorate one of Great Britain's historical industries. An updated National Shipbuilding Strategy is due to be released later this year, encompassing the broader merchant marine and other vessels, alongside the current strategy's focus on vessels for the Royal Navy.

"Building this new shipyard is a fantastic opportunity to support hundreds of jobs in the UK and forge ahead with the Government's ambition to reinvigorate shipbuilding right across the country," said Shipping Minister, Robert Courts MP.

The 3.3-acre shipyard development at Albert Island is one of three strategic sites in the Royal Docks Enterprise Zone. The shipyard is expected to feature a boat lift and other infrastructure. Under the current plan, they have a target date for operations by late 2023 or early 2024.

THREE INDIVIDUALS TO FACE CRIMINAL CHARGES OVER 2018 STRETCH DUCK 7 BOAT SINKING AT TABLE ROCK LAKE

The captain of a World War II era duck boat and two other employees at Ride the Ducks Branson have been hit with criminal charges in relation to the sinking of the Stretch Duck 7 on Missouri's Table Rock Lake in 2018, resulting in the death of 17 people. The Missouri attorney general's office announced a total of 63 charges against Scott McKee, the boat's Captain, and Operations Supervisor Charles Baltzell and General Manager Curtis Lanham.

According to a probable cause statement, the Stretch Duck 7 was under the command of McKee when it entered Table Rock Lake on July 19, 2018 during a severe thunderstorm warning and later encountered severe weather and rough winds, causing the boat to take on water and sink. Seventeen people died in the accident, including 16 passengers and one crew member.

The probable cause statement alleges that Scott McKee, the Captain of Stretch Boat 7, failed to exercise his duties as a licensed Captain by entering the lake during a severe thunderstorm warning, and failed to follow policies and training by not having passengers affix flotation devices as the boat took on water.

The statement also alleges that Charles Baltzell as Operations Supervisor and Curtis Lanham as General Manager failed to communicate weather conditions and cease operations during a severe thunderstorm warning.

McKee was charged with 17 counts of First Degree Involuntary Manslaughter, a Class C Felony, 5 counts of First Degree Endangering the Welfare of a Child, a Class A felony, and 7 counts of First Degree Endangering the Welfare of a Child, a Class D felony. Baltzell and Lanham were each charged with 17 counts of First Degree Involuntary Manslaughter, a Class C Felony.

Initial findings

The NTSB initial findings that led to the sinking of the DUKW amphibious passenger boat were presented at a virtual meeting on 28 April 2021. They were:

- The Stretch Duck 7's propulsion, steering, and bilge systems operated normally and were not factors in this accident.
- Neither alcohol nor drugs misuse were factors.
- On the day of the accident, the National Weather Service accurately forecasted and issued timely notifications of a severe thunderstorm that would impact the accident location.
- Ride the Ducks did not effectively use all available weather information at their disposal to monitor the approaching severe weather and assess the risk it posed to its operations.
- Ride the Ducks should have suspended waterborne operations for The Stretch Duck 7 and the other last tours of the day in anticipation of imminent severe weather with immediate effect.
- The rapid sinking of the vessel resulted from uncontrolled progressive flooding due to a lack of subdivision.
- When the vessel sank, the closed starboard-side curtain aboard the vessel impeded egress and likely resulted in additional fatalities.
- Initial water ingress to the Stretch Duck 7 was likely from waves rolling over the air intake hatch's spring-loaded damper and intermittently opening it, thereby allowing water into the engine compartment.



*The Coast Guard oversees the removal of Stretch Duck 7 from Table Rock Lake in Branson, Missouri, July 23, 2018.
US Coast Guard Photo*



MAIB CONFIRMS MISSING FISHING BOAT NICOLA FAITH HAS BEEN RAISED AND RECOVERED

Four months after the fishing vessel Nicola Faith went missing with all hands off the coast of Wales, the U.K.'s Marine Accident Investigation Branch confirmed that the vessel was recovered in a unique salvage operation. The MAIB said recovery and analysis of the vessel would help to provide answers to the question of why the fishing vessel was lost.

The vessel departed from Conwy, on the north coast of Wales, on January 27 and was believed to be out to set lobster pots. The vessel was not heard from and the MAIB was alerted to an overdue vessel, prompting the SAR operations. Seven RNLi lifeboats and three HM Coastguard teams searched an area measuring more than 400 square miles but reported no sign of the vessel or its three missing crew members.

In the first stages of the recovery operation, a remotely operated vehicle was used to conduct a final survey of Nicola Faith on the seabed. Evidence including fishing equipment and outlying debris was mapped and collected from the area around the vessel. MAIB said it believes this information will help the team to understand what led the vessel to capsize.

In preparation for the recovery, anchors were set, and salvage pumps were used to remove a large quantity of seawater from the vessel. The Nicola Faith, which weighed 11 tons was raised using a crane barge capable of lifting up to 150 tons from a depth of 140 feet.

"This operation needed to be meticulously planned and executed to ensure that valuable evidence was conserved," said Chief Inspector of Marine Accidents, Captain Andrew Moll. "The purpose of our investigation is to improve safety. The next phase of the investigation will be to establish what events led to the vessel's capsize, the mechanics of how the vessel sunk, and why."

BMA GIVES INSTRUCTIONS FOR THE INSPECTION, MAINTENANCE, TESTING AND SURVEY REQUIREMENTS FOR FIRE SUPPRESSION SYSTEMS

The Bahamas Maritime Authority (BMA) has provided instructions for the inspection, maintenance, testing and survey requirements for firefighting installations and portable fire extinguishers. All inspection, maintenance, testing and survey have to take the relevant manufacturer's guidelines into account. However, certain maintenance procedures and inspections can be performed by competent crewmembers, while others should be performed only by persons specially trained in the maintenance of such systems.

Any aspect of the testing and maintenance of the system which is assessed by the company to be beyond the competence of the company's and ship's personnel must be carried out by a competent specialist maintenance firm. The Company shall ensure that the inspection and maintenance of the whole system meets the requirements of the Recognised Organisation and any recommendations of the installation manufacturer or supplier.

Fixed CO2 Systems

At least once in every 5 year period, control valves of fixed CO2 systems are to be internally examined to ensure they can operate freely.

Alternative fixed gas firefighting media
Alternative firefighting systems may be fitted on board ships, subject to the approval of a Bahamas Recognised Organisation or SOLAS contracting Government.

In surveying the safety equipment on a vessel, Recognised Organisations must verify that:

- All firefighting equipment has been inspected and maintained in accordance with the manufacturer's instructions and the foregoing requirements;
- The manufacturer's maintenance instructions are on board;
- Records of inspections, maintenance and pressure tests are maintained;
- Spare charges or extinguishers.

Read the full article at <https://bit.ly/3heCcr8>

REPORT bites

MSC Mediterranean Shipping Company is introducing an electronic bill of lading for its customers following a successful pilot phase.

MB92, a superyacht refit yard in Barcelona has collected the equivalent of 65,000 33cl plastic bottles, over the past year from two sea bins installed in its facilities.

Byron Bay's iconic Cape Byron lighthouse has been named the 2021 Heritage Lighthouse of the Year by the International Association of Marine Aids to Navigation and Lighthouse Authorities. It received the award for its rarity, aesthetic characteristics, cultural significance and architecture.

"I realise from a service reliability point of view we must do better. It is also in our interests, because today we are consuming way too much fuel, we have too many ships in the networks, too many containers, all as a result of supply chains being stretched," said MSC CEO Soren Toft.

Battery and energy solutions provider Xalt Energy is providing lithium-ion batteries for New Zealand's first all-electric ferry.

A consortium of 26 leading companies and associations, led by DNV, has launched the "Handbook for Hydrogen-fuelled Vessels" to address the uncertainties surrounding hydrogen as ship fuel.

Irish early-stage marine technology firm, Raceix, is working in conjunction with the European Space Agency Space Solutions Centre Ireland on a next-generation shared-positioning system for the recreational boating sector.

The UK Canal & River Trust has worked with boaters and anglers to update and relaunch the Waterway Code to help all those who share the water understand and be considerate of each other's needs.

Amid container supply imbalance leading to shortages, container operators should avoid cutting corners when it comes to structural integrity, cleanliness and cargo-worthiness of those that are loaded, insurer TT Club warned.

The Canadian headquartered Chamber of Marine Commerce does not like new ballast water regulations released by Transport Canada; its president and CEO, Bruce Burrows, has called them "a half-baked solution."

French sailor, Romain Pilliard, is to take on the world's toughest sailing record - around the world non-stop against the prevailing winds and currents - in Ellen MacArthur's former record-breaking trimaran.

Maersk has agreed a contract that will see Hyundai Mipo Dockyards build a 172 meter feeder vessel with a dual-fuel engine technology that will enable it to sail on either methanol or traditional very low sulfur fuel.

A Danish company is the first in the world to certify personnel in accordance with the new recognised ISO/PAS 23678 standards for certification of personnel working with life-saving inspections equipment.

Safety Briefings

INSPECTION GUIDANCE FOR SMALL PASSENGER VESSELS ISSUED BY USCG

The US Coast Guard (USCG) has issued inspection guidance for Officers in Charge, Marine Inspection (OCMI), Chiefs of Inspection Division (CID), and Marine Inspectors for the small passenger vessels (SPV) risk-based inspection program.

USCG continues to conduct statutory inspections on the SPV fleet in accordance with 46 U.S. Code § 3301; however, data analytics provide a new tool and modernized approach to the marine inspection program to prioritize marine inspection resources. Using various computational methods, machine learning-enabled software, and a database of deficiency and casualty information, the Coast Guard developed a model to categorize SPVs based on potential risk for an undesirable outcome.

The CVC-WI-028 "Small Passenger Vessel Risk Based Inspection Program" issued by the USCG Office of Commercial Vessel Compliance (CVC) on 14 June says:

1. The Office of Commercial Vessel Compliance will annually evaluate the output of the risk model and provide a list of vessels and their tier level to internal Coast Guard users on an annual basis. Since a follow-on inspection is associated with a Tier I vessel, CG-CVC will notify owners if their vessel is a Tier I vessel and will only provide further notification in subsequent years if there is a change to the vessel Tier assignment. Each vessel will fall into one of three categories, Tier I, II, or III. An OCMI may recommend to CG-CVC, via a memo through District and Area, that a vessel be moved to a lower tier.
2. OCMI shall ensure that the appropriate MI is assigned to the vessel based upon the tier level and inspection required. The OCMI may continue and is encouraged to use their discretion to identify vessels that should receive an expanded annual inspection. The designated OCMI shall be briefed on the annual inspection results on each Tier I vessel. Initial and re-issuance COIs issued to Tier I vessels under Subpart D of references (a) and (b) shall be signed by the designated OCMI.
3. Inspection Types and Marine Inspector Attendance: The OCMI shall select the appropriate MI based on the vessel Tier (enclosure 1). Further, every vessel, regardless of tier assignment, should be inspected by an experienced MI at least once during a COI five-year cycle to provide a consistent baseline for regulatory compliance. This should occur at the COI renewal inspection. Other inspection requirements, including hull, internal structure exams, and deficiency checks, remain unchanged. The OCMI may conduct additional inspections to increase the frequency of MI attendance or to focus on a particular system at their discretion. The OCMI may expand the scope of the inspection to verify the vessel does not pose a threat to people, property, or the environment.

Read the inspection guidance at <https://bit.ly/3jJsH4N>



INVESTIGATION MAKES SEVEN SAFETY RECOMMENDATIONS AFTER SCANDIES ROSE SINKING

The National Transportation Safety Board (NTSB) has issued seven safety recommendations after the fatal sinking of the fishing vessel Scandies Rose in December 2019. The Scandies Rose was en route from Kodiak, Alaska, to fishing grounds in the Bering Sea when it capsized and sank 2.5 miles south of Sutwik Island, Alaska. The Scandies Rose had seven crew members aboard, two were rescued by the US Coast Guard and five others were never found.

Findings

The added weight from ice accumulating asymmetrically on the vessel and the stacked crab pots on deck, raised the Scandies Rose's center of gravity, reducing its stability and contributing to the capsizing.

Although the crew loaded the Scandies Rose per the stability instructions onboard, the instructions were inaccurate and as a result, the vessel did not meet regulatory stability criteria and was more susceptible to capsizing.

The NTSB determined the probable cause was the inaccurate stability instructions for the vessel, which resulted in a low margin of stability to resist capsizing, combined with the heavy asymmetric ice accumulation on the vessel due to conditions more extreme than forecasted.

The NTSB also identified the following safety issues during its investigation:

- the effect of extreme icing conditions,
- lack of accurate weather data for the accident area,
- the vessel's inaccurate stability instructions and
- the need to update regulatory guidelines on calculating and communicating icing for vessel stability instructions.

Read the story in full at <https://bit.ly/36dY67r>

WHAT TO KNOW ABOUT HATCH COVER MAINTENANCE

In association with McAusland Turner, The Shipowners Club has published advice on effective hatch cover maintenance for dry cargo ships including preventative action against ingress of water. According to the Club, one of the key requirements in cargo vessel operations is ensuring that the cargo is delivered to the discharge port in the same condition in which it was loaded. Despite improvements in the methods for ensuring that hatch covers are weathertight, claims for wetted cargo that has resulted from water ingress through hatch covers are still being experienced.

In order to ensure that hatch covers are closed sufficiently it is vital that the correct procedures are followed every time the hatches are closed and opened. This can be achieved by ensuring that crew are duly familiar with the manufacturer's operating instructions, the company's on-board operation procedures, risk assessments and any other relevant policies related to these operations. Occasionally, charterers or shippers may request that additional measures are taken to seal the hatch covers, regardless of their condition.

Such requests should always be treated with caution as temporary sealing measures such as Ram-Nek tape, expandable foam or tarpaulin (if not part of the vessel's certified design) often imply that there is an underlying defect with the hatch cover securing arrangement. It cannot be emphasized more that these measures should be resisted with charterers, with the best course of action being to demonstrate the weathertight integrity of hatch covers without said additional temporary measures.

Poor maintenance can greatly increase the likelihood of hatch covers failing and leaking during periods of heavy weather. Whilst the hatch cover sealing rubber plays an important role as a barrier against sea water ingress, it is not the only means of preventing water from entering the cargo hold.

While the hatch cover seals themselves may be well maintained, if other parts of the hatch cover sealing arrangement are in poor working condition or compromised, cargo wetting could occur, resulting in exposure to high quantum claims.

The water in this drainage channel should pass through a non-return valve installed at the end point and not through an open pipe or section of fire hose. It must be noted that if a non-return valve is not fitted, heavy seas can flow in the opposite direction, into the cargo hold. These non-return valves should be removable or enable easy access for cleaning to prevent blockage of drainage pipes.

Download the guidance at <https://bit.ly/3jUjEy3>

REPORT bites

X-Press Pearl insurers - the container ship which sank off Sri Lanka in early June causing major pollution - have agreed to pay approximately US \$3.6 million as compensation to the Sri Lankan fishermen affected by the disaster.

A steel cutting ceremony was held recently for the UK Royal Navy's third Type 26 frigate, HMS Belfast, with all three of the first batch of City Class frigates now under construction.

Geomac has announced the development of a brand new marina in Stafford-upon-Avon, due to open this autumn, and to be called the Shakespeare Marina.

A recent Hong Kong typhoon shelter blaze sank at least 20 vessels and damaged 12 more as fire jumped from one vessel to another, prompting renewed calls for authorities to fix long-standing 'structural problems' in marinas.

COVID-19 has exposed the vulnerabilities of the German and EU shipbuilding sectors. "The European shipbuilding industry has been losing market share for decades because of predatory competition in Asia and Europe is not doing anything about it," said Bernard Meyer, MD of Meyer Werft GmbH & Co.

The waterways and wellbeing charity, Canal & River Trust, has been awarded England's first ever international Blue Flag award for the Royal Albert Dock and Salthouse Dock marinas in Liverpool.

The Ocean Cleanup, PADI® and PADI AWARE Foundation™ have announced a global partnership to tackle ocean plastic pollution.

Following the postponement of this year's OSTAR and TwoSTAR transatlantic races to 2022, a small group of determined solo and double-handed skippers set off on their own challenge, the NOSTAR transatlantic.

A team of students at TU Delft in the Netherlands are getting set to compete at the eighth Monaco Energy Boat Challenge with what they call the "first flying hydrogen boat."

Lloyd's Register has agreed to sell its business assurance and cyber security division to Goldman Sachs Asset Management as the company focuses on maritime activities. The deal is expected to be completed during the second half of 2021 subject to regulatory approval.

The Wight Shipyard Company, manufacturer of aluminium marine craft based in East Cowes, Isle of Wight, has been awarded the Queen's Award for International Trade in recognition of its work to increase British exports.

MDL Marina's Green Tech Boat Show is thought to be the first boat show of its kind in the UK. The aim of the show is to allow the marine industry to demonstrate how it's contributing to combatting climate change.

Safety Briefings

AMSA TO CONSIDER CONCEPTION FIRE NTSB FINDINGS WHEN REVIEWING COMMERCIAL VESSEL REGULATORY REQUIREMENTS

Following the NTSB investigation into the fatal fire and loss of the passenger vessel Conception off California in September 2019, the Australian Maritime Safety Authority (AMSA) has identified key points of concern for Australian vessels. As a consequence, they have said it will consider the NTSB report in full when reviewing the current domestic commercial vessel regulatory requirements, including the standards for fire safety and accommodation.

The US-flagged passenger vessel Conception was at anchor off Santa Cruz Island, California, when a fire broke out in the early morning hours of 2 September 2019. Five crew members were asleep in the crew berthing area on the upper deck. One crew member and all 33 passengers were asleep in the bunkroom below. Of the 39 people on board, 34 perished in the incident.

Report findings

The NTSB report drew 18 conclusions, the following of which are considered worthy of note by those persons involved in operating passenger vessels in Australia AMSA says:

- **Although a definitive ignition source cannot be determined, the most likely ignition sources include the electrical distribution system of the vessel, unattended batteries being charged, improperly discarded smoking materials, or another undetermined ignition source.**
- **Although the arrangement of detectors aboard Conception met regulatory requirements, the lack of smoke detectors in the saloon delayed detection and allowed for the growth of the fire, precluded firefighting and evacuation efforts, and directly led to the high number of fatalities in the accident.**
- **The absence of the required roving patrol on Conception delayed detection and allowed for the growth of the fire, precluded firefighting and evacuation efforts, and directly led to the high number of fatalities in the accident.**
- **Conception's bunkroom emergency escape arrangements were inadequate because both means of escape led to the same space, which was obstructed by a well-developed fire.**
- **Although designed in accordance with the applicable regulations, the effectiveness of Conception's bunkroom escape hatch as a means of escape was diminished by the location of bunks immediately under the hatch.**
- **Conception's operator provided ineffective oversight of its vessels' operations, which jeopardized the safety of crew members and passengers.**
- **Had a safety management system been implemented, the operator could have identified unsafe practices and fire risks on the Conception and taken corrective action before the accident occurred.**





FATALITY DUE TO IMPROPER CRANE LIFTING

Belgium's FEBIMA has published an investigation report into the fatality of a crew member onboard the general cargo ship ATLANTIC PROJECT II while in the Port of Antwerp in February 2021. The investigation stressed that the contingency plan on crane lifting operations was not fully implemented.

On February 8th, 2021, stevedores were unloading the MV ATLANTIC PROJECT II while moored at the Port of Antwerp. When tween-deck cargo hold N°3 on PS was empty, the tween-deck pontoons had to be removed by the ship's crew, using ship's gear, to allow access to the cargo stowed below.

After the first pontoon was hoisted and moved using the ship's crane to its stacking position at the aft part of the cargo hold, a crew member was hit by the lifted pontoon. The injured crew member did not survive the impact.

Probable causes

The accident happened because the overview over the path of the hoisted pontoon was lost from the moment the pontoon was lifted from its initial position. Since there was no overview over the path of the hoisted pontoon, it was not observed that a crew member had entered the danger zone between the bulkhead and the hoisted pontoon.

A trained and informed crew member involved in the hoisting operation had moved into the zone where the lifting operation took place without previously having stopped the operation, a clear indication that the contingency plan was not fully implemented and thus contributing to the accident.

No control measures were in place to verify if the stacking position was free of obstructions, such as cargo debris, before commencing the hoisting operation. Absence of such control measures could have led to someone entering the danger zone to rapidly remove any obstructions. Therefore, the absence of control measures therefore is to be considered as a contributing factor to the accident.

Actions taken

On February 18th, 2021, the company issued Fleet Marine Safety Circular N° 01/2021 with subject "Improper lifting operation of crane results in fatality". The circular informed the fleet about the fatal accident and announced actions to be implemented.

Download the report at <https://bit.ly/3yocOon>

WARNING TO INSPECT FAST RESCUE CRAFT LIFEBOAT AND WORKBOAT LIFTING FRAMES

IMCA has received information surrounding an incident in which a lifting frame became detached from a fast rescue craft (FRC) during operations.

The incident occurred when the FRC was attempting to come alongside a vessel in good weather with choppy seas. During recovery, the complete lifting frame detached from the boat. No one ended up in the water, but one member of the crew was pulled up with the lifting frame and fell down into the boat. The crew member sustained only minor injuries. An investigation and checkup of similar boats revealed cracks around the lifting frames.

This was considered a high-priority incident with a potential outcome of multiple fatalities had the frame come loose later in the recovery operation. The subsequent investigation uncovered cracks, delamination and potential weaknesses in the structure of the anchoring of the lifting frame on this type of FRC.

Lessons learned - Surface cracks are early signs, but it is very difficult to assess the severity and any potential delamination as the attachment of the lifting frame is inside the hull.

Actions - In this case, a management decision was taken to cease use of this specific type of FRC and notify the manufacturer immediately.

Surveyors and inspectors are asked to inspect all FRC lifeboat and workboat lifting frames and attachments and to ensure that there is an appropriate focus on inspection and the detection of cracks in planned maintenance systems.

REPORT bites

It's taken over a decade, but it seems plans for Gran Marina del Estrecho, in the straits of Gibraltar, look set to finally become a reality with the contract now signed to enable ground works to begin. The new marina will be one of the most modern in the Mediterranean and is set to become a key base for superyachts.

The new partnership between the Port of Townsville and Australian-based Origin Energy will serve as a crucial use case for ports expanding into development of green liquid hydrogen.

Jersey Lifeboat Association has taken delivery of the fastest inshore rescue vessel in the Channel Islands.

K Line has issued an apology following a second hacking incident during 2021, indicating that shipping is becoming a popular target for cyber criminals.

Norwegian scientists want to launch floating solar power plants. However, the development of water-based installations is not without challenges. The installations must withstand dynamic conditions including waves, wind and currents.

Irish early-stage marine technology firm, Raceix, is working in conjunction with the European Space Agency Space Solutions Centre Ireland on a next-generation shared-positioning system for the recreational boating sector.

An Advanced RotorTug designed for escort duties at the Port of Corpus Christi is the first US commercial vessel to be designed, built and verified using an end-to-end 3D design process.

The Maritime Port Authority of Singapore has announced it will make available a further S\$3.5 million (\$2.6 million) for seafarers and other areas of the industry hurt by the COVID-19 pandemic.

The European Commission has approved €400M under the EU State aid rules for a new Danish aid scheme to support electricity production from renewable sources, including offshore wind and wave energy.

Decarbonisation is the biggest challenge the shipping industry faces now and possibly will ever face, according to Charles 'Bud' Darr, Executive VP Maritime Policy and Government Affairs for ship operator MSC Group.

IMO has adopted a ban on the use of heavy fuel oil in the Arctic region while green groups said the regulations contained loopholes which will allow many vessels to keep sailing without enough regulatory control.

A doubling of detention and demurrage charges during the pandemic has resulted in complaints across the US, Europe and Asia. Some shippers claim they have been charged thousands of dollars, without really knowing why.

Scanstrut has launched the world's world's first 12/24V waterproof wireless phone charging mat. It's said to allow the user to store and wirelessly charge their phone onboard, indoors or outside.

Safety Briefings

FAILURE OR ACCIDENTAL RELEASE OF THE LIFEBOAT HOOKS CAN BE FATAL

Lifeboats are designed to save lives, but over the years there have been many serious casualties that have occurred during drills, routine maintenance operations and inspections of davit suspended boats fitted with on-load release hooks. These accidents have also resulted in seafarers losing confidence in the lifeboat launching systems.

Lifeboat accidents have a variety of causes. Some of the more frequently occurring ones are:

- failure of the on-load release mechanism;
- inadvertent or accidental operation of the on-load release mechanism;
- inadequate maintenance of the lifeboat and its launching equipment. Sometimes the item to be maintained might not be readily accessible due to its location;
- lack of familiarity with lifeboats and the on-load release mechanism;
- unclear operating instructions of the on-load release/resetting mechanism; and
- faulty design.



Broadly speaking the above causes each fall into one of the following three categories: lack of familiarity, procedural inadequacy or faulty design. As for the faulty design, non-compliant hook mechanisms should have been replaced by now, as the deadline for their replacement was 1 July 2019. To address operators' lack of familiarity with the mechanism and procedural inadequacy, more needs to be done. Having a crew that is fully familiar with the lifeboat hook system and the potential failure points would be the starting point. For this the crew should carefully read through the instructions provided in the manufacturer's manual on items such as inspection, maintenance and operation, and if need be, seek clarification directly from the maker.



Figure 1: Fitting has a uniform appearance.

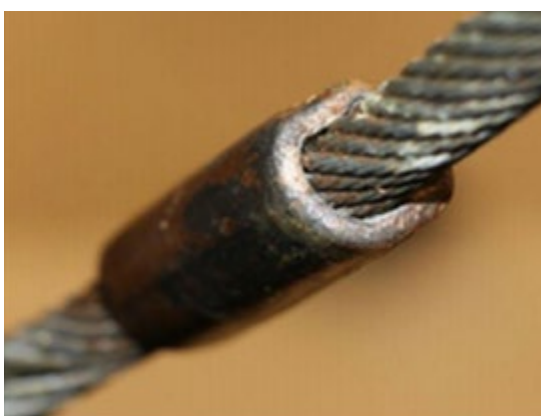


Figure 2: Completed fitting is not "round" nor within manufacturer specifications.

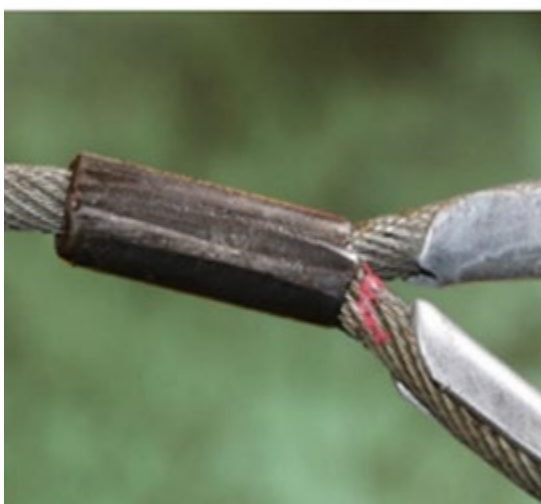


Figure 3: Fitting is deformed with "ridges" of extra material present from over-crimping.

CHECKING FOR FAILED WIRE ROPE TERMINATIONS SAFETY ALERT ISSUED

The US Coast Guard (USCG) has published a safety alert to address the importance of verifying the condition and manufacturing of wire rope terminations that are used in various systems that utilize wire rope in a load-handling capacity (e.g., lifesaving appliances, cranes, lifting slings). The Coast Guard is currently investigating a casualty involving a failed wire rope termination that resulted in extensive damage to equipment.

The Coast Guard has observed that improperly applied swaged fittings could result in unintentional damage to the wire rope, resulting in failure of the termination. Improper swaging procedure includes failures within a quality management system in which materials are improperly selected and do not match the specifications of the original equipment manufacturer.

A separate observation was that different types of fittings/end terminations might decrease the safe working load (SWL) of the wire rope. With this in mind, the type of fitting could affect the safety factor that is required by regulation or recommended by industry standard/practice for the application (e.g., 6:1 for lifesaving appliances launched with wire rope falls). As an example, a swaged sleeve in a common turnback eye results in a 90% or better efficiency of the termination (i.e., 10% or less reduction in the SWL of the wire rope) when properly installed in accordance with manufacturer's recommendations.

USCG strongly recommends that owners, manufacturers, operators and service providers utilizing wire rope in systems on any vessel or OCS facility:

- Visually examine wire rope terminations for abnormalities that may indicate improper installation
- Compare fitting dimensions against the manufacturer's specifications/tolerances for the completed fitting (i.e., does the length and diameter fall within fitting manufacturer specifications); and
- Verify through documentation related to the manufacturing of the assembly that the materials were properly selected and that the termination type does not reduce the SWL of the wire rope below the minimum safety factor for the type of service.

Marine inspectors, investigators, surveyors and servicing technicians are encouraged to maintain an acute awareness to these issues and initiate corrective actions as needed.

Download the safety alert at <https://bit.ly/36EoeJ4>

REPORT bites

There is widespread recognition that cybersecurity vulnerabilities make the maritime transportation system a soft target.

Sarah Treseder is to be the next Chief Executive of the U.K. Chamber of Shipping from October, replacing Bob Sanguinetti when she leaves the Royal Yachting Association.

Speaking at the opening of the new Horizon Cruise Terminal at Southampton, Alastair Welch, Director of ABP, said, "This next-generation-ready terminal strengthens the Port of Southampton's position as Europe's leading cruise turn-around port and is a huge vote of confidence in the future of cruise."

Skippers Canyon Jet Ltd has been fined NZ \$50,000 and ordered to pay NZ \$260,000 in reparations by the Queenstown District Court for a jet boat crash that injured 10 people who had to be evacuated by helicopter.

American maritime classification society American Bureau of Shipping has published a study that demonstrates LNG's potential to help reach low carbon goals in the shipping industry.

The Italian-Spanish shipyard Magonis is on a bid to revolutionise the electric boating market with its new Magonis Wave e-550 which it bills as both smart, efficient, and crucially, affordable.

Global, sector-focused law firm HFW and maritime cyber security company CyberOwl have joined forces to provide comprehensive technology and legal services to the shipping industry around cyber risk management and compliance.

The US Attorney's Office for the Eastern District of Louisiana reports that five more individuals have pleaded guilty in relation to a test score-fixing scheme at the US Coast Guard's Regional Exam Centre.

The Republic of the Marshall Islands has achieved a ranking in the top three on the white list of the Paris Memorandum of Understanding as reflected in the Paris MoU's Annual Port State Control Report.

Speaking to C83, Nick Brown highlighted 'the need for an even louder voice from IACS during this decade of rapid change as new technologies and new fuels need to be thoroughly understood and risks of adoption mitigated against.'

According to Sea-Intelligence's latest Global Liner Performance report, the average delay for container vessel arrivals that were marked as late remains extremely high globally, going up to 6 days.

Correct Craft recently announced its goal of becoming carbon neutral by 2025. The company said it will approach this sizable goal by investing its resources in long term solutions to lower carbon emissions.

Safety Briefings



REPORT ON FATAL CRUSH INCIDENT DURING TRANSFER FROM WORKBOAT BEINN NA CAILLICH TO A FEED BARGE

The MAIB has issued a report into the fatal crush incident involving workboat Beinn Na Caillich. The Ardintoul fish farm assistant manager drowned after falling into the water from a feed barge access ladder during a boat transfer. He stepped from the deck onto the ladder while Beinn Na Caillich was still moving forward and was crushed between the boat and the barge. A fish farm technician on board the barge attempted to stop the injured assistant manager from falling in to the water by holding onto the back of his personal flotation device and oilskin jacket, but the severely injured casualty slipped out of them. Despite the assistant manager being recovered from the water and the determined efforts of the fish farm workers, emergency services, and medical staff, the assistant manager could not be resuscitated.

The investigation concluded that the conduct of the boat transfer had not been properly planned or briefed and was not adequately supervised or controlled.

Safety Issues

- the transfer of personnel by workboat had not been properly risk assessed, and safe systems of work had not been put in place
- the crew on board Beinn Na Caillich were not fully prepared to deal with the emergency situation. They had not conducted regular man overboard recovery drills and were not familiar with the vessel's recovery equipment
- the workboat and fish farm owner of Beinn Na Caillich did not have an effective marine safety management system and lacked staff with the experience to oversee its marine operations

Recommendations

Recommendations (2021/110 and 2021/111) have been made to the owners to apply the standards set out in the Workboat Code Edition 2 to all its existing workboats and, specifically, to fully implement a safety management system across its fleet, as well as ensuring that it has appropriate marine expertise to oversee its marine operations.

Download the report at <https://bit.ly/3dGwxaT>

ARE YOUR CONTAINERS FIT FOR PURPOSE?

At a time of container supply imbalance leading to shortages, international freight transport insurer TT Club warns against cutting corners when it comes structural integrity, cleanliness and cargo-worthiness of those that are loaded. The responsibilities of container operators providing empty boxes and those packing them with cargo should not be forgotten in a period when such equipment is in short supply and temptations to forego security and safety measures are strong.



Containers have numerous touch points in any given supply chain, becoming the responsibility for shorter or longer periods with a variety of stakeholders. During these unprecedented times, TT's continued message to all parties is one of resilience and continuity of robust practices. This challenging period, for those reliant upon the container, provides an opportunity to reflect on the roles and responsibilities defined within the Code of Practice for Packing of Cargo Transport Units (CTU Code), as well as the necessary safety properties of a container and its suitability to carry its intended cargo.

Mike Yarwood, TT's Managing Director, Loss Prevention comments, "The ripple effects of various national lockdowns, interruptions in trade and less predictable peaks and troughs in cargo volumes has resulted in severe imbalances of container equipment," he notes.

"Compounding the challenge, national stay and work at home policies have resulted in unexpected surges in consumer demand particularly for e-commerce goods, translating to beyond peak demand for empty containers in the dominant manufacturing centres of Asia. These circumstances must not be allowed to lead to the widespread use of inferior container equipment or that which does not comply with industry standards."

Tritex NDT Multiple Echo Ultrasonic Thickness Gauges



The Drone Thickness Gauge
Multigaue 6000



The Surface Thickness Gauge
Multigaue 5700



The Underwater Thickness Gauge
Multigaue 3000

Tritex NDT specialize only in the manufacture and supply of Multiple Echo Ultrasonic Metal Thickness Gauges, used for verifying corrosion levels and measuring metal thickness from one side only, without removing any protective coatings.

Tritex NDT gives you the excellent performance that you would expect, with free annual calibration for the life of the gauge.



simple . accurate . robust



BOOK REVIEWS BY LEE WARTIER

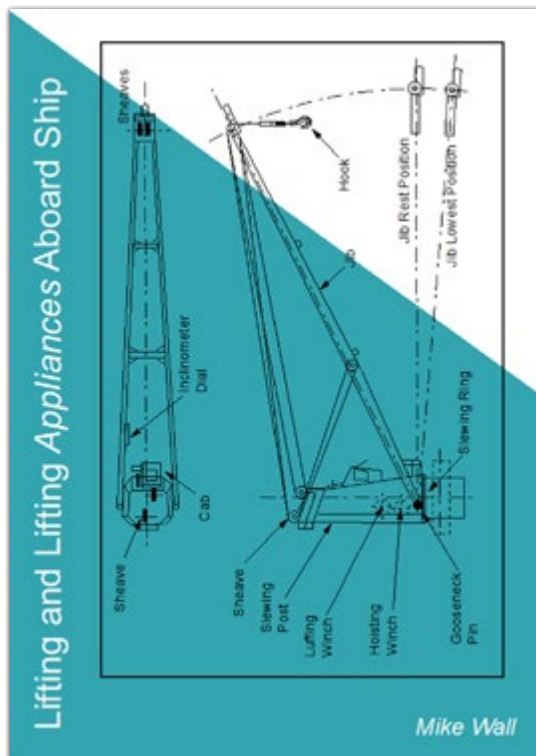
When the office first asked me to make an independent review of Mike Wall's book releases, I readily agreed believing this to be a thirty minute helping hand. That was back in early 2021. Since then Mike's books have now travelled around the globe with me and the mask wearing fraternity that we now find ourselves joining in airports, lounges and aboard planes. It has forced me off the liquid refreshment and my head into whatever books I carry. Mike's two books; 'Lifting and Lifting Appliances Aboard Ship' and 'Supercargo Operations – An Introduction' have kept me entertained in the most godforsaken places, worse still by the pandemic forcing the closure of most airport bars and eateries and my apologies, for both are now a little dog-eared but I've tried my hardest to maintain their original presentation.

Lifting and Lifting Appliances Aboard Ship

I'll start with 'Lifting and Lifting Appliances Aboard Ship'. In my 20+ years of experience in cargo surveying and superintendency I have seen all manner of lifting devices, heavy lift ships and shore based terminal rigs. I believed some of the discussion to be a little out of date as one would expect from the old sea dog himself though I impressed myself immensely when a recent condition survey instruction forced me to come face to face with a set of Velle Derricks. The fact that I had the book in the footwell of my car shoreside gave me the arsenal in which to win my argument with the Chief Mate who simply referred to the pair as Derricks. "No no my good Chief", I said, as my smile widened for the only time that day - it was not the best seagoing example I've been on.

So out of date? Certainly not and highly relevant in many aspects of general cargo and shipboard operations on other vessel types. All carry gantries, winches and cranes of some description allowing the ship to conduct basic tasks; down to offloading trash or loading spares / stores and simply lowering the gangway. Mike has covered all aspects here and what the ship's crew can do to maintain condition in general use and routine inspections. Obviously, a well-run ship with its safety management system fully in force and up to date will hopefully already be one step ahead but this text makes for great reference to a ship's officer in setting the standards when

implementing, undertaking or even improving the management system in place. More so, the budding surveyor needs an ever extending library of reference texts and this is an excellent book to assist in the learning of lifting gear and equipment inspection; what to look for, how and where with integration to the legal aspects and current legislation. Any surveyor involved with ships on/off hire, pre-purchase or generic condition surveys on any commercial vessel would benefit from a stock copy. Being a fellow author, in my case with the IIMS Diploma programme, I ponder if the text of this book would make for an excellent assessed module. Food for thought...



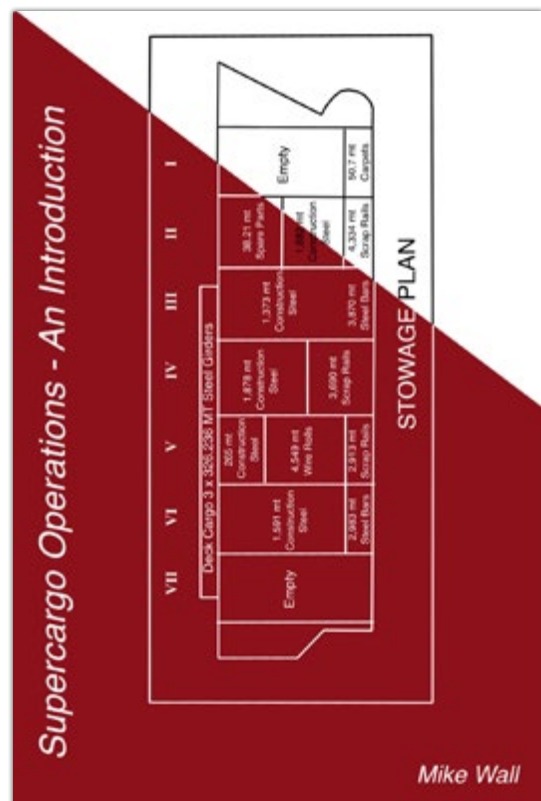
'Lifting and Lifting Gear Aboard Ship' by Mike Wall, self-published December 2020. Cost US\$120 + P&P. ISBN: 978-616-577-283-9. Size: 9" x 6" x 346 pages

Supercargo Operations – An Introduction

The 'Supercargo Operations – An Introduction', yes all 568 pages of introduction (I can't wait for the detailed full version!) covers a diverse range of cargo operations from bulk to breakbulk, liquid to solid and some special project work thrown in for good muster. Having worked as both a Supercargo and Cargo Surveyor on numerous occasions this text was right up my street and easily won the fight against this year's Love Island offering. There are many sections personally relevant to my day-to-day work particularly heavy lifts, yacht shipping and the interaction between all the parties on the deck of a ship. The multi-role individual be this the surveyor, or the supercargo (or even current ship's crew) would all

be able to take something here. Access to check lists for reassurance and the back up at that vital pre-planning stage, this book has it all and is a worthy companion on any practicing cargo surveyor's shelf.

The author has surpassed himself on many levels with this creation drawing on his years of experience to highlight some of key pitfalls of the industry; even down to the tiniest detail such as the impact of ships security or handheld VHF. Two quite understandable but not obvious items without the prior planning of which can quickly bring an operation (or certainly your involvement in it) to an abrupt halt. The background information based on cargo sampling, quality assurance, documentation and reporting is sound. This book gives a great introduction to readers on the various strategies for different types of cargo, the basic principles of lifting, stowage and lashing and the regulations that tie it all together.



Having worked with many supercargoes that are effectively promoted stevedores it is clear that whilst the practice or industry is effectively unregulated with no real qualification other than experience, I feel this type of text would make an excellent assessed qualification and the IIMS Education Board should perhaps seriously think about the potential to keep Mike busy for a few years yet (Sorry Mike!).

Both texts I've reviewed in brief and it is clear my school days are not yet over. One cannot recommend such books more highly and I for one will certainly be looking at similar examples to boost my own position in industry.

Lee Warltier MIIMS
Sterling Global Marine Limited

'Supercargo Operations - An Introduction' by Mike Wall, self-published January 2021. Cost US\$140. ISBN: 978-616-577-534-2. Size: 9" x 6" x 568 pages

For more information and to order copies go to <http://www.mikewallassociates.com> or email mikewallassociates@gmail.com.

HE ASKED... SHE REPLIES

In the last issue of the Report Magazine, Jeffrey Casciani-Wood invited Karen Brain to give a comment on the following when he wrote:

Perhaps the most common of the errors that I have seen over the years is the use of so-called reported dimensions not measured ones. I should point out that the marine surveyor's report is a legal document and therefore requires a content that he/she has measured, weighed, tested, or examined, whatever, not what he/she has been told by a third party who may, or may not, have given him/her valid and correct information. Reported dimensions are hearsay and, as such, are not admissible in Court, except under very special circumstances.

The precise definitions of the principal dimensions of a boat up to 24 metres length are given in the publicly available document ISO8666, a copy of which should be in every small craft marine surveyor's library. I would like to see Karen Brain's comments on this paragraph.





Karen Brain, Matrix Insurance Ltd., accepted Jeffrey's invitation and has replied as follows:

Most of the claims we see arise from:

- not checking, or rather not being able to evidence checking of something on a vessel;
- commenting in a way that infers something about a part on a vessel that should not be commented on e.g. condition of an engine;
- the general construction of a report, its content and unfortunately sometimes, the use of the English language; it is also sometimes evident that surveyors do not understand what needs to be said in a report to cover the client's expectations and the surveyor's duty of care.
- what their findings really mean in terms of potential expenditure to the client in the future i.e. are they aware it could be thousands of pounds of work needing to be done - if known, or suggesting they may wish to consider engaging a professional to check and provide a quote.
- and one that frequently gives rise to claims is not drawing to the attention of purchasers to the requirement, including timescales, of further checks required by other professionals – the hull is frequently a problem area.

As Jeffrey mentions, sometimes surveyors do not check facts and rely on information from unsubstantiated sources. No surveyor should accept a third party's figures and/or information to use in a report to a client unless it is from a paid professional, preferably paid for by the surveyor, to provide them with the figures and/or information, or alternatively you are looking at setting out and agreeing contractual terms to ensure the surveyor is exempt from liability for any losses resulting from the use in their report of figures and information provided by a third party – a caveat.

I will not mention terms and conditions here, but they are also very important and this would be a lengthy article in its own right. But it is equally important to state in a report to a client what has not been looked at and why - maybe reference to terms and conditions, or stating clearly the reason, such as perhaps being unable to access a specific area. It is always good to include suggestions for checks the client may wish to consider, for example, before purchasing a vessel e.g. engaging an electrician or an engineer to check certain things, or perhaps have a boat yard check the hull.

Sometimes timescales are omitted from a report, for example, to ensure the client understands the urgency to have something checked on a vessel.

Surveyors should advise clients if they have used third party information and its source and state whether it can potentially be relied upon, or should be checked, and they may wish to mention any consequences, particularly with fishing vessels and length.

You could, as Jeffrey has said, call them simple errors and in fact interestingly the majority of claims against professionals in other professions, such as solicitors and accountants, could be deemed simple errors e.g. just not checking facts and reliability of sources of information.

Hearsay is a very interesting topic on which there are a substantial number of books written, so I will not go into that area of law.

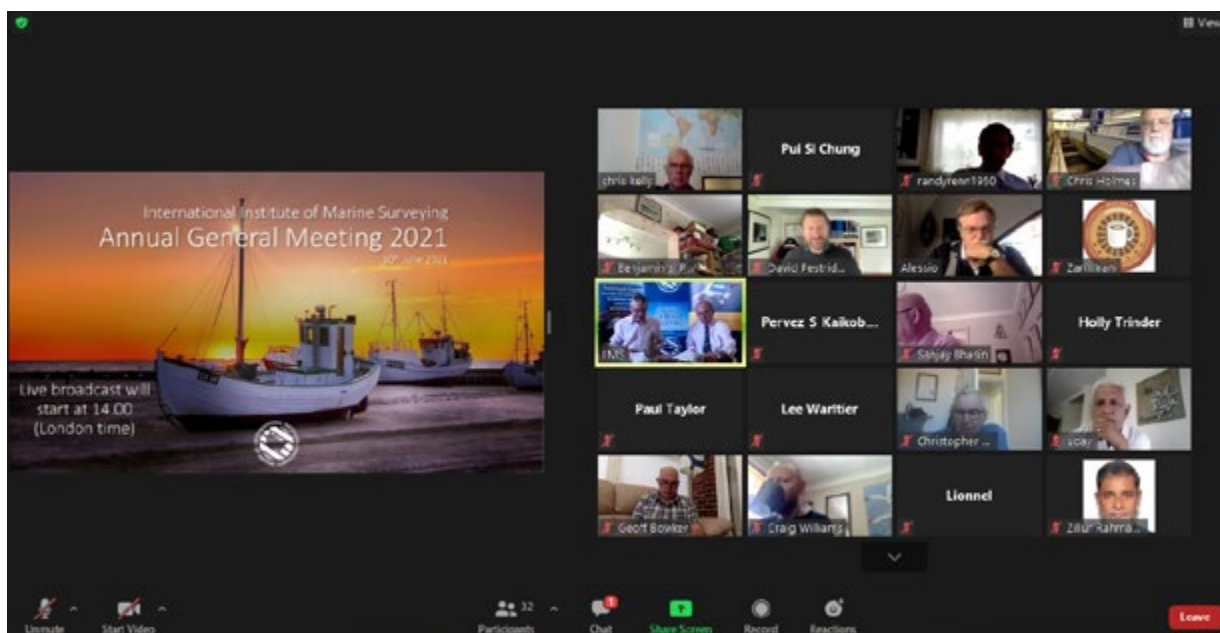
I hope readers of the IIMS magazine find the above of interest and helpful.

Karen Brain
Managing Director – solicitor non-practising
Matrix Insurance Services Ltd



Matrix Insurance Services Ltd -
Provider of professional indemnity
scheme for IIMS members

Tel: 01892 724060 | enquiries@matrix-ins.co.uk



AGM 2021 AND 30TH BIRTHDAY CELEBRATIONS WELL ATTENDED

A healthy number of members joined IIMS online on 9 June 2021 for some frivolity to celebrate the Institute’s anniversary followed by the more serious business of the Annual General Meeting 2021.

The formal 30th birthday celebrations took place over lunchtime immediately prior to the Annual General Meeting. Duncan William bedazzled those who were online with his amazing and frankly unbelievable cyber magic and was an instant hit. Just how did he do that? We will never know. And the 30-minute video that was compiled especially for the IIMS by the five strong Portsmouth Shanty Men was well received.

Videos of the AGM and the 30 minute musical set by the Portsmouth Shanty Men are now available to view on a private playlist on the IIMS YouTube channel. Access and view the two videos at <https://bit.ly/3vwOyi9>.

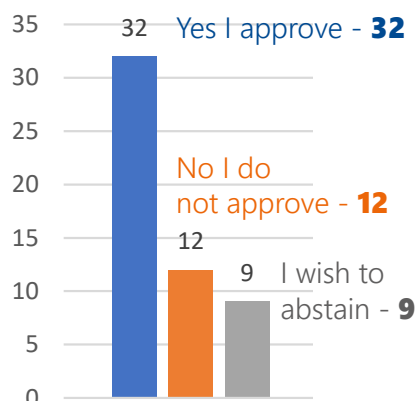
The results of pre-AGM voting on three proposals were as follows:

a) Proposed fee structure for 2022 membership



Motion carried and the membership fees will increase as per the proposal from 1 January 2022.

b) Proposal to increase the Continuing Professional Development points from 10 to 15



Motion carried and the CPD requirements will increase to 15 points from 1 January 2022 and a new points table will be issued.

c) Re-election of the Executive and Management Boards en-bloc



MURRILLS HOUSE FOUNDERS PLAQUE TAKES PRIDE OF PLACE

Nearly 40 members and supporters of the Institute have come together over the past 18 months or so to help with the cost of the renovations to Murrills House in a crowdfunding initiative. A sum of nearly £20k was raised and thanks are due to all those who generously donated to a good cause.

Constructing the new plaque was held up by Covid-19, but it is now proudly displayed in the redecorated Board Room at Murrills House.

Thanks are due to IIMS member, Geoff Bowker, who made the tiles at a very reasonable cost out of light oak wood. The plaque will remain in pride of place for as long as IIMS occupies the building.

As mentioned, the Board Room has been freshened up. There was also a need to produce a new Board for future Presidents. The first one is full of the names of 15 past Presidents, but current President, Geoff Waddington, has the new board to himself - for now!



MEMBERSHIP TOPS 1,000 FOR THE FIRST TIME

IIMS has recently passed the 1,000 member mark for the first time in its thirty year history. And there are nearly another 50 applications being processed and



under review by the Professional Assessment Committee. This is something of a milestone and certainly worth celebrating. The timing could not have been more perfect either as this achievement coincided with the Institute's 30th birthday celebrations just a couple of months ago.

THE IIMS HEAD OFFICE TEAM AS YOU RARELY SEE THEM

In recent years, the IIMS head office team has headed to the New Forest in Hampshire for an overnight team building event which has proved to be beneficial and popular.

The pandemic last year made this impossible. So, it was with much anticipation that the group assembled at the end of June - an opportunity for the team to reconnect in person for the first time as a group for over 18 months.

Freedom to roam in the open space of the forest meant social distancing was not an issue. Ticks however were, and several of the team picked up a few from the lush long grass!

To start proceedings, the team undertook some trust challenges. This led on to an exercise involving two canoes and a set of complicated instructions that needed to be worked through before the task could be successfully completed. The result was that all individuals finally found themselves on the other side of the lake.

The evening BBQ was well prepared and fun. President, Geoff Waddington (who lives close by the venue) joined the group for a while. Sleeping arrangements overnight were mixed with some choosing the relative comfort of a shepherd's hut, whilst others opted for hammocks or simply slept close to the campfire on the ground. The following morning the group reassembled to review business objectives and successes; and to think about future IIMS strategy. To round off the event, the group undertook the high wire challenge, which as the photos show, proved to be a challenge.

Commenting on the event, Vicki Loizides, the newest member of the IIMS team, said, "The New Forest Outdoor Centre hosted us for two days of adventure, with canoeing, high wire climbing and sleeping under the stars in hammocks. Taking us out of our comfort zones to unite us as colleagues and friends, we reflected both personally and professionally on the past year with tears and laughter around the campfire. A wonderful way to get to know this incredible team, and myself a little bit more too."



SPOTLIGHT ON THE IIMS WEBSITE: MARINE RESOURCES AND MARINE LINKS

Go to the main Marine Resources page at <https://bit.ly/3cJss5w>.

Searching the internet for specific information can be a thankless and time-consuming task as we all know and not always successful. It might be one simple piece of information you are seeking and sometimes even Google just does not cut it. When the architecture was first scoped out for the IIMS website, the aim was to provide links to a series of valuable resources, some of which are not so easy to find, in one central place.

The result was the Marine Resources page which has been meticulously put together slowly over the years. It has just had a significant makeover. The main page categorizes links to nearly 200 valuable websites and pdfs full of essential free information for marine surveyors.

From the main Marine Resources page, the sub-categories that can be selected are:

Business Management Resources - go to <https://bit.ly/3wzaSsE>.

There are just half a dozen links here for now to help you with managing your business, but expect the list to grow.

Corrosion Guidance - go to <https://bit.ly/3clLuiU>.

A great place to visit if you are seeking technical help on corrosion types. This page offers links to 9 different corrosion resources, many written for the National Corrosion Service, including cathodic protection, a guide to conservation of metals and bimetallic corrosion.

Enclosed Space Guidelines - go to <https://bit.ly/3wuYudr>.

On this page there are 7 links to important information about the dangers of entering enclosed spaces.

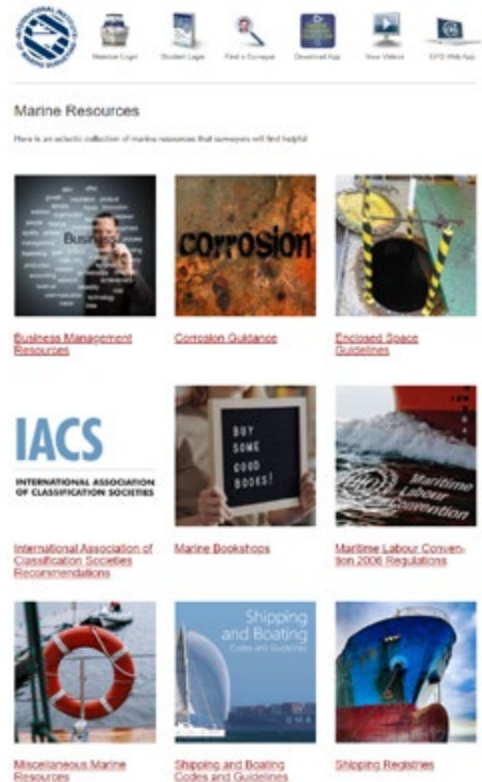
International Association of Classification Societies Recommendations - go to <https://bit.ly/3gELnPY>.

IACS has produced a wide selection of material, but the ones most relevant to marine surveyors (14 in total), can be found on this page. They include, amongst others, the Duties of Surveyors under Statutory Conventions and Codes and Guidelines for Surveys Assessment & Repair of Hull Structures (container ships).

Marine Bookshops - go to <https://bit.ly/35ov18Y>. Here you will find links to 7 sites where a range of marine books are sold online.

Maritime Labour Convention 2006 Regulations - go to <https://bit.ly/35pUvTI>.

This page offers links to 14 specific parts of the convention covered by MINs, MGNs and MSNs.



Miscellaneous Marine Resources -

go to <https://bit.ly/3iLnFEk>.

Just a small collection of 9 links to resources that we could not find a home for in the other categories!

Shipping and Boating Codes and Guidelines -

go to <https://bit.ly/2RZyW98>.

One of the most valuable resources, this page links to nearly 50 essential shipping and boating codes, including the Polar Code, UK Hire Boat Code, Marshall Islands Yacht Code and Workboat Code edition 2.

Shipping Registries - go to <https://bit.ly/3q0OnKE>.

On this page are links to 21 shipping registries worldwide.

Tonnage Regulations - <https://bit.ly/2TFJLhi>.

This page offers a link to The Merchant Shipping (Tonnage) Regulations 1997.

Also in the past month, the **Marine Links** page has been updated with plenty of new links of value to marine surveyors ranging from maritime regulators to essential marine industry associations. There are more than 130 links to browse. Click to view **Marine Links** and be sure to bookmark the page for future reference at <https://bit.ly/3xRBtIG>.

If you would like to suggest links to other valuable free resources that you think are worth sharing with other members, please suggest them to IIMS and they will be included.

IIMS LAUNCHES A NEW MEMBER BENEFIT – THE VINTAGE BOAT MODEL DATABASE

Finding historical data and facts about boat models that were constructed decades ago, but which are still on the market and come up for survey from time to time, is a real challenge. With that in mind, IIMS has gathered a valuable resource featuring reviews and original specification information of what are now vintage boat models going back, in some cases, as far as the late 1980s. The original reviews and boat specifications are available to download for each vessel in pdf format. The current stock of more than 100 boat model's editorial and specifications will grow over coming months to many hundreds, so bookmark the page, which can be viewed on the IIMS website at <https://bit.ly/3z89DI2>.



Fairline 38 Phantom



Falcon 23



Fleming 50



Flying Fox Horizon



Goldfish 32 Sportcruiser



Jaguar 42

SECOND MARINE CORROSION PROFESSIONAL QUALIFICATION COURSE IN NOVEMBER OPEN FOR BOOKING

The first Marine Corrosion Professional Qualification course, which commenced in mid June, is nearing completion. Most delegates so far have opted to take the content in video catch up format followed by the online test. Several delegates have successfully passed the modules delivered. We have experienced some self-inflicted delays in rolling out and delivering the other modules. These is simply to give Mike Lewus time to perfect the content, which has taken longer to prepare than estimated. We are open for bookings on the second course, which will broadcast live in November. Study can be done via the live lectures or on catch up by video afterwards. For more information go to <https://bit.ly/39PG3qG>.



NEW WHATSAPP GROUPS LAUNCHED FOR MEMBERS



Over the past 18 months, IIMS has experimented with and successfully launched 14 free WhatsApp groups for students and some members in the UK and West Africa - and is now launching more...

Connecting via an IIMS WhatsApp group is an additional well of knowledge and networking resource only available to members. It is an opportunity for professional networking, to share ideas, or to ask for advice from other members who work in your territory.

The initial group, launched for UK Inland Waterways surveyors, has less than 20 members, yet it is a busy channel and regularly used as a way to check regulations, share images for other opinions, and to impart news to one another.

IIMS moderates all groups from the UK and there is a set of guidelines and rules surrounding the use of the groups and this will be made available to those who choose to join.

The Institute has recently launched WhatsApp groups for Australian members:

- Australian Yacht & Small Craft surveyors
- Australian Cargo & Commercial Ship surveyors



You can join either or both depending on the type of work you do.

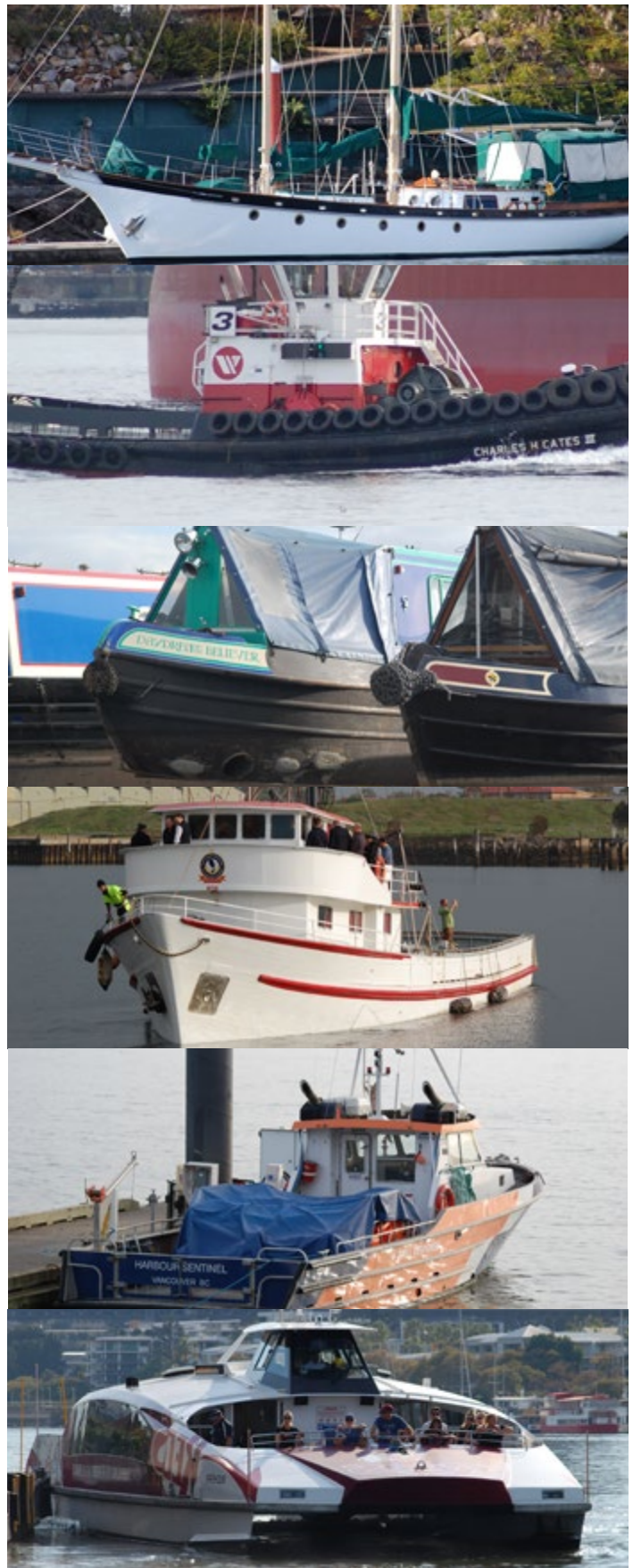
Soon we plan to launch groups for Canadian members - look for your invitation to join.

- Canadian Yacht & Small Craft surveyors
- Canadian Cargo & Commercial Ship surveyors



Similarly, you can join either or both depending on the type of work you do.

If you would like more information or wish to join these WhatsApp groups please send a request directly to Holly Trinder at info@iims.org.uk.



Obituary: Capt. Marazban P. Karanjia, 1932-2021

by Allen J. Fernandes

Capt. Marazban Pestonji Karanjia, MPK as he was fondly called, was a true professional and a thorough gentleman. All who knew him will remember him for his thoroughness and professionalism as a marine surveyor, traits he tried to impart to all those who were under him or associated with him during his long surveying career, spanning more than four decades.

In appreciation of his long-dedicated service and significant contribution to the marine surveying profession, Capt. Karanjia was awarded honorary membership by the International Institute of Marine Surveying UK in 2010.

After training in the Dufferin (1948-1950), Capt. Karanjia joined the Scindia Steam Navigation Company and served as a Merchant Navy Officer in various capacities from 1951 to 1960. He then came ashore and was an Executive Officer on Training Ships "Naulakshi" and "Mekhala" from 1960 to 1969, responsible for imparting training to Merchant Navy cadets and other personnel.

He then moved on to the US and took up marine surveying as Principal Surveyor with General Surveying Company, Philadelphia, but soon returned to India to start his marine surveying career in Mumbai, initially with J. B. Boda Marine and General Survey Agencies from 1971 to 1981. He then co-founded Seascan Services Pvt. Ltd. and was Director/Principal Surveyor in charge of the Marine & Cargo Division from 1981 to 1999. Thereafter, he was a Consultant and Principal Surveyor at Stewart Surveyors & Assayers Pvt. Ltd. and Alex Stewart International, from 2000 until his retirement in 2012.

Those who under him or interacted with him will recall his deep sense of dedication to the marine surveying profession, always with the highest level of integrity and professionalism, which gained him tremendous respect in the industry. Whether it was the Ship Owners or Charterers, Shippers or Receivers, Cargo Underwriters or the P&I Clubs or their local

correspondents, they all sought his advice on various issues pertaining to Cargo inspections and Loss minimization. In his marine surveying work, especially in the 70's and 80's, he interacted closely with the Mumbai Port and it was a familiar sight to see Capt. Marazban Karanjia at 8.00 am in the morning in the docks, attending ships and cargo inspections, before proceeding to the office.

One issue which was a bug bear for marine surveyors in those days comes to mind. It was very difficult to obtain

permission for photography within the port premises, requiring port and police permission for carrying a camera into the port and a police constable had to be present while the photographs are being taken, a set of photos given to the port and so on. One can



imagine the delay in obtaining such permission and meeting all the port requirements, but Capt. Karanjia always pursued this issue with the port authorities to the highest level and it is through his efforts that the port photography permission, that initially would take 2-3 days, could be got the next day. This made things easier, especially in the case of cargo damage in the port warehouses and transit sheds, where the cargo had to be cleared or moved away the next day.

A disciplined approach, an eye for detail and a factual and technically correct description of the incident or cargo damage, is what Capt. Karanjia always taught us, with the saying that "You are the eyes and ears of the client, who is sitting miles away" and unless your Survey Report is clear and in detail, with all supporting documents and photographs, it will not serve the purpose for which you have been appointed. He always stressed on the importance of detailed notes in our 'rough diaries', as he would say that in case of an investigation or enquiry, it is these notes in the surveyor's rough dairy that would be relied upon and would stand as evidence in a court of law.

Capt. Karanjia had stood as 'Expert Witness' in several investigations and enquiries and would warn us that the opposition party would 'take your pants down' if you did not know your subject or had not done your homework, so maintain your records well was his motto. He was a wonderful teacher, and many have benefited greatly from his experience and knowledge.

After his passing away I have spoken to many of my colleagues, who have been taught and some 'moulded' by him in the early years of their surveying career and who have now gone on to achieve high positions in the marine surveying and inspection business. They all remember him for his disciplined

approach to the job and his sound work ethics. Also, what stood out was his absolute sense of punctuality, with no tolerance for being late and blaming it on the proverbial 'Indian Standard Time,' whether it was an official meeting or social gathering, Capt. Karanjia was there well on time and smartly turned out – we would remark on his shoes, always polished to a shine that 'you could see your face in'. Many remember his work diaries, which would have every small detail about the job recorded, underlined in red and blue and highlighted. In those days, in addition to the volumes of Visiting Card albums that he would maintain, his diary would also have clients and associates' names, contact details, etc. including the date, time and place that he had last met them. He would often refer to these diaries years later and rattle out a person's names, dates and timings related to a particular survey job or meeting, which we had long forgotten.

Capt. Karanjia always stressed the need to understand the fundamentals of surveying and to know your role as a surveyor while undertaking an assignment, so that you do not overstep your function as a surveyor nor underestimate the job that you are required to do. Another great attribute of Capt. Karanjia was that he had a heart of gold. He was always eager to help anyone in need, be it professionally or otherwise. He was always willing to share his knowledge and vast collection of information – in those days maintained in books and files, which he kept meticulously, labelled and updated from time to time.

We will all remember Capt. Karanjia for the great professional and wonderful human being that he was. May his soul rest in peace.

Allen J. Fernandes

Obituary: Monday Ogadina 1963 - 2021



Reacting to the recent sudden death of Monday Ogadina MIIMS, Mike Schwarz, IIMS CEO, writes, "Monday's sudden passing was a great shock, both to me and to those who knew him in the West Africa area. Monday was the IIMS Regional Director in West Africa for a number of years and respected by those who encountered him.

Whilst I cannot claim to have known him well, it was clear from the time I spent in his company that he was both a gentleman and a knowledgeable, well connected marine surveyor. Prior to the pandemic, Monday was a regular attendee at the Institute's London Annual General Meetings and contributed fully at those events. We talked about how to develop the Institute's presence in the West Africa region and he was a passionate supporter of the Institute and its aims.

Monday will certainly be missed by those who knew him in West Africa and further afield." **RIP Monday Ogadina**

RECENT NEW IIMS MEMBERS

Full members

'Buddy' Ronald Bramwell	MIIMS	Namibia
Oli Byles	MIIMS	UK
Philip Carter	MIIMS	UK
Matthew Fenton	MIIMS	Hong Kong
Richard Franklin	MIIMS	UK
Franklin Gutierrez	MIIMS	Philippines
Noel C Kimmayong	MIIMS	Philippines
Denis Korolkevich	MIIMS	Russia
Ian Lardner	MIIMS	UK
Johannes Schutte	MIIMS	South Africa

Affiliate members

Gord Cooney	AffIIIMS	Canada
Pramod Dwivedi	AffIIIMS	Ireland
Fintan Keating	AffIIIMS	Ireland
Yuce Mert Koseoglu	AffIIIMS	Turkey
Craig Mitchell	AffIIIMS	Netherlands
Lee Ottery	AffIIIMS	UK
Tony Tufft	AffIIIMS	UK
Yevgen Yaremachenko	AffIIIMS	Ukraine

Associate members

Krishna Murthy Bharadwaj	AssocIIMS	India
Panagiotis Konstantios	AssocIIMS	Greece
Carlos Montamarta	AssocIIMS	Spain
Robert Paine	AssocIIMS	USA
Stuart Richardson	AssocIIMS	UK

Graduate members

Murray Kirzinger	GradIIMS	Canada
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IIMS congratulates Murray for completing his studies in the IIMS Advanced Qualification in Marine Surveying

Emiliano Parenti	GradIIMS	Italy
Jo Rees-Howell	GradIIMS	UK

IIMS congratulates these students for completing their studies in the IIMS Professional Qualification in Yacht & Small Craft Marine Surveying

Chigozie Odumodu	GradIIMS	UK
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IIMS congratulates Chigozie for completing their studies in the IIMS Professional Qualification in Cargo and Commercial Ship Marine Surveying

The Synthetic Rigging Revolution Continues

—
Further advances
in the synthetic
rigging technology
and application
—

An update by **Nick Parkyn**

This article provides further insight into advances in synthetic rigging and the ongoing evolution of this technology.



“Wire rigging is, after all, the attempt of a previous generation to do with wire what they had previously done with rope. A couple of hundred years later, we are just running things the other way.”

- Brion Toss

Spectra® / Dyneema® is fibre rope and is the most used and most suitable for both standing and running rigging on yachts. Spectra® and Dyneema® are UHMPE fibres (Ultra High Modulus Polyethylene, also known as UHMWPE or Ultra High Molecular Weight Polyethylene) and is available in several different grades which all have excellent fatigue resistance (cyclic bending), UV and abrasion resistance.

Vectran™ is a high-performance multifilament yarn spun from liquid crystal polymer (LCP). Compared to Spectra® and Dyneema®, Vectran™ exhibits no creep, so it does not permanently increase in length overtime when kept under load. This makes it a preferred choice over Spectra® / Dyneema® by some yachtsman for halyards, runners, and other applications on racing yachts where no creep is important to maintaining a constant amount of tension.

Vectran™ has been used for several years in a covered form for cores of ropes. Since the strength of Vectran™ degrades very quickly when exposed to Ultraviolet (UV) light, it should be used in a covered form where the cover is tightly woven and of a fibre that exhibits good UV resistance.

Recently Vectran™ used in an uncovered form has been used in applications where no creep is required on racing dinghies. Users of uncovered Vectran™ should be aware of the fast degradation and reduction in strength caused by exposure to UV light. Vectran™ rigging should be removed when de-rigging the craft and stored in a dark closed container or similar storage to prevent any unnecessary exposure to UV light (even indoors). Consequently, the service life of uncovered Vectran™ is difficult to determine as it is based on duration of exposure to UV light, so it is prudent to limit exposure and replace it regularly even if there are no signs of wear. Spectra® / Dyneema® still represents the fibre of choice for most standing and running rigging applications.

Synthetic Lifelines

Spectra® / Dyneema® is becoming increasingly popular for lifelines. It is lighter, more flexible, and has a much longer service life than wire.

The options are whether to use:

- covered or uncovered line
- what thickness to use.

Often this choice is decided for you by the sailing authority of your country who will specify what they approve. Yachting New Zealand Safety Regulations, for example, specify requirement for covered core and minimum core thickness. The 2017-2020 Yachting New Zealand Safety Regulations read as follows:

“If fibre used instead of wire e.g., single braided Dyneema®, Spectra®, Vectran™, Dynex® or similar, there can be no tolerance for wear. **Material must be protected from U.V. and chafe by a sheath.** The sheath can be taken as an overbraided core over the main load member of the same material or another type of material. The strength of the fibre must be equal to or greater than that of the appropriate stainless-steel wire”.

Figure 2:
Whipping on lifeline rope for chafe protection

Covered Spectra® / Dyneema® rope is supplied by several manufacturers including:

New England Ropes

WR² with 100% Dyneema® fibre cover and core. This rope is the perfect wire rope replacement for lifelines and selected standing rigging.

Armare

Lumina Lifeline with SK99 Dyneema® core and SK78 Dyneema® cover

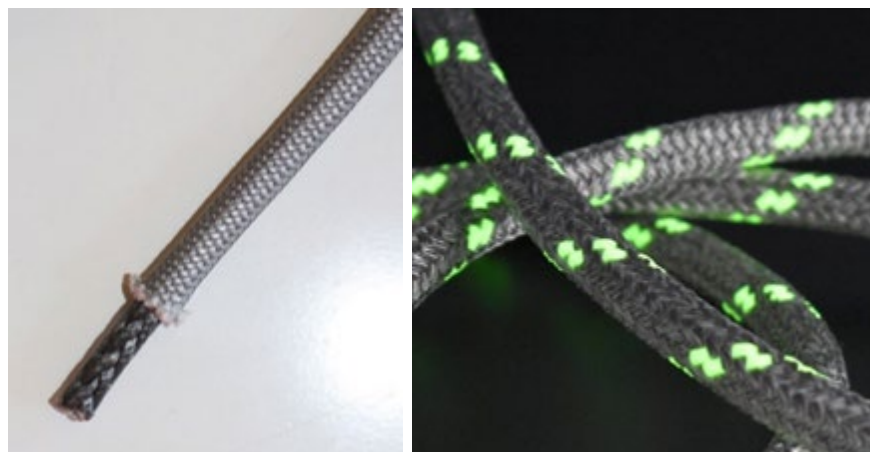
This rope is purpose built for lifelines and is innovative as it has luminescent inserts which glow in the dark. The glow-in-the-dark inserts make the lifeline visible even at night, improving safety and making movements easier on the deck during night-time navigation.

years) the uncovered Spectra® / Dyneema® rope will still be many times stronger than the stainless-steel lifeline wire it replaced.

The strength of Vectran™ degrades very quickly when exposed to UV and is NOT in my opinion suitable for lifelines even in a covered form. Even covered Vectran™ is not immune from UV degradation as some UV light does penetrate the cover.

Where covered or uncovered fibre lifelines pass through stanchions, they can be protected from chafe with a whipping of polyester or similar line (figure 2). If this protection gets damaged due to chafing, it is easily replaced.

Figure 1:
New England Ropes WR² (left)
Amare Lumina lifeline rope(right)



Technically covered (sheathed) fibre rope construction is not essential for Spectra® / Dyneema® lifelines from the aspect of UV degradation as it exhibits good UV resistance, however uncovered fibre lifelines of these fibres must have chafe protection where the cable passes through the stanchions. While UV degradation reduces strength of the Spectra® / Dyneema® rope over time, the initial strength of the fibre rope is around five times that of the stainless-steel wire it replaces. Even after worst case UV degradation during the service life (three

Bobbins

Bobbins for Loops (figure 4) developed by Armare differ from the rigging thimbles and ferrules (figure 3) due to their wider groove, allowing the fitting of loops when used for both running rigging and standing rigging and to obtain optimal distribution of the load on lashings. They can be used with loops, strops and spliced on ropes. The greater width of the bobbin allows for better D/d ratios and less loss of strength in the lashing line when they are used as terminators for lashings.





Figure 3: Ferrule

blocks. However, when used with ropes with conventional covers, friction is slightly higher, and operation is not optimal.

Consequently, Fineline in New Zealand has created Fineline Control 2.0 rope (figure 6) especially for this application. Designed with input from Olympic Gold Medallist and Emirates Team New Zealand Americas Cup Helmsman Peter Burling. Fineline Control 2.0 comprises high strength Dyneema® fibre SK78 core with lightweight Dyneema® fibre polypropylene blended cover. The Dyneema® in the cover reduces the friction loss and provides excellent performance where covered Spectra® / Dyneema® rope is required for cleating of running rigging. Static blocks, ring ferrules and bobbins are not suitable for mainsheets or running rigging which are constantly adjusted as the heat build-up damages the hard anodized surface.



Figure 4: Bobbin by Armare

They can be used for running, standing rigging and to obtain optimal distribution of the load on lashings, replacing blocks when the rope undergoes little sliding, such as the vang cascade system, backstay cascades, etc. They can be used with loops, strops and spliced on ropes.

Line Deflectors

Deflectors developed by Armare (figure 5) are a new alternative to thimbles or ferrules is applications like spinnaker sheet tweakers, Barber Haulers, Jib clew, Up and Down control lines and any other uses you can dream of. The line to be deflected passes thru the tubular section and the control line eye splice is formed around the tube in the groove.

Frictional Losses and choice of rope

Frictional losses in static blocks, ring ferrules and bobbins are low when using low friction line such as uncovered Spectra® / Dyneema® allowing excellent performance for most applications). Static blocks, ring ferrules and bobbins are also lighter, less expensive, and less prone to failure than conventional



Figure 5: Line Deflectors by Armare



Figure 6: Fineline Control 2.0 Rope

Stretch Equivalent Sizing

When replacing stainless steel standing rigging, it cannot simply be replaced with Spectra® / Dyneema® fibre rigging of the same diameter. The diameter of the fibre rigging is based on Stretch Equivalent Sizing which is not simple to calculate. An app to calculate Stretch Equivalent Sizing (figure 7) has been developed by the author and will soon be available for Android, Apple and desktop Personal Computers from the Google and Apple app stores.



Figure 7: Equivalent Stretch Sizing Calculator

Further information and understanding of synthetic rigging can be gleaned from the IIMS Marine Surveying Reference Guide Book *“What a marine surveyor needs to know about synthetic (composite) yacht rigging”*. The book is available in paperback or downloadable pdf format – see <https://bit.ly/3fBv14r>.



Finnish marine insurance company **Alandia** works with promoting **safety at sea** both through **digital innovation** and **dedicated and diverse Loss Prevention** work

The marine insurance company Alandia is an insurance company with focus on Marine, Cargo and Pleasure Craft insurance. With over 80 years of experience Alandia provides superior marine insurance expertise and claims service to its customers by creating long-term relationships in a committed and accountable way. Headquartered in Aland islands and with offices in Helsinki, Stockholm and Gothenburg Alandia employs approximately 120 professionals.



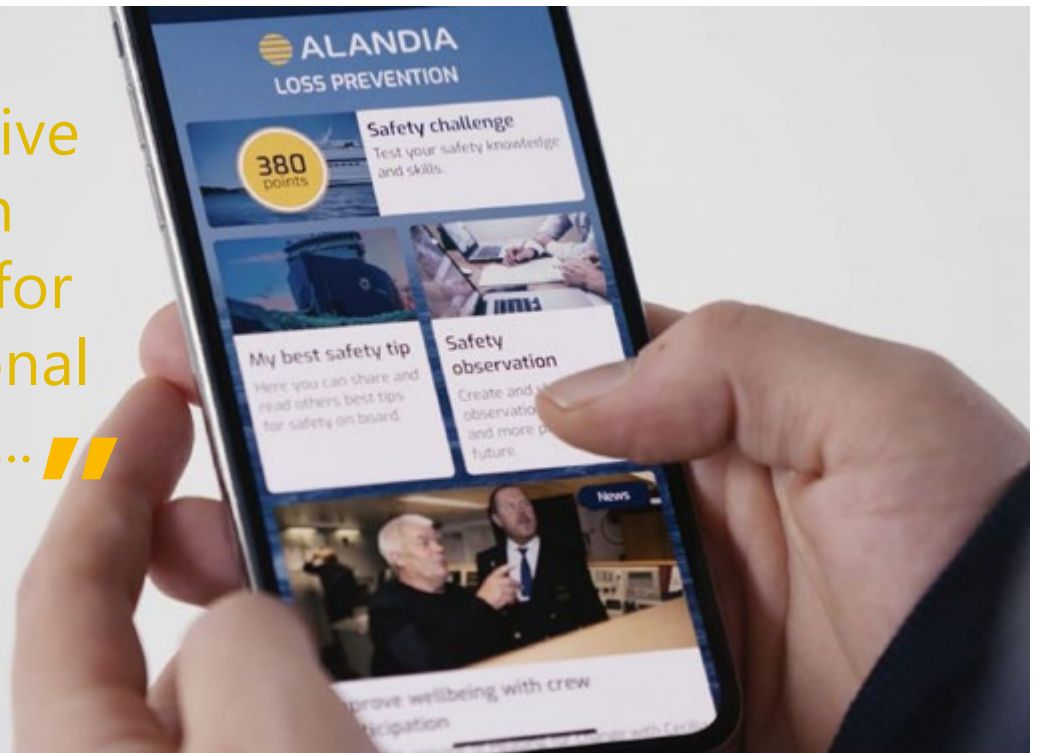
Left: Captain **Martti Simojoki**, Senior Loss Prevention Manager



The company has a dedicated Loss Prevention team of two, consisting of Captain **Martti Simojoki**, Senior Loss Prevention Manager and Ms **Johanna Kull**, Loss Prevention Executive.

The team has a solid knowledge in human factors, global shipping, ship management and marine insurance. It offers training tools for professional safety in marine operations and help recognise which elements are required to make an operation safe. "We work closely with our customers to assist them in taking control of risks, minimising their potential liabilities, and thus helping them maintain a sustainable business. An operational culture that helps companies succeed is important to us.", says Martti Simojoki.

“...innovative hands-on solution for professional mariners...”



New mobile application for minimising losses and keeping operations accident free

On April 19, 2021, Alandia released a solution for minimising losses and keeping operations accident-free – a mobile application designed by the Loss Prevention team.

The Alandia Loss Prevention mobile application offers an innovative hands-on solution for professional mariners for transforming everyday routines into truly proactive safety management.

As we know, proactive maritime safety management requires efficient communication, regular reporting, and up-to-date safety know-how. Alandia, has therefore developed a mobile application to help foresee and prevent any accidents that might involve a vessel, its crew, or any damage to the marine environment.

“The main purpose of the Alandia Loss Prevention application is to minimise losses and keep operations accident-free by enhancing

communication and integrating safety observation reports into daily routines,” says Martti Simojoki.

The benefits of the application are two-fold: while it works as an important reminder of safety matters and an engaging tool for safety education for Alandia’s customers, it also helps Alandia’s own Loss Prevention team to understand the needs and challenges of their customers.

“The reporting feature of the application enhances communication and increases awareness of the complex causal relationships between vessel operation procedures and professional safety,” Simojoki explains.

Furthermore, the application collects anonymous statistics and safety tips from vessels around the world, which enables Alandia to identify various risks and to use the data to improve safety.

“Collecting and sharing data from a large number of vessels enables further risk identification and analysis, which allows employing proactive countermeasures well in advance,” Simojoki concludes.

An API integration makes it possible for Alandia’s customers to integrate the application directly into their own ITC infrastructure.

The App’s quiz function keeps one’s safety know-how up-to-date

The app includes a quiz function through which the user can collect points for oneself, or one’s team in the “Safety Challenge”. The Safety Challenge feature of the app is a new and engaging way to keep one’s safety know-how up to date. With the help of a familiar quiz function the Safety Challenge turns important safety information into a gamified form. Collecting safety points works as an important reminder of safety matters as well as an engaging tool for safety education.

The App encourages to make reporting a daily routine with safety observation

The “Safety Observation” reporting feature of the app is designed to enhance communication within the customer’s organisation and to increase awareness of the complex

causal relationships between vessel operation procedures and professional safety. The Safety Observation is an easy way to report if an accident almost happened. You can also share your best safety tips with other users through the app. All the reports and tips from vessels around the world are anonymously available in the app. These statistics create a wealth of broad know-how and an additional means for identifying risks and improving safety for all the users.

Extensive instruction- and material package included

The more users app has the more effective it is. Therefore, Alandia has created a set of materials to make it as easy as possible to start using the app. These materials include a user manual for Captain and Chief Officer, information package for the shore personnel and posters for the vessels with download instructions.

Alandia is collecting user feedback on the app

Alandia had a selected group of customers to test the Alandia Loss Prevention app in advance to get helpful comments and development ideas from real users. The feedback has been remarkably constructive and positive.

The public feedback Alandia has received so far includes shipping companies Destination Gotland, VG-Shipping Ltd, and Rederi Ab Eckerö:

"I think the app seems to be great, and I think it is useful for our company"

Captain **Mattias Elisson**,
Destination Gotland

"The app has many useful functions; I believe the most useful for us is the safety observation module"

Fleet manager **Lassi Eloranta**,
VG-Shipping Ltd.

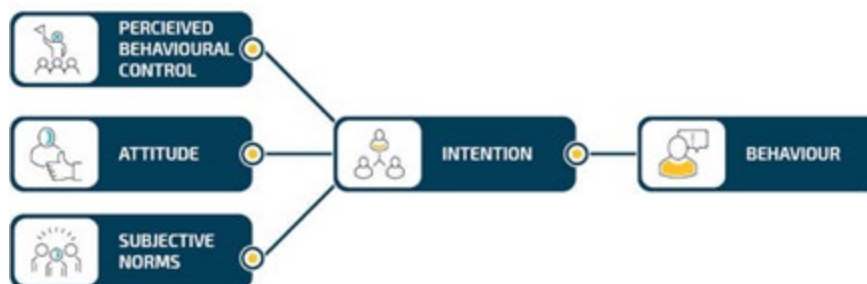
"It is very nice and appealing and will certainly be popular with the younger generation who 'live with apps'"

DPA/CSO **Sten Rosenqvist**, Rederi Ab Eckerö

Beside focusing on the digital solutions and apps, the Loss Prevention team at Alandia concentrates on promoting a safety culture all over the industry to foster a professional safety and operational culture that helps the customers succeed.

One of the key focus points is human behaviours and maintaining a professional safety mindset, the other is focusing on crew well-being and occupational safety.

Cyber security behaviour



Investigations into factors affecting cyber security have shown that when it comes to maintaining security in cyberspace, human behaviour tends to be the weakest link. Companies often have compliance strategies and systems for their shore personnel and vessel crews, but – as we know – being compliant is not necessarily synonymous with being secure. This is partially because cyber security is situation-dependent and as such may only be maintained by taking the right action at the right time. In addition, maintaining secure conditions requires adequate resources, knowledge, motivation, and an attitude that helps promote cyber security. Even if we provide personnel with all the right resources, will we succeed in helping shore organisation and crew members sustain the optimal mindset for maintaining cyber security?

1. **Perceived Behavioural Control:** Do the personnel and crew feel that they can follow instructions? Do they have the right knowledge and tools? Do they feel maintaining cyber security is a part of their role in the company?
2. **Attitude:** What attitudes are there in the company towards cyber security? Is it deemed important? Company culture affects individual attitudes.
3. **Subjective norms:** Some team members acting in a certain way can cause others to follow their lead. For example, if several members upgrade their computer system every second week, other team members will experience social pressure to do so regardless of whether it is a written rule. If the social rules seem logical to individuals, the chance is even greater that each person will follow the suit.

The instructions, attitudes and social rules lead to intentions that in daily work become actions. These actions, in turn, represent the cyber security behaviour of a company.

What can be done to encourage the right behaviour?

- **Communication.** Communicate with all employees in the company with clear and up-to-date information.
- **Cyber security culture.** Include a cyber security perspective in company working culture: facilitate discussion workshops and leader development, streamline communication from a cyber security point of view.
- Intranet or company internal channels updates. Highlight the importance of cyber security regularly on the intranet or through other internal channels.
- Training in known real situations. Make sure that cyber security training is anchored in practical daily working tasks.
- Memory support. Visual training is good for spreading awareness. Storytelling is a good way to support memory. Crowd-source and share cyber security-related work experiences among employees.

- **Regularity.** It is not enough to remind your personnel and crew once a year about the existence of cyber security. Integrate cyber security information into daily routines to boost awareness.
- **Practical guidelines.** Compile a simple list of cyber security best practices for the personnel and crew. Include instructions for exactly what to do as well as how and when to do it.

Occupational health and safety are also an obvious, prioritised theme for Alandia Loss Prevention.

Occupational health and safety

Working onboard vessels carries an increased risk of occupational accidents. There is, depending on source, a ten to twenty times higher risk for fatality than for any other industry.

According to available statistics the current global death toll at sea is 2500/year! However, most accidents do not lead into lethal injuries.

The most common injuries among seafarers are:

- Strain, sprain, or twist
- Foreign object in the eye or body
- Crush or trap injury
- Bruising, burns, cut or piercing injury
- Striking injury
- Fractured or broken bones

The typical circumstances for these accidents to occur are slips, trips, and falls when moving around the vessel. These account roughly 50% of all onboard accidents.

The most dangerous operations onboard:

- mooring
- handling of heavy or unwieldy objects
- working over the side
- engine maintenance at sea
- working aloft
- cargo related work
- entry into enclosed spaces.

"Another, not yet solved, symptom in the maritime industry is the inadequate reporting (dark figures), lacking details and the lack of reliable global statistics when it comes to non-lethal injuries and near-misses. Some of the challenge might lay on the cumbersome reporting systems and regimes, blame culture, and lack of organisational safety commitment. The good news is that there are solutions and positive examples to overcome these particular challenges!", says Martti Simojoki.

First of all, we must establish what safety and just culture is.

Safety = The sum of technical, human, and organizational factors that allow fail safely.

A Just culture = An atmosphere of trust where people are encouraged (even rewarded) for providing essential safety-related information, but they are also clear about where the line must be drawn between acceptable and unacceptable behaviour – James Reason

Having just culture, safety oriented and committed ship management, pro-active risk identification and management, feedback and actions on reported events allows "safe failures" and everyone wins at the end of the day.

"In order to minimise the unknown and unexpected frequent, simple and relevant reporting is needed. Everyone makes 5-6 mistakes each hour, therefore the only way to pro-actively manage risks is to speak up and report them. A near miss report is a gift to the organisation!", Simojoki concludes.

There are several, fit for purpose, reporting systems and schemes. One, purpose built for shipping, is the ForeSea's IRIS system – widely used by Nordic ship owners.

Apart from organisation and systems the safety "hardware" on the vessel ought to be the everyday normal; PPE (Personal Protective Equipment), helmets, safety goggles, Hi-Viz clothing, protective clothing, fall arrestors, signage, and restricted use of mobile devices when at risky work.

For the hardware and safety systems to work "in real life" it is paramount that the systems, equipment, and feedback are simple and communicated in two-ways. The end user is the expert what works and what does not.



SMART SHIPPING HAS ARRIVED



By **Joshua Flood**

Source: Joshua Flood, Senior Research Consultant, Valour Consultancy

One thing is certain within the maritime industry, smart shipping has arrived.

However, what most people will think and ask is... “What is Smart Shipping?”

After speaking to range of different players in the ecosystem; I will endeavour to try and provide some understanding of this.

Smart shipping, ship digitalisation, maritime IoT, maritime digital applications; all these terms essentially refer advancements in ship operations, maintenance, performance optimisation via the use of technology and broadband communications.

Over the course of developing our latest report on smart shipping – The Future of Smart Shipping and Maritime Digital Applications, we discovered a plethora of opinions and interpretations about the aforementioned terms from a variety of players in the ecosystem.

Valour Consultancy defines a smart vessel as any vessel with applications to cover remote machinery diagnostics, CCTV/ video connection services, predictive maintenance and cloud-based storage. To achieve this, the vessel must have broadband connectivity capabilities such as VSAT or cellular, and a vessel management system.

However, proclaiming how many smart ships are operating around the world is challenging as this category is catered for by a multitude of players for each of the above components.

Furthermore, for example, Samsung Heavy Industries (a ship

builder) constructs a merchant vessel and deploys its SSI solution, sells the vessel to CMA CMG, who purchase several pieces of equipment from ABB and Wartsila, then also add some additional IoT services from Marlink, its connectivity service provider, and also subscribing to a data analytics company, such as NAPA.

Each of the parties will claim a sale, or subscription service for this one smart vessel. As such, calculating the total number of smart ships is rather challenging because if we were to sum each smart ship subscription or service, it would amount to a very high number indeed misrepresenting magnitude of the market.

Key Suspects

Presently, the maritime equipment manufacturers hold the majority of smart shipping services, with companies such as Kongsberg, Wärtsilä, and ABB being quick to extend their digital offerings to existing business operations. For example, as widely publicised, Kongsberg has been heavily involved in the Yara Birkeland, an autonomous container vessel currently being completed and commissioned in Norway. Although the subject of this piece is smart shipping, this element is a key step in the evolution, ultimately, to autonomous vessels.

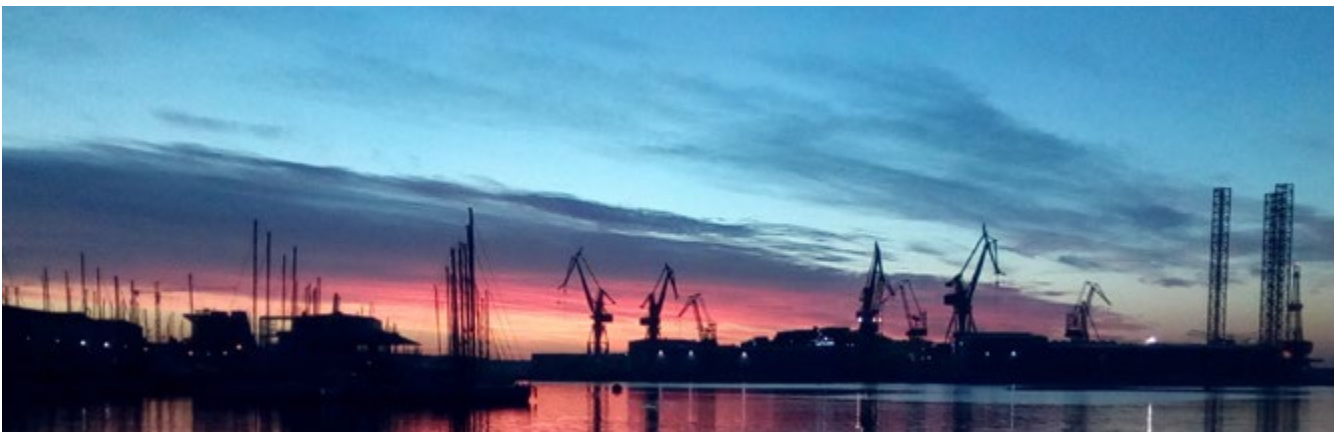
Kongsberg's intelligent digital platform, Kognifai, enables 3rd party data analytics companies to bring their solutions to a much larger shipping fleet. In addition, one of the company's key smart shipping and IoT solutions is "Vessel Insight Benchmark". The new application aims to provide ship metrics and data insights to improve a vessel or a fleet of vessel's performance and was launched in the middle of 2020. The maritime digital application looks to provide a data-driven insight into the vessel operating profile compared to vessels of similar size and type. The service is based on common definitions and high-quality data that provides an instant historic perspective. It is understood 37 per cent of the firm's maritime revenues are recurring basis. The firm had more 30,000 vessels with vessel insight installed.

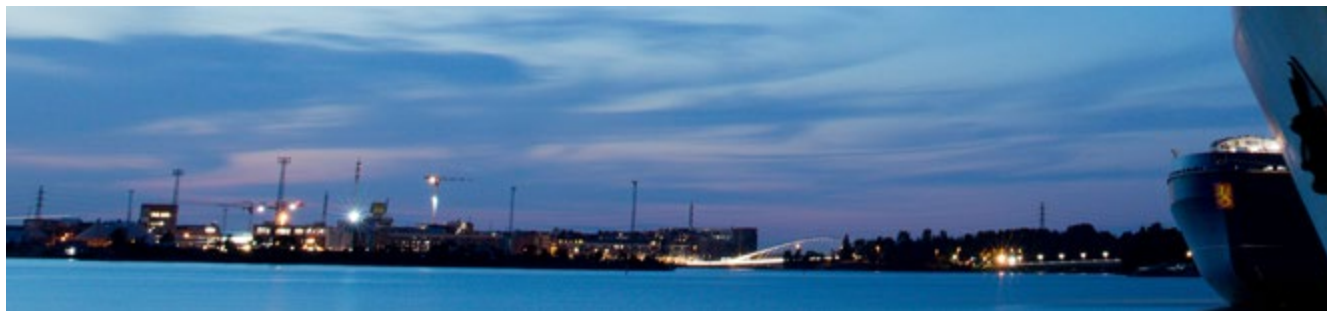
The Finnish company, Wärtsilä, defining its products and services within the smart shipping realm in itself would be a 50,000 word thesis focusing upon operational efficiencies and cost savings. However, a short summary includes the firm serves Anglo-Eastern's fleet, more than 600 vessels, with its Fleet Optimisation Solution, a digitalisation suite that enhances efficiency and performance via route optimisation, speed management, weather routing, ship-to-shore reporting, and fleet performance management to reduce fuel consumption. Other services offered include a new online platform that allows companies to manage their installations more efficiently, and the remote accessibility of experts. This tool leverages artificial intelligence and advanced diagnostics to remotely monitor equipment and systems in real time. The firm has quickly transformed its business model to a SaaS rather than traditional CAPEX business model. Consequently, managing the lifecycle of an asset has become paramount and performance gains are achieved via upgrades, fuel conversions, and using data analytics and artificial intelligence to support its customer business decisions. Even by the end of 2019, the business of equipment sales to service revenues were equally split.

ABB launched ABB Ability in 2017, digital portfolio that offers hundreds of digital solutions to increase productivity and safety cost effectively. The solution is part

of an integrated global network of round-the-clock operations centres that can take care of the full scope of ABB systems on board vessels from afar. Remote diagnostics of shipboard equipment has become a key feature of shipping over the last decade. Sensor-driven onboard monitoring software that fully integrates with analytics ashore plays a central role in facilitating this approach and ABB believes that there are clear maintenance savings available to owners that commit to its package as digitally connected on-duty engineers can solve cases remotely 24/7.

Traditional connectivity providers such as Inmarsat, KVH Industries and others are also embracing the smart shipping revolution. For example, Inmarsat now provides dedicated IoT and operational service called Fleet Data. The service or digital ecosystem enables 3rd party data analytic vendors or other solutions to "plug-in" their applications for Inmarsat's FX vessels. This could be simply to aggregate data functions allowing the user of the service to easily view, monitor, analyse and compare performances of vessel operations. Inmarsat has made Fleet Data available to all its FX and FB vessels – more than 40,000 vessels. The service is offered on a yearly subscription basis and it is estimated that the basic package starts from \$1,000 per year, however, costs obviously vary upon the application's data usage from a bandwidth and capacity standpoint.





KVH provides a similar stand-alone IoT service which it launched in June 2019. The solution has three modes: Watch Flow, for 24/7, machine-to-machine (M2M) data delivery compatible with all IoT applications; Flow Intervention for a boosted data capacity and speeds for bulk file transfers, application updates, and general access to the onboard endpoint. Remote Expert Intervention is an on-demand high-speed session for remote face-to-face support and remote equipment access. The company hopes KVH Watch service enable hardware manufacturers, data analytic companies and other IoT service firms to have their own dedicated VSAT terminal.

The Watch Flow plan starts from as little as \$99 per month and customers do not need to purchase an AgilePlans subscription for the IoT service. The price of the plan is primarily dependent on the number of sensors and data requirements of the user.

As stated above, many companies are addressing elements of the smart shipping market in different ways. This patchwork of solutions is a start but still in the primary stages of development.

The availability and price of ship satellite connectivity is much

better than, say, 5 years ago, and, providing simple solutions to streamline processes onboard a vessel is easy to translate into operational and financial gains.

It is expected that a swarm of bigger companies will develop holistic system solutions that will provide a complete oversight and co-ordination for all the software inputs feeding it. These may be companies outside of the maritime sphere.

Market Dynamics

Satellite connectivity is becoming ever more cost effective. It's highly commoditized and we will see a raft of mergers and acquisitions in the next 18 months within the maritime connectivity sphere.

One natural strategy for service providers and operators will be to include and upsell more value-added services. Cybersecurity protection and IoT solutions will become focal services in the next two years. Services providers will likely generate more than 40 per cent of their revenues from these new services rather than the connectivity airtime within this period.

We will also see it as much more common practice for hardware companies, such as Wartsila

or Kongsberg to own their communication terminals onboard customer vessels. Control and accessibility of their resources will be more critical than ever. KVH Industries will likely see some strong upsides from this trend.

Valour Consultancy's key takeaways

1. The initial stages of the smart shipping evolution are now fully developed.
2. A concise and clear definition of a smart vessel is possible, how many smart ships sailing the oceans is still unclear. However, there are many smart shipping solutions being used.
3. Following the last point, the number of maritime digital applications has exploded, and hundreds of vendors are pushing their services.
4. Large number of acquisitions will be undertaken by the leading companies of hardware manufacturers and service providers.
5. Service providers will become kingmakers in this field by 2026 onwards, we believe they will quickly purchase the leading 3rd party maritime analytic companies.
6. The end game is autonomous vessels.

About Valour Consultancy

Valour Consultancy is a UK-based provider of market intelligence services. Founded in 2012, the company has grown rapidly and is renowned for its comprehensive

and high-quality research and consultancy services. Having firmly established itself in the aviation space, where many companies rely on its expert insight and analysis, Valour Consultancy has successfully expanded into

a number of other markets including, maritime, industrial, drones, police and enterprise body-worn cameras, consumer electronics and more.

Website:
www.valourconsultancy.com

Huge Spike in Shipping Containers Lost at Sea



An opinion article by **Ann Koh**, Reporter at Bloomberg.

Containers piled high on giant vessels carrying everything from car tires to smartphones are toppling over at an alarming rate, sending millions of dollars of cargo sinking to the bottom of the ocean as pressure to speed deliveries raises the risk of safety errors.

The shipping industry is seeing the biggest spike in lost containers in seven years. More than 3,000 boxes dropped into the sea last year. The accidents are disrupting supply chains for hundreds of U.S. retailers and manufacturers such as Amazon and Tesla.

There are a host of reasons for the sudden rise in accidents. Weather is getting more unpredictable, while ships are growing bigger, allowing for containers to be stacked higher than ever before. But greatly exacerbating the situation is a surge in e-commerce after consumer demand exploded during the pandemic, increasing the urgency for shipping lines to deliver products as quickly as possible.

“The increased movement of containers means that these very large containerships are much closer to full capacity than in the past,” said Clive Reed, founder of Reed Marine Maritime Casualty Management Consultancy. “There is commercial pressure on the ships to arrive on time and consequently make more voyages.”

After gale-force winds and large waves buffeted the 364-meter One Apus in November, causing the loss of more than 1,800 containers, footage showed thousands of steel boxes strewn like Lego pieces onboard, some torn to metal shreds. The incident was the worst since 2013, when the MOL Comfort broke in two and sank with its

entire cargo of 4,293 containers into the Indian Ocean.

In January, the Maersk Essen lost about 750 boxes while sailing from Xiamen, China, to Los Angeles. A month later, 260 containers fell off the Maersk Eindhoven when it lost power in heavy seas.

The need for speed is creating precarious conditions that can quickly bring disaster, according to shipping experts. The dangers range from stevedores incorrectly locking boxes on top of one another to captains not deviating from a storm to save on fuel and time as they face pressure from charterers, they said. One wrong move can put cargoes and crew at risk.

The chances for mishaps are increasing as exhausted seafarers face deteriorating conditions during the pandemic. Allianz Global Corporate & Specialty estimates that human error contributes to at least three-quarters of shipping industry accidents and fatalities.

Almost all the recent incidents have occurred in the Pacific Ocean, a region where the busiest traffic and the worst weather collide. The sea route connecting Asia's economies to consumers in North America was the most lucrative for shipping companies last year. China's exports have gone on a tear as the pandemic fuels demand for all the stuff people need to work, learn and entertain from home.

The journey has always been rough, but it's become more perilous due to changing weather patterns. The rise in traffic from China to the U.S. this past winter coincided with the strongest winds over the Northern Pacific since 1948, increasing the likelihood of rougher seas and bigger waves, said Todd Crawford, chief meteorologist at The Weather Company.

With 226 million container boxes shipped each year, the loss of 1,000 or more can seem like — well — a drop in the ocean. "That's a very small percentage lost," said Jacob Damgaard, associate director of loss prevention at Britannia P&I at a conference in Singapore on April 23. "But it's almost 60% of the monetary value of all container incidents."

At an average of \$50,000 per box, the One Apus was estimated to have lost \$90 million in cargo alone, the highest in recent history, according to Jai Sharma, a partner at maritime law firm Clyde & Co. in London. Losses so far this year have totalled an estimated \$54.5 million, Bloomberg data show.

The issue is also gaining attention as last month's grounding of the

400-meter vessel Ever Given in the Suez Canal threw a spotlight on the vulnerability of the shipping industry. The mega-ship blocked traffic through the vital waterway for nearly a week, and the impact on global trade is still being felt.

So far, none of the recent container accidents has been directly attributed to safety lapses. The International Maritime Organization said it is still awaiting results of investigations into the latest incidents and cautioned about making any conclusions before that.

But many experts say the situation has grown more dangerous because of pressure on supply chains since the pandemic. When ships approach heavy weather, captains have the option to steer away from the danger. But the attitude is "don't go around the storm, go through," said Jonathan Ranger, head of marine Asia Pacific at American International Group Inc.

"When you combine that with potentially poor maintenance of twistlocks and cabling required to secure these boxes, then it's an accident waiting to happen," he said at the industry conference in Singapore.

Top Heavy Containerships

With boxes stacked ever higher, a ship can become more unstable in a storm — wave after wave can cause the vessel to roll at steep angles, putting strain on the securing of containers. The situation becomes even worse if the stack is top-heavy. That can happen when there's incorrect weightings on the bills of lading for containers, which many in the industry say happens too often.

"You cannot see inside the containers," said Arnaldo B. Romero, a captain who sailed from Japan to South America late last year. "So when the cargo is heavy and the officer in charge of cargo planning puts it high up, during the rolling of the ship, we may not have control anymore."

Overworked crews also heighten the risks. Reduced manpower onboard with an increased number of containers on deck make it increasingly difficult for crews to check every single bar and screw effectively, said Neil Wiggins, managing director of Independent Vessel Operations Services Ltd.

There's also the health and safety of the seafarers at stake. The toppling of multiple tiers of 40-foot containers during a raging storm is one of the most terrifying experiences for a captain and crew. Post-traumatic stress disorder among crew members is common, according to Philip Eastell, founder of Container Shipping Supporting Seafarers.

Concern is growing for the industry to address the situation...

"Traffic on the seas is different from what it was 10 years ago," said Rajesh Unni, founder of Synergy Marine Group, which provides services to ship owners. "How do we adapt as an industry? It's convenient to blame the captain, but we need to look at how the port infrastructure needs to change, how ships transit."

The IMO, which is the United Nations' agency responsible for shipping regulations, says countries whose flags the ships are sailing under are responsible for issuing safety certificates for vessels, while ports that the vessels call at are responsible for ensuring rules on loading containers are followed.

The agency said its sub-committee on the carrying of cargoes routinely looks at container issues and has scheduled its next meeting for September.

AlG's Ranger says companies should be prepared to go around storms and maintain vessels properly. "These vessels are designed to carry the boxes, and to have these losses is — dare I say it — unacceptable."

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EVER GIVEN FIASCO ILLUSTRATES THE IMPORTANCE OF THE SHIPPING CONTAINER

Take a look around you.

Perhaps you're snacking on a banana, sipping some coffee or sitting in front of your computer and taking a break from work to read this article. Most likely, those goods - as well as your smartphone, refrigerator and virtually every other object in your home - were once loaded onto a large container in another country and travelled thousands of miles via ships crossing the ocean before ultimately arriving at your doorstep.



By **Anna Nagurney**,
who is a John F. Smith
Memorial Professor of
Operations Management
at the University of
Massachusetts, Amherst.

Today, an estimated 90% plus of the world's goods are transported by sea, with 60% of that (including virtually all your imported fruits, gadgets and appliances) packed in large steel containers. The rest is mainly commodities like oil or grains that are poured directly into the hull. In total, about US\$14 trillion of the world's goods spend some time inside a big metal box.

In short, without the standardized container, like the thousands that helped to keep the Ever Given stuck in the mud along the Suez Canal and snarling traffic for almost a week, the global supply chain that society depends upon would not exist. About 30% of global container shipping volumes transit through the Suez Canal.

The Ever Given incident reveals several kinks in the modern supply chain. But, as an expert on the topic, I think it also highlights the importance of the simple yet essential cargo containers that, from a distance, resemble lego blocks floating on the sea.

TRADE BEFORE THE CONTAINER

Since the dawn of commerce, people have been using boxes, sacks, barrels and containers of varying sizes to transport goods over long distances. Phoenicians in 1600 B.C. Egypt ferried wood, fabrics and glass to Arabia in sacks via camel-driven caravans. And hundreds of years later, the Greeks used ancient storage containers known as amphorae to transport wine, olive oil and grain on triremes that plied the Mediterranean and neighbouring seas to other ports in the region.

Even as trade grew more advanced, the process of loading and unloading as goods were transferred from one method of transportation to another remained very labour-intensive, time-consuming and costly, in part because containers came in all shapes and sizes. Containers

from a ship being transferred onto a smaller rail car, for example, often had to be opened up and repacked into a boxcar.

Different-sized packages also meant space on a ship could not be effectively utilized and also created weight and balance challenges for a vessel. And goods were more likely to experience damage from handling or theft due to exposure.

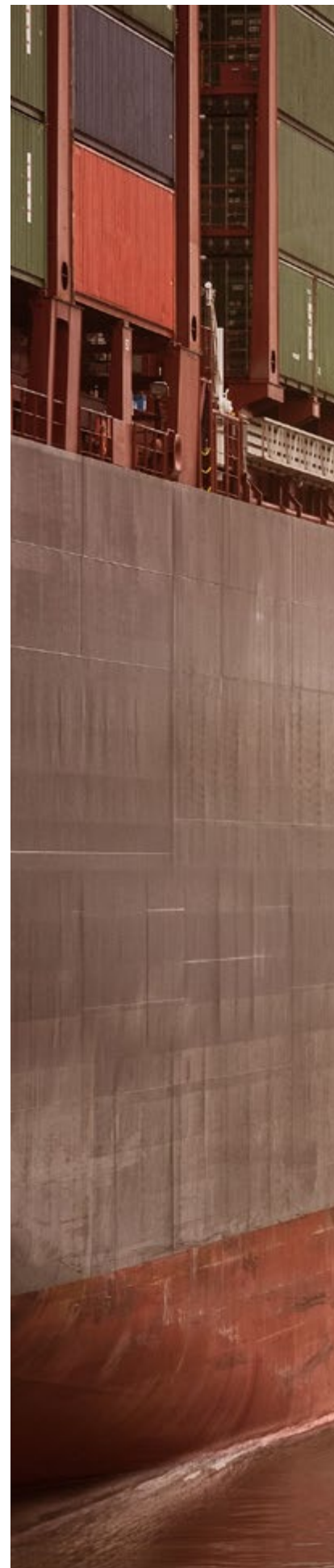
A TRADE REVOLUTION

The U.S. military began exploring the use of standardized small containers to more efficiently transport guns, bombs and other materiel to the front lines during World War II. But it was not until the 1950s that American entrepreneur, Malcolm McLean, realized that by standardizing the size of the containers being used in global trade, loading and unloading of ships and trains could be at least partially mechanized, thereby making the transfer from one mode of transportation to another seamless. This way products could remain in their containers from the point of manufacture to delivery, resulting in reduced costs in terms of labour and potential damage.

In 1956, McLean created the standard cargo container, which we basically still use today. He originally built it at a length of 33 feet - soon increased to 35 - and eight feet wide and tall.

This dramatically reduced the cost of loading and unloading a ship. In 1956, hand-loading a ship cost \$5.86 per ton; the standardized container cut that cost to just 16 cents a ton. It also made it much easier to protect cargo from the elements or pirates, since the container is made of durable steel and remains locked during transport.

The U.S. made great use of this innovation during the Vietnam





War to ship supplies to soldiers, who sometimes even used the containers as shelters.

Today, the standard container size is 20 feet long, the same width, but more commonly half a foot taller - a size that's become known as a "20-foot-equivalent container unit," or TEU. There are actually a few different "standard" sizes, such as 40 feet long or a little taller, though they all have the same width. One of the key advantages is that whatever size a ship uses, they all, like lego blocks, fit neatly together with virtually no empty spaces.

This innovation made the modern globalized world possible. The quantity of goods carried by containers soared from 102 million metric tons in 1980 to about 1.83 billion metric tons as of 2017. Most of the containerized traffic flows across the Pacific Ocean or between Europe and Asia, often through the Suez Canal.

SHIPS GET HUGE

The standardization of container sizes has also led to a surge in ship size. The more containers packed on a ship, the more a shipping company can earn on each journey.

In fact, the average size of a container ship has doubled in the past 20 years alone. The largest ships sailing today are capable of hauling 24,000 containers - that's a carrying capacity equivalent to how much a freight train 44 miles long could hold. Put another way, a ship named the *Globe* with a capacity of 19,100 20-foot containers could haul 156 million pairs of shoes, 300 million tablet computers or 900 million cans of baked beans (in case you're feeling hungry).

The container ship, the *Ever Given*, is seen in the distance stuck on the bank. Its stern can be seen with lots of containers. Plants are in the foreground. In

terms of cost, imagine this: The typical pre-pandemic price of transporting a 20-foot container from Asia to Europe carrying over 20 tons of cargo was about the same as an economy ticket to fly the same journey.

COST OF SUCCESS

But the growing size of ships has a cost, as the *Ever Given's* predicament showed.

Maritime shipping has grown increasingly important to global supply chains and trade, yet it was rather invisible until the recent logjam and blockage of the Suez Canal. As the *Ever Given* was traversing the narrow 120-mile canal, fierce wind gusts blew it to the bank, and its 200,000 tons of weight got it stuck in the muck.

About 12% of the world's global shipping traffic passes through this canal. The blockage had, at one point, at least 369 ships stuck waiting to pass through the canal from either side, costing an estimated \$9.6 billion a day. That translates to \$400 million an hour, or \$6.7 million a minute.

Shipbuilding companies continue to work on building ever-larger container vessels, and there's little evidence this trend will stop anytime soon. Some forecast that ships capable of carrying loads 50% larger than the *Ever Given's* will be plying the open seas by 2030.

In other words, the standardized shipping container remains more popular - and in demand - than ever.





Seacor Power:

A sobering note on incident reporting

Image credit: Gerald Herbert/AP

When accidents go un-investigated, more will happen in the future.

The tragic sinking of the liftboat Seacor Power with the loss of thirteen lives when it capsized on April 13 in a squall three hours after departing Port Fourchon, Louisiana, brought to mind the capsizing of Ezion's liftboat Teras Lyza, which turned over and sank off the Philippines under tow in bad weather in 2018. The need for transparent and open reporting by flag states on accidents is vital.

No lessons from Teras Lyza

At the time, the Singapore flag state were urged to publish a report into the sinking of the Ezion-owned unit even though there was no loss of life, which was only because Teras Lyza was fortuitously unmanned. We noted that the capsizing of a manned liftboat could result in death. In the case of Seacor Power, thirteen men were killed in the Gulf of Mexico.

Singapore's Ministry of Transport has still not published an accident investigation report into the loss of Teras Lyza. Singapore benefits enormously from its status as the offshore hub for South East Asia. As the richest country in East Asia, Singapore should do better with its reporting responsibilities.

No lessons from Bourbon Rhode

Nor has the Luxembourg flag state published any further information on the causes of the loss of Bourbon Rhode since August. Eleven seafarers were killed when the Bourbon-owned anchor handling tug sank in a hurricane in the Atlantic whilst in transit between the Canary Islands and Guyana en route to start a charter for Saipem. One might wonder why a landlocked grand-duchy should be the flag state for an offshore vessel trading across the Atlantic for French owners.

Luxembourg benefits enormously from its status as a legal tax haven within the EU. As the richest country in Europe, Luxembourg should do better with its reporting responsibilities.

NTSB has a better track record

Let's hope the National Transport Safety Board (NTSB) in the United States can provide more comprehensive reporting on the tragic loss of Seacor Power. The safety record of liftboats as a whole does require scrutiny, as we have highlighted. After the loss of Teras Lyza, two more liftboats were lost in the Gulf of Mexico – Ram XVIII through the collapse of a leg in November 2018 and Kristin Faye through a punch through in September 2019.

Mercifully, there were no deaths in those two previous incidents, but the loss of three units in the

space of just 18 months in the same area ought to be a cause of major concern to the NTSB, and to the industry as a whole. The liftboat industry must make some wholesale changes to its procedures and practices. The NTSB accident report should be a milestone in that process.

Loss of Chinese unit makes five

July 2020 saw a fifth accident of note in China, albeit with completely different dynamics. The jackup installation vessel Zhen Jiang suffered a catastrophic failure whilst installing turbines at the CSIC Jiangsu Rudong H3-1 offshore wind farm. The vessel's jacking system failed during turbine installation, and when the tide rose, the leg was stuck, and Zhen Jiang took on water.

Reports suggest that the watertight door to the engine room was left open, which led to flooding. The crew were evacuated safely but the jackup required salvaging.

Commercial pressure?

Of particular relevance to the Bourbon Rhode, Teras Lyza and Seacor Power cases is the

possibility of commercial pressure being applied to masters to take vessels into marginal weather conditions. Talos Energy, the charterer of Seacor Energy, issued a statement that it was not responsible for the vessel sailing into the storm:

"The Seacor Power was in port for service and inspections for several days prior to its departure. The vessel was not at a Talos facility and was fully under the command of its captain and Seacor Marine, including when to depart the port," the company said.

Ill-advised social media at Talos

Newspaper Houma Today reported that family members of the missing seafarers were furious that a senior manager responsible for safety at Talos Energy, had spent the weekend deep-sea fishing off the coast of Venice, Louisiana, not far from where the search efforts were continuing. He posted photos and comments on his fun day out on Facebook, provoking a firestorm of criticism online.

Did nobody learn the social media lessons of BP's CEO in the Deepwater Horizon disaster?

Lawsuits may shed more light

The families of lost crew members are now suing both Seacor and Talos. One lawsuit states that the companies "knew or should have known of the deteriorating weather conditions on April 13," according to local news reports. The lawsuit claims that the death of the crewmember whose family are seeking damages "was in part caused by the legal fault, negligence, carelessness, and omission of Seacor, Talos, and Semco, which built the liftboat that capsized."

Outsiders may complain that America has an overly litigious culture, and that lawsuits for damages will never bring back the lost loved ones. However, in situations like that of Bourbon Rhode, where a vessel is sunk internationally, sailing under a flag of convenience, the families of the dead crewmembers never have the chance to gain legal redress. Instead, they are given "take it or leave it" compensation from the insurers and have signed away their rights to go to court. That's assuming that the courts of Luxembourg, or St Kitts and Nevis, or Panama, or wherever, would take the case in the first place.

The American court system may be expensive, arbitrary, and adversarial, but it may also throw more light on the tragic circumstances where thirteen lives were lost on April 13.

Nobody can bring those men back, but preventing another accident and preventing future loss of life is something that everyone in the industry should make their number one priority, even if it causes embarrassment to vessel operators and flag states.

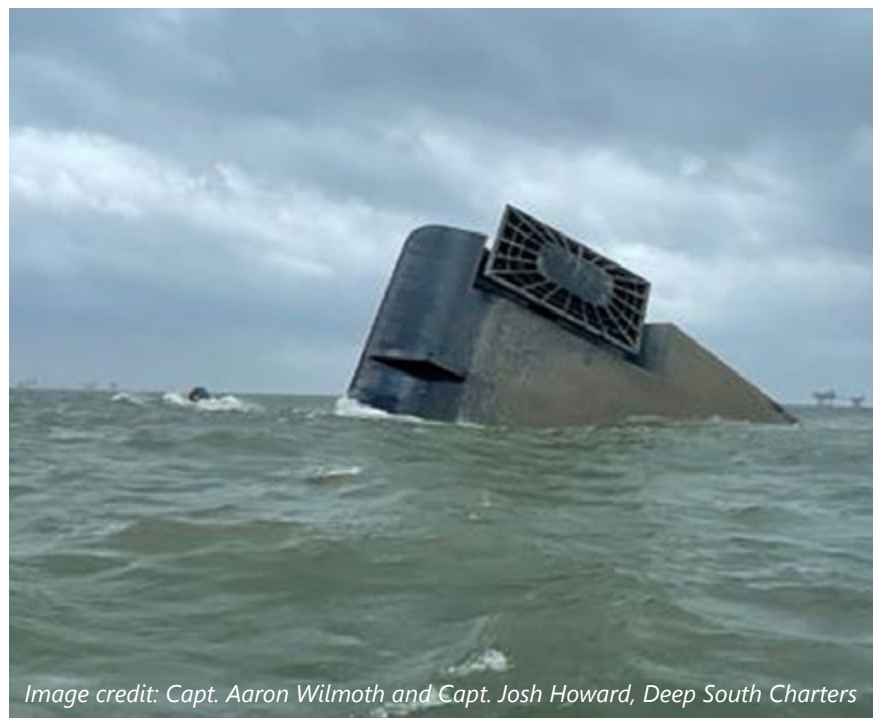


Image credit: Capt. Aaron Wilmoth and Capt. Josh Howard, Deep South Charters

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Hold Cleaning and the Legal Issues



By **Andrew Gray**,
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Andrew is a Director in the Campbell Johnston Clark London office. Following a career at sea as an officer in the Royal Navy, he trained as a solicitor with an international law firm in the City. He has since worked in London, Singapore and Hong Kong and has over 20 years of experience in Admiralty and shipping law.

Introduction

The preparation of cargo holds for the next intended carriage is a critical operation which requires careful planning and execution. A lack of proper preparation may lead to claims for contamination, water ingress or shortage as well as contractual disputes. It is essential that those involved understand exactly what

is required of them under the charterparty in terms of cleaning and preparation.

This article considers a number of legal issues which may arise, including terms commonly used in charterparties to describe the cleanliness of cargo holds, the consequences of failing to comply with such terms, potentially

resulting in off-hire claims and damages, and the role of the independent surveyor.

We will look at these issues in the context of three cases:

- a) London Arbitration 14/18
- b) THE "BUNGA SAGA LIMA"
[2005] 2 Lloyd's Rep. 1
- c) London Arbitration 7/10

Charterparty Terms

The relevant terms between Owners and Charterers are typically found in charterparties and fixture recaps, negotiated and disseminated in advance of the charter. Standard contracts such as the BIMCO NYPE 46 and NYPE 93 forms are commonly used but are usually heavily amended with additional wording and clauses. It is therefore important to read the charterparty and recap carefully to fully appreciate what has been agreed.

Various expressions are used within these charterparty and recap terms and it is useful to be familiar with them. These include:

- a) "Hospital Clean" - the most stringent and requires all hold surfaces to have 100% intact paint coatings on all surfaces (including the tank top, all ladder rungs and undersides of hatches).
- b) "Grain Clean" - requires the holds to be free from insects, odour, residue of previous cargo, lashing material, loose rust scale and paint flakes, etc. Prior to loading, the holds must be swept, washed down with fresh water, dried and well ventilated. This is the most common requirement.
- c) "Normal Clean" - requires the holds to be swept to remove all residues of the

previous cargo, washed down and dried ready to receive a similar or compatible cargo.

- d) "Shovel Clean" - does not require washing but only the removal of the previous cargo by rough hand or mechanical sweeping.
- e) "Load on Top" - is when new cargo is loaded on top of existing cargo residues. This is most appropriate in certain long-term contracts where a particular vessel is routinely transporting the same cargo.

The most common requirement is for a hold to be "Grain Clean", but as we will see the clause may be amplified – for example: "holds clean swept, washed down by fresh water, dried, free of salt, rust scale and residue of previous cargo".

The independent surveyor

The charterparty might also require that the cleanliness of the hold be "... determined by an independent surveyor...". What does this mean?

In the English case of *Protank Shipping Inc. v. Total Transport Corporation (the "Protank Orinoco")* [1997] 2 Lloyd's Rep. 42, the Commercial Court considered the meaning of this term. The case related to a charterparty clause permitting the deduction from

freight where cargo remained on board after the completion of the discharging operation. The amount involved was to be "determined by an independent surveyor whose estimate shall be final and binding".

Thomas J held at p.42 "...if the meaning of "independent" was satisfied by showing that the surveyor in question was a firm or organization that operated independently of the owner or charterer or receiver, then there was always the likelihood that at any port of discharge there would be more than one surveyor who was "independent"...". However, by the inclusion of the words "... whose estimate shall be final and binding..." the charter party clause must have envisaged the appointment of a surveyor jointly on behalf of the parties to make the determination that was final and binding.

What if the words "...final and binding..." were not included? Thomas J went on to observe at p. 46 "...Quite apart from that, I consider that it is highly unlikely that the parties would have intended to entrust such an important determination which would final decisions on significant sums of money unless the person was jointly appointed..".

Following this decision, it is considered that an independent surveyor must be jointly appointed by the parties.



Charterparties: Law, Practice and Emerging Legal Issues (Baris Soyer and Andrew Tettenborn), 2018 Edition p.168 observes "It was held in [The Protank Orinoco] that in the absence of any other clarifying words an "independent inspector" was one that had been jointly appointed by the shipowners and charterers...".

London Arbitration 14/18

Such a conclusion was also reached by the tribunal in London Arbitration 14/18, which considered the requirement to present a cargo hold which was "free of salt". Clause 11 of the fixture recap provided that the vessel's holds be "...clean swept/washed down by fresh water and dried up so as to receive charterers int cargoes in all respects, free of salt, loose rust scale and previous cargo residue to the independent surveyor satisfaction". In that case, silver nitrate testing was carried out by a surveyor who had been instructed by charterers for their own account.

At the first loading port, in Vietnam, the charterer conducted an on-hire condition survey. Despite the Masters' protests, a surveyor was instructed by the charterers to conduct silver nitrate testing in the ship's holds. Alleged salt traces were detected, and the ship was placed off hire. Having first reserved its position that the holds were contractually compliant, the owner arranged freshwater washing of the holds (under protest) to minimise delay. The cargo (steel) was then loaded.

At the second load port, in Korea, the charterer alleged that water dropping from the hatch cover had further contaminated some steel pipes in the holds with salt. A debate developed as to the origin of salt on the pipes. To minimise delay, the crew mopped the tank tops in the holds to remove cargo

and hold "sweat". Again, the charterers placed the ship off hire for the duration of the stoppage. With mopping complete, the holds were approved for loading. The owners claimed a balance of hire in respect of the periods in which the charterers had withheld hire at the first and second loading ports.

The charterers alleged that the silver nitrate test was customary when loading steel products. Based on the results of such tests, they were entitled to place the vessel off hire for the periods which they did. In their view, the presence of any salt meant that the hold was not "free of salt". The owners argued that the charterers' construction of the term "free of salt" was flawed and that the silver nitrate test was not appropriate to establish compliance of the vessel's holds with the relevant clause. They owners submitted that it cannot be expected that a seagoing vessel be entirely free of any traces of any chloride.

The tribunal found in the owners' favour. They held that charterers had failed to establish that the silver nitrate test was customary. Considering its extreme sensitivity, it would be surprising if that was indeed the case. As to the construction of the words "free of salt", the tribunal was not convinced that the literal interpretation which the charterers ascribed to it should be preferred. It considered it unrealistic to expect a vessel in a maritime environment to be free of any salt whatsoever. The tribunal considered that a more realistic and commercially sensible interpretation of the words would be 'free of any significant traces of salt'.

The tribunal found that "It was common ground that the silver nitrate testing had been undertaken for the account of the charterers and not jointly on behalf of both parties. Therefore, X could not be regarded as

"independent" for the purposes of Clause 11". The provision in the clause which stated that the vessel would be off hire in the event that the holds were not to the satisfaction of the independent surveyor was to be construed against the party seeking to rely on it, that is the charterers. As the findings on which the charterers sought to rely were the product of unilateral testing by a surveyor acting only on the charterer's behalf, the tribunal found that the charterers had not succeeded in bringing themselves within the relevant clause.

"BUNGA SAGA LIMA" [2005] 2 Lloyd's Rep. 1

When must the hold be clean?

Another question which arises is at what point the owners of a vessel must ensure that the holds are clean. Typical contractual terms include: "Upon arrival at the first loading port"; "On arrival at load port"; "On delivery" or "On first loading". In the "Bunga Saga Lima" [2005] 2 Lloyd's Rep. 1, the vessel Bunga Saga Lima was chartered on an NYPE 93 form as amended for a short time charter period comprising two or three laden legs.

The charterparty required as follows:

Line 21 - "Vessel on her delivery to be ready to receive cargo with clean swept holds and tight, staunch, strong and in every way fitted for the cargo as per clause 29, having water ballast...".

Clause 46 (amended) – "...it is understood that on delay or upon arrival 1st loading port, vessel to be clean grain standard up to independent surveyor's satisfaction"

Clause 13 of fixture note – "Owners warrant that vessel's holds on delivery or arrival first load port to be cleaned, swept washed down

with freshwater, dried up free from rust leaks, scale, free from salt and free from residue of previous cargo and in every respects ready to load up to the satisfaction of the local surveyor. Should Vessel fail to pass hold inspection Owners to arrange cleaning at their time and expense and the Vessel to be off-hire from the time of failure until survey passed in all holds and any extra or directly related expenses incurred to be for the Owners acct”.

At the time of delivery under the charter at the first loadport at Sepetiba, Brazil, the vessel's holds were dirty with coal residues from a pre-delivery cargo. However, the charterers loaded a cargo of iron ore without requiring the remaining coal residues to be removed. The iron ore cargo was carried to Swinoujscie, Poland, where it was discharged. The charterers then decided to load a cargo of rapeseed in bulk at Rostock, Germany, so the coal residues had to be removed. This resulted in a delay while the holds were cleaned to a 'grain clean' standard. The charterers alleged that the owners were in breach of the cleanliness warranties under the charter, and that the charterers were entitled to place the vessel off-hire at Rostock until the holds were passed 'grain clean'.

The tribunal found that at the time of delivery at the first loadport, both the charterers and the owners knew that the holds did not comply with the 'grain clean' requirement. They therefore rejected the charterers' claims. Although the vessel did not need to be cleaned to load iron ore, by not insisting on clean holds on delivery, the charterers had lost their right to claim for the loss of time and expense incurred to clean the holds at the second load port. Under the NYPE and Fixture Note, the only entitlement to place the vessel off-hire in the event of unclean holds was upon delivery or arrival at the first load port, and not thereafter.



London Arbitration 7/10

In London Arbitration 7/10, on similar facts to the “Bunga Saga Lima”, a vessel was chartered on an NYPE form with the following terms:

Line 22 of NYPE - “...Vessel on her delivery to be ready to receive cargo with clean-swept holds...”.

Clause 54 – “Vessel’s holds conditions on arrival at first loading port to be fresh water washed down, clean dry, free from loose rust flakes/scales and residues of previous cargo and in every way ready and suitable to load Charterers’ intended cargo to the satisfaction of the independent surveyor. If vessel is rejected by the independent surveyor at load port, vessel to be off-hire until ready to pass inspection...”

The vessel was delivered to charterers in Haldia, India after discharging her last (coal) cargo under her previous charter. She then sailed in ballast to Thailand to load her first cargo (steel) under the charter. Her holds were cleaned by the crew during the ballast voyage. On arrival at the loadport, the charterers’ on-hire surveyor found the holds to be in a sound condition but noted dark staining on the bulkheads and sides, caused by the pre-charter coal cargo. The vessel loaded the cargo of steel. She

sailed from Thailand to the United States. During the voyage, she was fixed to load grain at Vancouver, Washington state. Subsequently, the vessel arrived and discharged the steel in Kalama, Washington state. An NCB surveyor inspected the holds and required removal of the coal staining. The Charterers were concerned that the holds would fail inspection at Vancouver. Therefore, the Master had the holds cleaned with chemicals to remove the staining. The vessel arrived at Vancouver seven hours after completion of discharge at Kalama. USDA and NCB inspectors rejected her holds, apparently due to the coal staining. After a further five days of cleaning by the crew and a shore team, the vessel’s holds were passed at a re-inspection.

Charterers alleged that owners were in breach of the charter because the vessel’s holds were not, on delivery in Haldia, in a fit state to receive grain cargo at Vancouver due to the presence of coal residues. The tribunal rejected the charterers’ claim. The charterparty was specific about how clean the holds had to be and when. On arrival at the first loadport, the holds had to be sufficiently clean to load the intended cargo (steel). The crew were given the chance to clean the holds properly, not before delivery but during the ballast voyage to the first loadport – after delivery.

The owners had complied with their charterparty obligations

because the crew cleaned the holds properly during the ballast voyages to the loadport. The charterers accepted the ship unconditionally, and the owners were not liable for the vessel’s arrival at the second loadport in a non-grain clean condition. This was consistent with the decision in The Bunga Saga Lima.

Preservation of Evidence

In the event of a dispute or even potential dispute, it is important that those involved secure contemporaneous evidence an early stage to protect their position. This might include:

- Initial correspondence
- Notes of telephone calls
- Fixture recap
- Charterparty
- Instructions to crew and/or contractors
- Attendance of surveyors
- Notes of protest
- Cleaning records
- Note books
- Photographs

Conclusion

In conclusion, it is important that the following steps are taken:

- a) Consider charterparty and fixture recap terms carefully;
- b) Comply with the terms of the charterparty;
- c) Seek prompt advice if unsure; and
- d) Preserve all evidence.

Contact Andrew Gray, email: andrew@cjclaw.com



Nerves of Steel:

Fleet-wide implementation of the next-generation hull integrity monitoring

Working in collaboration with Altera Infrastructure, one of the world's leading operators of shuttle tankers, DNV has successfully completed a fleet-wide implementation of Nerves of Steel, the industry's most advanced hull integrity monitoring system.

For decades, assumptions about the status of the structural integrity of a vessel have been based on its age, design and observations taken from surveys, which only provide a static snapshot of existing conditions. In the absence of more concrete, verified data, different stakeholders have been left to make critical decisions related to safety, scheduled maintenance, inspections, commercial operations, charter agreements and calculations on insurance premiums. Worse, the quality of these assumptions degrades as a vessel ages, leaving many to only estimate the real condition of a vessel's structural integrity.

Nerves of Steel provides more precise decision support

According to Antonio Goncalves, Business Lead (Maritime Advisory) at DNV, the organization worked to develop a tool called Nerves of Steel that

can provide a more dynamic overview, which not only helps explain past findings, but also allows owners to predict the future degradation of the vessel. "Simply by pairing a vessel's location using AIS data with asset-specific information, we can calculate wave loads on the hull with far more accuracy," he explains. "And by applying DNV's hull integrity analytical expertise and other relevant data, we can provide owners and other stakeholders with better decision support."

In addition to reducing safety risks, Nerves of Steel allows for more cost-effective and proactive scheduling of dry-dockings and provides greater guidance on where inspectors should focus to find potential damage, saving time at the yard. "Nerves of Steel is a user-friendly tool, providing operators with a high-level overview of the fleet, with hull integrity indicators based on encountered weather conditions,"

says Goncalves. "This insight gives owners a better understanding of structural integrity."

Utilizing new technologies to calculate operational effects

The development of increasingly sophisticated software tools, such as digital twins and onboard sensors now found on many vessels, created an opportunity to develop Nerves of Steel further. "For example, by utilizing 'digital twins' to calculate the wave-induced damage risk for ship hulls, fleet managers can visualize all key components, perform analyses and calculations," explains Goncalves. "In this way, owners have more control over the long-term effects of operation on the ship's structural and functional components."

In 2020, DNV entered into a formal collaboration with Altera Infrastructure to develop a structural monitoring system

for hulls that would add value to its fleet of shuttle tankers. According to Lars Holterud Aarsnes, DNV's Digital Product Manager (Maritime Advisory), working with Altera Infrastructure provided invaluable insight. "By sharing their hands-on experience and operational know-how, Altera Infrastructure ensured the tool has the correct features and usability for the end user," Aarsnes says. "DNV's contribution was to perform the technical calculations and develop a dashboard to help users visualize hull utilization of individual vessels."

Altera benefits from increased fleet safety

James Fowler, Structural Integrity Manager for Altera Infrastructure, says that while

Nerves of Steel may focus on safety via hull integrity monitoring, the concept supports the company's business objectives. "We have gained a great deal of insight working with DNV, and by identifying our safety, operational and commercial priorities which are unique to our shuttle tanker fleet, we have a solution that fits our needs," he says. "We have implemented the basic Nerves of Steel indicator service across our entire shuttle tanker fleet and are currently pilot-testing the digital-twin numerical services on four vessels, which provides us with near real-time monitoring of hull integrity."

Fowler notes that Nerves of Steel allows them to further

establish proactive inspection and maintenance regimes to identify small defects before they become critical, which is crucial. "This is not just a matter of safety," he says. "We have a high utilization rate across the fleet, so taking a vessel out of service to carry out unscheduled steel repairs is bad for business. And because demand for more detailed hull integrity assessments is increasing, Nerves of Steel helps to strengthen the confidence that charterers and insurers have in our organization. We are no longer working with assumptions but with verified data."

"We have gained a great deal of insight working with DNV, and by identifying our safety, operational and commercial priorities, we have arrived at a solution that fits our needs."



Shuttle tanker operator Altera Infrastructure has been the first to implement the Nerves of Steel structural management system for hulls.



Nerves of Steel - Cross Section - Hull Condition Monitoring of Fatigue Utilization - Fatigue Utilization Relative to Design

Visualizing potential vessel damage

One focus of the project was to develop a dashboard that enables Altera to visualize hull integrity in real time. “The dashboard has helped us gain a better understanding of the relationship between a vessel’s trading pattern, the weather and hull integrity,” says Fowler. “This allows us to evaluate the consequences of operating in harsh weather environments and at the same time gives us the foresight to make more informed decisions on routing. By potentially limiting our vessel’s exposure to high wave loads, we can quantitatively extend the life of the asset for continued shuttle tanker operations or select a suitable asset for further analysis for conversion.”

Nerves of Steel also provides data that helps Altera perform root-cause analysis. “In addition to gaining a better understanding

of how structural defects may develop on a particular vessel, this hindsight can be applied to sister ships for comparison purposes; it also helps inform us how we should design vessels, especially those expected to operate in areas with challenging weather conditions, such as the North Sea,” he says. “What can be measured can be managed.”

Sensor technologies provide a clearer picture of hull structure. In addition to the basic Nerves of Steel service (indicators) and the digital-twin service (numerical), DNV has also developed a hybrid service which integrates data from on-board sensors. “Using relevant sensors, combined with numerical models and relevant weather data, we can provide an even more accurate picture of hull structure utilization,” says Goncalves. “And in cooperation with Altera Infrastructure, we are developing a reporting tool that makes it easier to share data and

exploring how the application of machine-learning algorithms can strengthen the service.”

Findings and tools can be translated into other projects

Goncalves says that while this Nerves of Steel project was developed for Altera Infrastructure’s fleet, “lessons learned” from the collaboration have produced a proven suite of tools that can be easily applied to other shipping segments or offshore structures. “DNV is working with a broad range of stakeholders in the maritime and energy industries to enable owners to monitor their assets in real time through the Nerves of Steel interface,” he says. “We are confident that as more stakeholders become aware of the benefits of this approach, we will be able to enable safer, more cost-effective operations.”

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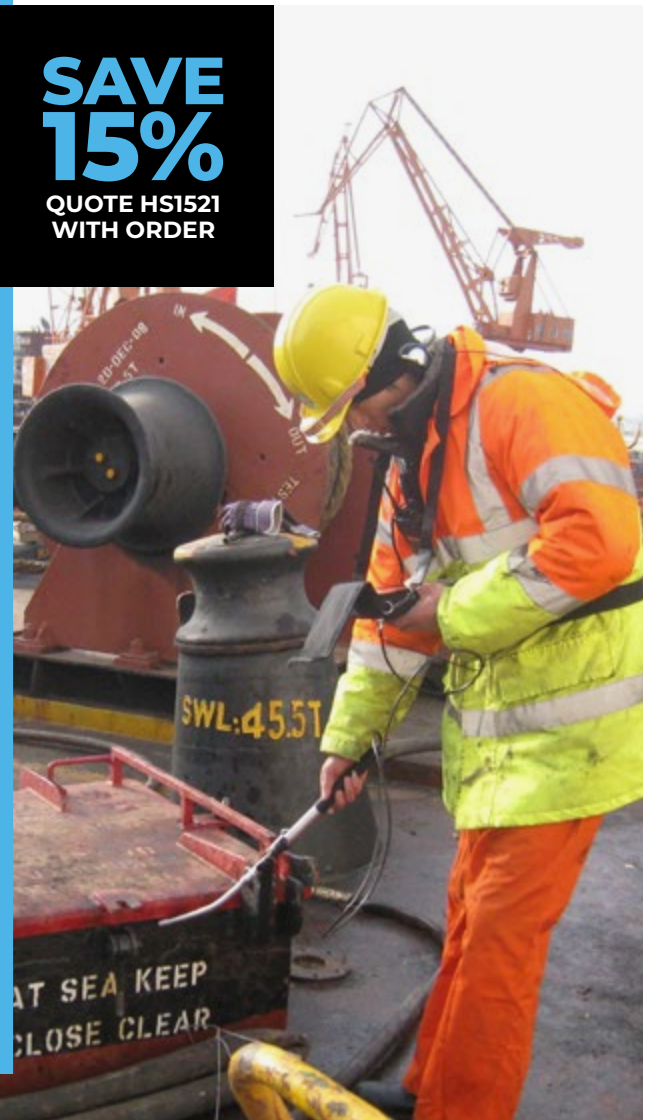
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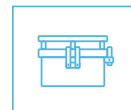
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SURVEYING RIVETS AND RIVETING Part Three

Rivets are a permanent mechanical fastening and one of the oldest and most reliable methods of fastening and have been found in archaeological digs dating back to the Bronze Age. Modern vessels are, of course, fully welded but, before that became commonplace as the method of constructing them, iron and steel ship and the parts from which such vessels were built, were connected together with rivets. Riveting in shipbuilding is, these days, an old fashioned and long out of date method of securing together the structural items forming a ship's hull, nevertheless, a good small craft marine surveyor should know about it as, even today, many of the vessels he will have to survey are fastened together using the method. Dutch and London river barges are prime examples. On the face of it riveting seems to be a simple process but there are a number of factors of which the marine surveyor should be aware if he is going to be successful in his understanding of that particular aspect of his chosen profession. A full understanding of those various factors will enable him to 'read' the structure and thereby to give better advice to his client.



By Eur. Ing. **Jeffrey N. Casciani-Wood**

Carrying on from Part Two found in The Report, Issue 96, June 2021...

The Efficiency of Riveted Joints

The assumptions made in the calculations of joint strengths in Formulae 21 to 35 are:

- the tensile load is equally distributed over the pitch lengths.
- the load is equally distributed over all rivets.
- bending of the rivets does not occur.
- the rivet holes do not produce stress concentration and the area of the plate round the hole is not weakened by any increase in the rivet diameter during the upsetting process.
- the crushing pressure is uniformly distributed over the projected area of the rivet.
- friction between the faying surfaces of the plates may be neglected.

- If only a pitch length of solid or a hole free plate is considered, then the plate's load carrying capacity will be:

$$P_1 = p_t \sigma_t N \quad (33)$$

P_1 will clearly be greater than P_t , P_s , P_c or P_{es} and the efficiency of the joint is defined as the ratio of any of P_t , P_s , P_c or P_{es} to P_1 in that particular mode. Ideally P_t , P_s , P_c and P_{es} are equal but actually that is rarely the case and the efficiency of the joint will be determined by least of those forces.

Thus, efficiency of the joint in practice is:

$$\eta_j = \frac{\text{The least of } P_{tr}, P_{sr}, P_c \text{ or } P_{ms}}{P_1} \% \quad (34)$$

where

$$\eta_j = \text{the joint's efficiency} \%$$

The ideal that strengths in different modes of failure are equal cannot be achieved in shipbuilding because the rivet hole and rivet diameters are standardised for technological convenience. See Table 1 below which gives an indication of the average and maximum efficiencies of commercial shipbuilding riveted joints.

Table 1
The Efficiency of Typical Shipbuilding Riveted Joints

Type of Joint		Average Efficiency %	Maximum Efficiency %
Lap Joints	Single Riveted	45-60	63.3
	Double Riveted	63-70	77.5
	Treble Riveted	72-80	86.5
Strapped Joints	Single Riveted	55-60	63.3
	Double Riveted	70-83	86.6
	Treble Riveted	80-90	95.0
	Quadruple Riveted	85-94	98.1

Riveted Butt Straps

In order that the butt straps have the same breaking load (*i.e.* the same area under shear) as the plates that they are connecting together they should have the same cross sectional plate and rivet area and, taking into account the plating and rivets in the seam lands, that means that the butt strap should be somewhat thicker than the associated plating. It is common to increase the thickness of the strap by about 1/8th of an inch or 2 mm as appropriate to allow for that but the required thickness can be assessed more accurately as follows:

$$[(n + 2)(p - d) + 2d]t_p + n\pi d^2/4 = [n(p - d) + 2d]t_{bs} + n\pi d^2/4 \quad (35a)$$

$$t_{bs} = t_p[n(p - d) + 2d]/[(n + 2)(p - d) + 2d] \quad \text{mm} \quad (35b)$$

It will be noted from an analysis of Formula (35b) that the actual shear force is irrelevant.

It is not often mentioned as a factor when discussing a vessel's strength, but when the failure of a riveted joint of whatever type is under investigation, the marine surveyor should be aware that it is also necessary to remember that the contraction of the rivets on cooling causes a clamping effect on the faying surfaces that results in an amount of friction between the two which may be estimated from: -

$$F_f = 7.4A \quad \text{t/cm}^2 \quad (36)$$

Such a joint may sometimes be found connecting together the plates forming a vertical centre line keelson.

Note the use of snap points on the rivets which was common practice on such a joint.

The Effect of the Supporting Structure

An important point in clinker riveted construction that is often overlooked by the marine surveyor is the arrangement of the plating and the primary supporting framing on the inside. Clunker plating is usually laid in one of two methods respectively called the lap strake and the in and out method. Most Dutch barges, particularly tjalks (pronounced *tchall'ck*), are usually laid lap strake clinker fashion with such vessels as tjalks having a shear strake and the first below horizontal and the remaining strakes tucked up under the ends of the shear strake and/or the first strake below at each end. That lay-up is called the Dutch fashion and is necessitated by the very full apple shaped bows of the tjalk form and is opposed to the so-called English fashion where all the strakes run from end to end of the ship and use is made, where necessary, of stealer plates.

Stijlstevens and luxemotors usually have their plating strakes running the full length of the boat with the ends of the strakes reduced in width to allow for the reducing end girth but without stealer plates. British built boats were usually plated on the in and out system with stealer plates at each end. With the in and out system if the frame is turned and smithed to a smooth line the plate will lay clear of the faying surface of the frame in way of the out strake. In early iron shipbuilding days, the gap was filled by a forged filling piece. That method, of course, was very expensive in both labour and material and also led to a very heavy steel weight and relatively poor deadweight/displacement ratios. Two methods were used to overcome the problem both of which required the yard to have the room for a large size bending slab. The first was to joggle the frame at the points where it crossed the seam and the second was to joggle the seams of the outer plate which method required the shipyard to invest heavily in the special machinery necessary. Both methods required the shipyard to invest in a gas powered furnace large enough to take the longest frame they might expect to bend so that the frame could be brought to glowing red heat over its full length. Additionally, the first method required the shipyard to employ highly skilled angle smiths.

Both of those methods were labour intensive and costly and in order to keep the cost of construction down barge yards usually sprang the frame across the seam. That resulted in the rivets immediately above the seam being put under high tensile stress causing them frequently to pull inward. It also left a small triangular gap between the top edge of the inside plate, the rivet above the seam and the inside faying surface of the frame - see Figure 15 - into which cargo detritus would collect. That, together with moisture from the atmosphere, causes surface rusting of the inside surfaces of the frame and plate and crevice corrosion in the top of the plate seam in way. The rust expands and can cause the upper rivet in the sketch to pop or, at least, to pull a defect often found in Dutch barges.

When taking UTS thickness measurements, therefore, on such plating/framing arrangements the marine surveyor is advised to take one on either side of the frame and another at the frame station itself at the point indicated. He may well be surprised at the differences obtained.

When examining riveted vessels, it is good surveying practice to check the rivet points on the outside of the hull for corrosion and pull through (a sure sign of internal jacking corrosion on the faying surface of the frame flange and the shell plate) but also to check the heads on the inside for rivet fracture or slip. When surveying a riveted ship, the marine surveyor should use a hammer to ring an installed rivet as a non-destructive test for tightness and imperfections. As such slip is most likely to occur at the points of high shear stress and a knowledge of basic naval architecture will tell the marine surveyor the places in the ship's hull where rivet slip is most likely to be. Such testing is usually only carried out on seam

rivets at the quarter lengths at the mid depth of the hull and under the deck or in the bilges or double bottoms amidships.

When defects are found in rivets such as excessive corrosion of the point or slip two methods of dealing with the defect are open to the marine surveyor. If the number of defective rivets is small, then they can be ring welded or fully welded over the point on the outside. If the edge of the plate is thinned and a largish number of rivets are found defective, then it is common practice to double the seam with a strip of welded steel about 150 mm wide remembering the Law of Unintended Consequences. The edges of the doubling plate should be kept well clear of the seam to avoid pulling the rivets and causing them further to fracture, slip or leak as the welding cools. The doubling plate should be wide enough so that the edge stands clear of any rivets by about one and a half to two diameters. Another but more expensive alternative is to burn the defective rivets out and fill the whole hole with welding. That method is rarely used not only because of its inherent higher cost but also because of the much greater risk of fire.

The marine surveyor should examine the riveting carefully all over the hull especially looking for four specific points:

1. the rivet holes are made in the plate by punching the metal out from the faying surface. The outer surface of the plate should then be countersunk to enable a full point to be made on the rivet. If the work is carried out in cold weather the outer surface of the plate can develop radial frost or brittle fracture cracks leading away from the rivet holes which in later life can develop intergranular or crevice

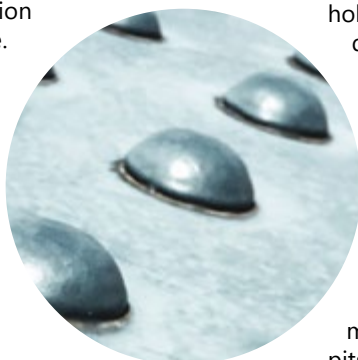
corrosion. These cracks are easily discoverable with the aid of a simple magnifying glass. In older and Continental built vessels, to reduce the cost of construction, countersinking of the rivet holes was often waived, the shipbuilder relying on the natural shape of the hole caused by punching to give the necessary grip to the rivet shank/point. In such cases, the point will often be of the flat type and will often overlap the exterior plate but that is not a reliable method of detecting the lack of countersinking.

2. jacking corrosion on the faying surface between the outside of the frame flange and the inside of the plating will often pull the rivets through the plate. Any rivet points below the surface of the plate should be treated as suspect and local thickness measurements taken around them to ascertain the general condition of the plating.
3. such rivets are usually welded over and that is usually considered to be a satisfactory repair. If ignored, the rivet will eventually leak. The marine surveyor has to take care here as over welding one rivet can cause the rivet either side to distort and leak and the welder can end up rivet chasing. In such cases it is often better to weld a suitably wide plate over the seam with the edges well clear of the rivets.
4. since the rivets are most frequently, but not necessarily, manufactured from wrought iron even if the ship plating is steel, they tend to develop galvanic corrosion defects and the points pit badly and waste away. Rivet points are also subject to heavy scuffing, particularly on canal barges and the like.

Surveying tip 4 | The method of testing a rivet when on a survey is to crook the fore finger under the rivet's head and tap the top of the head with a hammer of about one half a kilogramme in weight and, using his experience, judge the quality of the audibly returned sound and the feel of the sound travelling through the metal to his fingers. A rivet tightly set in its hole will return a clean, clear ring while a loose rivet will return a recognisably different dull sound and feel. If the rivet has slipped or fractured, the head will move, and the finger underneath will feel a distinct sting. Rivets are considered to be acceptably driven if and only if, when tapped with a hammer, the marine surveyor hears a clean ring. If the sound is a dull thud, the rivet should be drilled out and another driven in. Alternatively, the original rivet may be ring welded.

The Effect of Residual Stresses

A properly driven rivet possesses a considerable amount of residual tensile stress. That develops as the rivet cools and shrinks, clamping the two plates together and is only partially relieved by plastic deformation in the rivet. Such stress can have an effect on the behaviour of the rivets during an impact on the hull plate. The residual stress does not have an effect on the tensile strength of the material. However, it does have an effect on the amount of plate deflection would be required cause the rivet to fail during an impact. For a given rivet, the presence of a residual tensile stress decreases the amount of additional stress needed to exceed the ultimate tensile strength of the material. That represents a smaller amount of deflection of the hull plate applying the stress though leverage against the supporting item inside the ship. High residual stresses increase the tendency of rivets to fracture or pop during collisions. The head of the rivet can become exfoliated and the slag stringers within the rivet spread, driven by residual stress during stress corrosion cracking and dissolution of the ferrite.



Rivet Point Defects

In many ships or small craft, the heads of the rivets are often behind linings and are invisible and the marine surveyor usually has to estimate the condition of the riveting by examining the points only. There are usually five defects that he will find:

1. scuffing of the point due to the vessel being taken too close to a quay or canal bank.
2. localised cracking of the plating.
3. pitting of the point.
4. rivet slip due to the shank being sheared.
5. rivet points being pulled through the plating.



Photograph 1 Shear Strake Plate blown off the Side by Crevice/Jacking Corrosion on the Landing Strake Seam

Note how the rivets have pulled completely through the plate along both the seam and the butt. The vessel is beyond economical repair and should be scrapped.

Cracking of the plating is often found in Dutch barges along the line of rivet holes and is due to the shipbuilder not countersinking the rivet hole in order to cut costs. It is dealt with in the same way as scuffing.

Drifting - when the rivet holes in the frames and plates do not align correctly, it used to be common practice to force alignment by driving into the misaligned holes a drift punch made of high tensile or tool steel. The process, called drifting, was officially frowned on as it often led to failure by shear of the rivet concerned but was equally often ignored because the riveters were on piece work rates and wouldn't wait for a driller to arrive to drill the hole fair.

Pitting is the most common defect to be found on the shell plating and is usually but not necessarily due to galvanic action. It is often ascribed by those not understanding the difference to electrolysis but that is, these days, a fairly rare cause. If true electrolysis is found, it is usually due to stray currents whose source may be external to the vessel. It is sometimes due to using heavily roked wrought iron rivets. Because of the different microstructure of the two materials, steel rivets usually show large area shallow pits and iron rivets deep pits of small surface area. Both, again, are dealt with by capping or doubling.

Rivet slip is actually fairly rare and is usually due to bad workmanship in fitting the rivets in the first place. Overuse of the drift punch instead of drilling to compensate for bad hole alignment is the most frequent cause. Any such defective rivets have to be drilled out and, if possible, replaced or, alternatively, the whole of the hole filled in with welding. Overuse of the drift punch is often considered to be one of the (many) subsidiary causes of the Tay Bridge disaster of 1879.

Pull through is often found in Dutch barges in the first rivet immediately above any shell plating seam. It is due to the Dutch practice (in order to save money) of springing the frame over the seam instead of joggling either the frame or the outer shell plate. It is often indicative of internal jacking corrosion and is dealt with in the same way as rivet slip.

Scuffing or **scraping** of the rivet points is obvious and is usually dealt with by capping the defective rivets with welding or, if over a wide area, by fitting a welded doubling plate.

Rivets can also be attacked by various forms of corrosion, be deformed by time or have their points removed by grit blasting or other forms of mechanical descaling.

Iron and Steel Caulking

Seepage is neither normal nor acceptable. Although the resulting flooding would be minimal, a seeping joint would mean that the metal inside the joint was subject to corrosion by the salt water. To ensure that a joint was watertight, the plates were drawn tightly together by the rivets as they cooled and contracted, and any leaking joints at the plate edges would be dealt with by caulking. In the case of a lap joint, caulking was achieved by staving up or thickening the edge of the outer plate, using a special chisel.

At a riveted plate connection, water can penetrate the vessel two ways:

1. through a loose rivet.
2. from the caulking edge.

The seams and butts of the shell plating however well riveted are not watertight and have to be caulked. The exposed edge of the outside plate is called the caulking edge and caulking on iron and steel vessels involves forcing an edge of the outside plate tight against the inside plate sealing the land joint. This is accomplished with an air powered chipping hammer and a caulking tool that wedges the inboard part of the caulking edge toward the inside plate. To do that, after the plate has been riveted up, with a lapped butt or seam the sea side edges are caulked by splitting the edge of the outer plate with a chisel driven by an air hammer to a depth of about 6 mm and the inner part of the edge hammered hard up to the inner plate. The first pass with the tool cuts a wedge shaped groove about 2 to 4 mm wide with the high side of the wedge shape is against the inside plate. On the second pass, the tool is turned 180° and used to force the wedge shape down flat and tight against the inside plate. Caulking also tends to force the plate fay apart. The finished caulking edge has a slight step on its inboard edge towards the inside plate. With a strapped butt there were two possible methods. The first involved leaving a 12 mm gap between the edges of the plate, filling that gap with a bar of iron and caulking either side of the bar as in Figure 15 below. Look for galvanic corrosion of the spline. Alternatively, the edges of the plate were close fitted and chiselled to fill the gap and

the seam then fullered smooth. The fuller was placed against the metal and then struck with a hammer. The rounded nose of the fuller spread the metal more efficiently than the flat face of a hammer. The process left ridges in the plate which may then be peened out later with the hammer or other tools. As the author can testify to the reader from experience such work results in an eardrum shattering din. Because of the way the metal is manufactured and its inherent microstructure, wrought iron plates though less likely to suffer galvanic pitting are prone to delaminate under the effects of caulking and when inspecting boats known or suspected to be built from that material the marine surveyor is well advised to check the caulked seams to see if such lamination can

be seen. If below water and near an anode the joint may also show hydrogen blooming. Weeping rivets are sometimes caulked with a caulking chisel hammered round the edge of the point. Weeping is usually an indication of poor initial riveting or of the joint working. As stated above, weeping rivets are more usually capped by depositing a layer of welding over them.

Such was the mind set of some of the older men with whom the author worked when he was serving his time, that, on one occasion, when tying off a line connected to some of the staging upon which it was intended to work, he was told not to tie off the line to one piece of structure because *“that’s only welded, son, not riveted - an’ it might tear off!”*

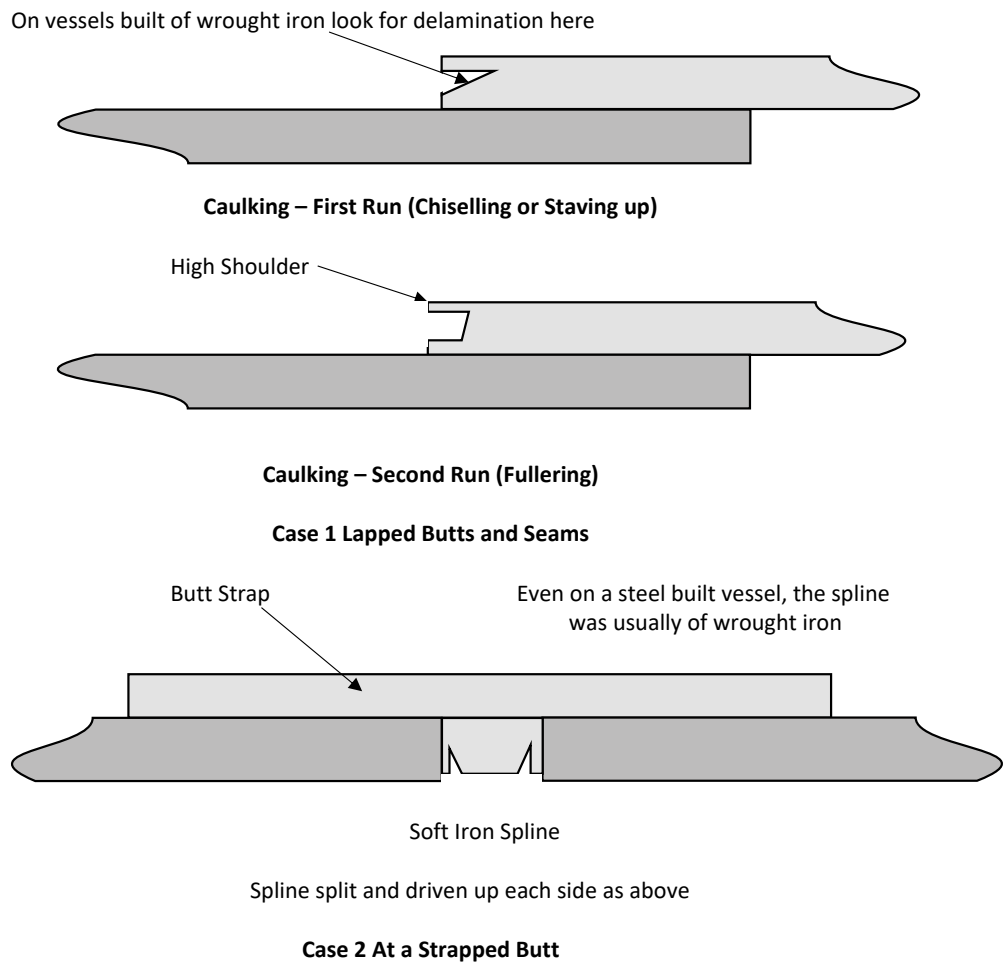


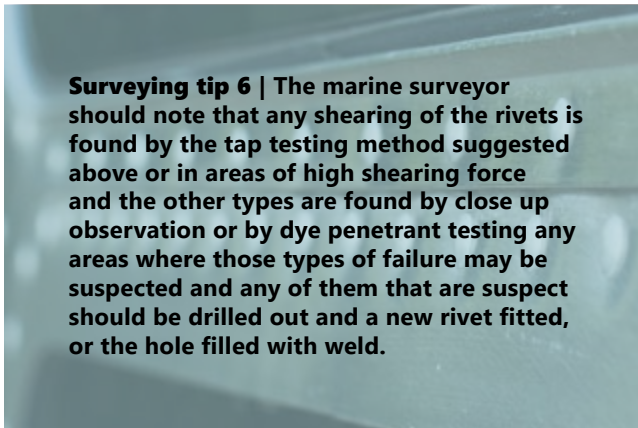
Figure 15 The Steel Caulking Procedure

Surveying tip 5 | A flat bladed screwdriver or caulking chisel with the blade laid flat along the seam and struck with a hammer can be very revealing in respect of possible delamination.

Riveting – Multi-Ply

When inspecting riveted structures there is one important point to bear in mind. Ships are, wherever possible, built using what is called two ply riveting *i.e.*, there are only two pieces in any joint in any part of the structure. Three or more ply riveting, although sometimes unavoidable, was definitely frowned on as it tends to work more easily in a seaway and, if found, such a joint must be very carefully inspected for any signs of rivet slip or joint movement.

One of the places where triple ply riveting is unavoidable is where the plating fits either side of a bar stem or stern post or where the garboard plates fit either side of a bar keel. In all of those places countersunk rivets are used. The inner joint between the garboard strakes and the bar keel is a collection point for water and crud and a prime breeding ground for rust and corrosion with subsequent crevice and jacking corrosion. On a quintuple ply riveted joint it is difficult to make the steel fully watertight, and the marine surveyor should expect to find leaks on the inside of such a joint. As such joints are usually in way of the forward and after peak tanks, chain locker or steering gear flat, such leaks are not usually in themselves serious but, if neglected, they can lead to crevice and consequent jacking corrosion which, over time, can force the joint faces (the fay) apart. On good class vessels the riveting in way of such a joint is often locally of the chain type but, as that is costly, such an arrangement is rare.



Surveying tip 6 | The marine surveyor should note that any shearing of the rivets is found by the tap testing method suggested above or in areas of high shearing force and the other types are found by close up observation or by dye penetrant testing any areas where those types of failure may be suspected and any of them that are suspect should be drilled out and a new rivet fitted, or the hole filled with weld.

Rivet Welding

With Dutch barges, the rivet points in the seams in the side shell just above the waterline will frequently be found to be pulled below the surface of the shell plate by crevice and jacking corrosion between the faying surfaces at the point where the frame has been sprung over the seam and not joggled – see Photograph I. The defect is also due, in part, to the common Dutch barge building practice of not countersinking the rivet holes. The marine surveyor will find that it is common practice to overplate outside of the shell in the area of the pulled rivets but that is bad practice as not only does it not cure the problem merely hiding it, but also the doubling plate is rarely properly connected to the shell in its middle.

A badly welded doubling plate can also lead to the rivets either side of it being pulled and the seam in way opening up leading inevitably to a certain amount of leaking rivet chasing. A second, better but still not correct, repair is to

simply to cover over the rivet point with weld metal. That leaves the jacking corrosion in place and continuing to work and so slowly putting the weld under unnecessary shear stress.

The correct method of repair is to hammer the frame and shell to break up the corrosion and to blow out with compressed air or otherwise mechanically clear the faying space of rust afterward coating it to reduce as far as possible any reoccurrence. The point of the rivet should then be burnt out with an oxy-acetylene torch and the removed volume filled with weld metal. It is expensive and often impractical because of the presence of interior linings but it works. Although it is the correct way to carry out the repair it is very rarely done because it is time consuming and expensive.

The marine surveyor may come across a newly built boat with washers welded on the inside of the hole along the frames and seams as imitation rivets. Such boats are called (with some sarcasm) Washer Joshers.

Riveting Aluminium Alloy

All of the above sections on riveting apply equally well to aluminium alloy as to steel with one small exception. When riveting this material, because it is relatively soft, the hammering causes the metal between the holes to spread by a small amount. Over the course of a long seam, such spreading can build up so that, by the end of the seam, the holes for the rivets no longer line up. The way to avoid that is to rivet up the first four or five holes, miss out four or five holes, rivet up the next four or five and so on to the end of the seam then go back and fill in the gaps. The process is tedious but it saves having to ream out the last half a dozen or so holes at the end of the seam. Aluminium alloy riveting is generally at a much closer spacing than that of iron or steel. **BEWARE**, the plate seams also tend to buckle slightly between the closed rivets and that, therefore, makes them difficult to caulk.



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COP26 and the road to global net zero

Everyone is aware of the urgent need to reduce emissions in the maritime environment and eye-catching innovations are starting to shape up and move in slowly as current methods of propulsion start to look obsolete. It is time to prepare for a brave new world in shipping and boating and new challenges for the marine surveying profession.

Ahead of the COP26 Climate Change Conference scheduled for 1-12 November 2021, to be held at Glasgow under UK Presidency, IIMS has put together a special feature including SIX FEATURE articles in the coming pages which talk about the huge challenges that lie ahead and some of the possible solutions.



So, what is COP26?

In November, the UK, together with partners Italy, will host an event many believe to be the world's best last chance to get runaway climate change under control. COP26 is the 2021 United Nations climate change conference.

For nearly three decades the UN has been bringing together almost every country on earth for global climate summits – called COPs, standing for 'Conference of the Parties'. In that time climate change has gone from being a fringe issue to a global priority. This year will be the 26th annual summit, hence the name COP26.

In the run up to COP26 the UK is working with every nation to reach agreement on how to tackle climate change. More than 190 world leaders will arrive in Scotland. Joining them will be thousands of negotiators, government representatives, businesses and citizens for twelve days of talks. Not only is it a huge task but it is also not just yet another international summit. Most experts believe COP26 has a unique urgency.

What does COP26 need to achieve?

1. Secure global net zero by mid-century and keep 1.5 degrees within reach.

Countries are being asked to come forward with ambitious 2030 emissions reductions targets that align with reaching net zero by the middle of the century.

To deliver on these stretching targets, countries will need to:

- accelerate the phase-out of coal
- curtail deforestation
- speed up the switch to electric vehicles
- encourage investment in renewables.

3. Mobilise finance

To deliver on these first two goals, developed countries must make good on their promise to mobilise at least \$100bn in climate finance per year. International financial institutions must play their part and collectively need to work towards unleashing the trillions in private and public sector finance required to secure global net zero.

2. Adapt to protect communities and natural habitats

The climate is already changing, and it will continue to change even as we reduce emissions, with devastating effects. At COP26 countries need to work together to enable and encourage countries affected by climate change to:

- protect and restore ecosystems
- build defences, warning systems and resilient infrastructure and agriculture to avoid loss of homes, livelihoods and even lives.

4. Work together to deliver

The challenge can only be met by working together and COP26 must:

- finalise the Paris Rulebook (the detailed rules that make the Paris Agreement operational)
- accelerate action to tackle the climate crisis through collaboration between governments, businesses and civil society.

Before we move into the longer feature articles over the coming pages, the next two pages are just extracts from some of the breaking news stories in recent months on this subject to whet your appetite and to give an understanding of how seriously this matter is being taken.

IMO advances measures to reduce emissions from shipping

The IMO's Marine Environment Protection Committee has approved a draft of new mandatory measures for a 40% reduction of carbon intensity compared to 2008 across the global shipping fleet by 2030. The measures include an A-E rating system to incentivize shipowners to improve the carbon efficiency of their ships. The agreement builds on current energy efficiency requirements and provides a global regulatory framework for various technical and operational carbon reduction measures.

Fitting sails and slowing down could cut shipping emissions up to 40%

Fitting sails to cargo ships and sailing more slowly could reduce greenhouse gas emissions from the shipping industry by up to 40% or possibly more as technologies improve, according to a new report from the Institution of Mechanical Engineers.

Air pollution from shipping has increased rapidly over the last decade driven by growth in world trade, and as most emissions are from international shipping, they are not included in individual countries' reduction targets. If unchecked, shipping could account for as much as 20% of global emissions by 2050.

The shipping industry is focused on developing alternative fuels such as hydrogen and ammonia to replace polluting bunker fuel, but these fuels will be at least three times more expensive and will not be ready for the shipping market for at least a decade. Using alternative fuels combined with wind power makes economic sense.

Shipping industry calls for new global carbon tax

The global shipping industry is calling on the world's governments to tax its carbon emissions. Groups that represent more than 90% of the global fleet say the measure is needed to tackle climate change. "A global solution is the only one that's going to work", Guy Platten, secretary-general of the International Chamber of Shipping told the BBC.

Port cities are key to reducing maritime carbon emissions

Port cities offer a vital (and overlooked) way to help decarbonize the global economy. The maritime sector has been seen as a laggard in decarbonizing, but port cities are perfectly positioned to help catalyze a reduction in shipping emissions. Over half of all maritime emissions come from ships while berthed in ports. A port can provide clean renewable energy to ships in port - as well as to the city and surrounding industrial clusters - and support

vessels can provide clean electricity to ships on the approach to the port.

Port cities can also provide the infrastructure needed to facilitate a switch from fuel oil to liquefied natural gas for ships, apply "green port duties" and fee incentives to speed adoption of clean shipping, invest in hydrogen, biogas and carbon capture and sequestration infrastructure and develop circular and bio-economy infrastructure and activities. State-of-the-art digital platforms in port cities can help to optimize shipping and port operations, reduce overall emissions and integrate energy systems of port cities and adjacent territory.

Stena Line accelerates fossil-free shipping to reduce emissions by 30% by 2030

In 2020, ferry company Stena Line continued to reduce its total CO₂ emissions and is ten years ahead of the IMO international shipping emission reduction targets. Nevertheless, the Swedish shipping company is now accelerating the transition towards fossil-free shipping and presents its plan to reduce total CO₂ emissions by as much as 30% until 2030.

Despite a challenging year, Stena Line continued to reduce its total carbon dioxide emissions in 2020. Emissions also decreased per nautical mile sailed by -2.3%/nm, which shows that the ships have become even more energy efficient in 2020.



UK Government launches £20m competition to boost innovation in zero-carbon shipbuilding

The UK government has launched a competition with a £20m prize fund to encourage innovation in the shipping industry to cut harmful greenhouse gas emissions which are currently on the rise. The Department for Transport's scheme aims to foster innovations for a greener shipping future, including zero-emission vessels and clean port infrastructure.

The government said the fund will be used to support the development of prototype vessels alongside infrastructure which could then be rolled out widely, helping move the sector towards net-zero.

SEA/LNG defends LNG's role in shipping decarbonisation

Industry association SEA/LNG defended the immediate environmental benefits of using LNG as a marine fuel and stressed the danger of waiting for alternatives, after the World Bank advised against a two-stage transition.

Waiting for "unproven alternatives" and not fully utilising the "safe, proven, competitive and immediately available" option LNG provides is "a mistake" which only makes the problem of greenhouse gas and local emissions worse, the association said.

The statement was issued in response to a report published by the World Bank, which only sees a "limited role" for LNG as a marine fuel. The bank argued that zero-carbon versions of LNG, such as liquefied biomethane (bio-LNG) and liquefied synthetic methane (LSM), are not expected to be available at sufficient scale to support a "transitional" role for LNG, and additional investments needed for a "temporary" use of LNG would be too high.

LR unveils first members of Maritime Decarbonisation Hub advisory panel

LR has named the industry experts who have joined the advisory panel of its Maritime Decarbonisation Hub and will ensure that the Hub fulfils its mission of providing the right level of insight, collaboration and leadership to support the shipping industry address its decarbonisation challenges.

The panel is made up of representatives from across the industry and includes:

Ole Graa Jakobsen – VP Head of Fleet Technology at AP Moller-Maersk

Tom Strang – Senior Vice President, Maritime Affairs at Carnival Maritime

Aoife O'Leary – Director at Environmental Defence Fund

Damien Speight – Head of Markets Innovation at Orsted

Katy Ware – Director of UK Maritime Services at the MCA

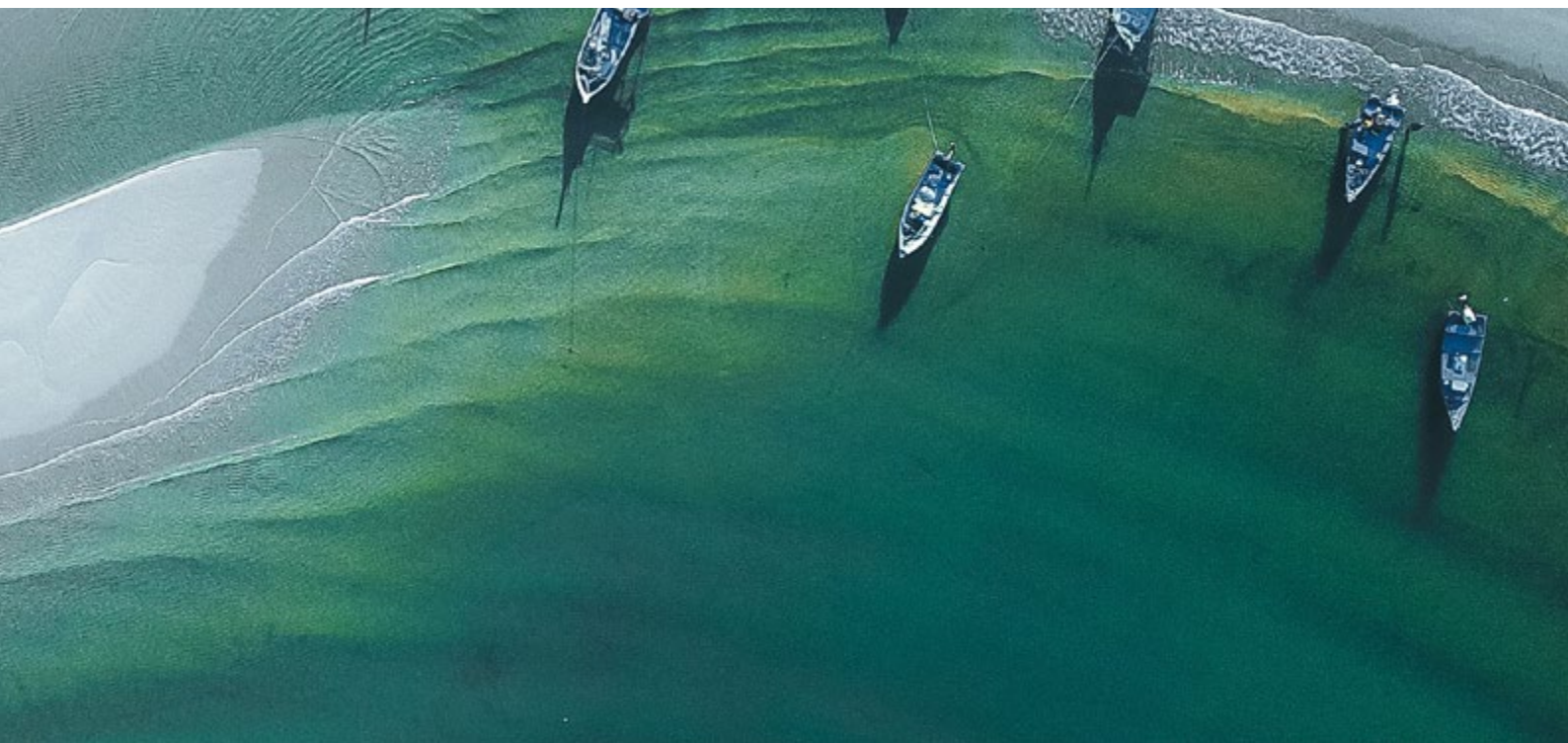
LR's Maritime Decarbonisation Hub, launched in October 2020, is a dedicated centre of excellence to accelerate the safe, sustainable and cost-effective decarbonisation of world shipping in support of delivering greenhouse gas reduction targets.

Lundin probes wave power for 'significant challenges' of offshore decarbonisation

Transitioning offshore oil independent Lundin Energy has launched new R&D with marine renewables outfit Ocean Harvesting Technologies to explore using wave energy converters to help slash emissions from oil and gas production at sea.

The one-year project, which would gather data to project-scope electrification of "major" offshore oil & gas complexes in the northern seas with wave power, is the latest step by Lundin – which last year changed its name to 'Energy' from 'Petroleum' – in a wider decarbonisation campaign that targets carbon-neutral operations inside four years.

But in order to meet both future energy demand and climate targets, it is critical to decarbonise the production of oil and gas as much as possible.



The Shipping Industry Embraces Battery Power



The past decade has seen tight restrictions on emissions from vessels, notably with a 2015 move to a .10% sulfur maximum in Emission Control Areas (ECA) in North America and in northern Europe. As the International Maritime Organization (IMO) now shapes shipping's decarbonization future, shipowners are looking at transitions away from fossil fuels. Among the myriad of alternatives are lithium ion batteries and some early forays into hydrogen fuel cells.

To date, large batteries are used on short runs, mainly as an auxiliary power source in conjunction with traditional fossil fuels, with benefits of load balancing, in a “hybrid” configuration, that is batteries in concert with conventional generators. DNV presents the case for batteries succinctly: “All electric and hybrid ships with energy storage in large Li-ion batteries can provide significant reductions in fuel cost, maintenance and emissions as well as improved responsiveness, regularity and safety.”

Batteries have figured in retrofits of existing offshore service vessels. Eidesvik Offshore, active in the North Sea oil and gas arena; has retrofitted multiple diesel electric vessels for battery power beginning in 2015. In the Americas, OSV operators installing battery retrofits have included Seacor, Companhia Brasileira de Offshore, and, more recently, Harvey Gulf Marine, fitting batteries into “tri-fuel” vessels fueled by conventional diesel and LNG.

The current boom in the maritime wind energy sector, where a decarbonization posture is de rigueur, has provided a further impetus for battery power in newbuilds. Louis Dreyfus Armateurs, with two Service Operations Vessels built in a Turkish yard, has deployed ABB's Onboard DC Grid. ABB explains that this Electrical Supply System (ESS) “...will integrate two sets of batteries used primarily for spinning reserve and peak shaving. Power peaks during

operation can be covered by the battery rather than starting another engine. Again, battery power can act as backup for running generators, reducing the need to run spare generator capacity.”

Batteries bring efficiency where the vessels must wait alongside turbines, as the battery power can substitute for inefficient low-rev generators. Green credentials have also influenced power choices in the ferry sector, with companies’ environmental postures now a factor in riders’ modal choices, and, more broadly, in carriers’ funding sources. In a hybrid situation, one or more diesel powered generators are replaced by batteries, which would then run in port or for load balancing while underway. Ferry specialist naval architects Elliott Bay Design Group (EBDG) Principal, John Waterhouse, explains: “For vessels operating at sustained power on long trips, hybrid propulsion only makes sense if there are varying loads where the ESS can be used for peak shaving or as a spinning reserve.” Depending on the configuration, an inverter and step-up transformer would be linked in to bring battery power up to the equivalent voltage as a generator. Waterhouse, notes that: “High speeds or long distances make the use of an ESS less attractive because of the sheer size of the battery installation.”

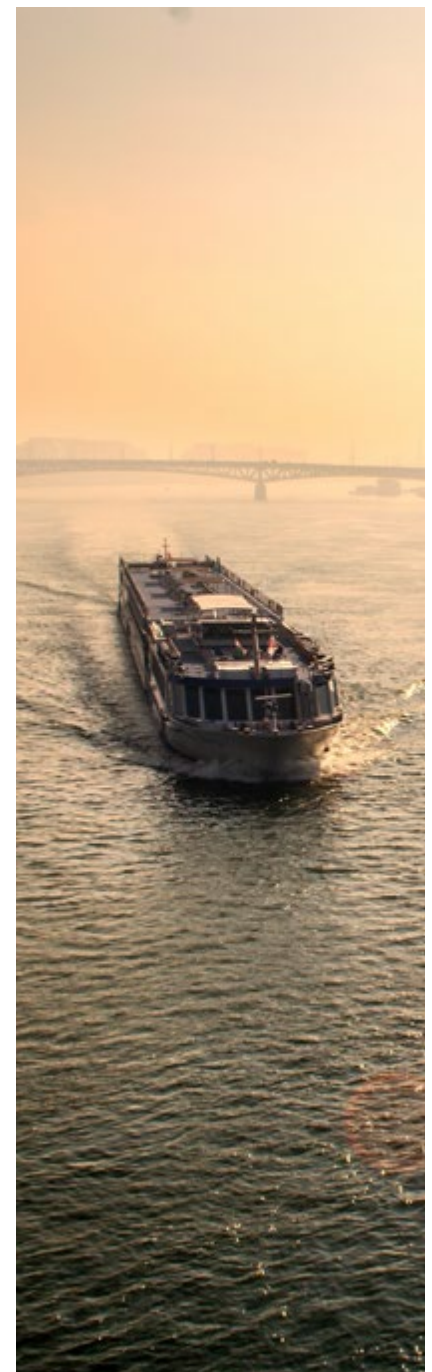
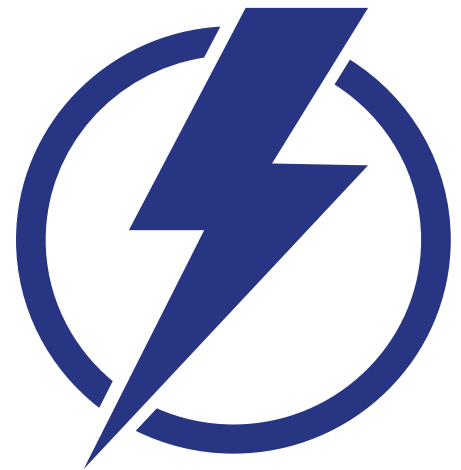
Battery retrofits began in the ferry sector, during 2013 - 2016, with Scandlines (with runs between Denmark and Germany in the Baltic Sea ECA) outfitting six passenger ferries, including two with 1,300 passenger/ 460 vehicle, with lithium ion batteries. In 2019, one of these, Copenhagen, was fitted with a Norsepower Rotor Sail for the Gedser/ Rostock route. In North America, Washington State Ferries (WSF) has embarked on a plan to electrify nearly all of its fleet, in line with its 2040 Long Range Plan (LRP), “...which calls for fleet stabilization by delivering 16 new vessels to replace aging vessels and retrofitting six existing vessels,” according to WSF’s Jan. 2021 System Electrification Plan. WSF has announced plans to convert its three largest ferries, the Jumbo Mark II class, from diesel to a 10.4 MWH hybrid-electric, with system upgrades to be provided by Siemens (which had assisted Scandlines earlier).

Waterhouse notes that EBDG is leading the engineering on the WSF project at Vigor Shipyard.

BC Ferries, serving ports further north, has seen Island Discovery and Island Aurora, the first two of six Island Class hybrids (up to 400 passengers/47 vehicles), constructed at Damen Galati, Romania, enter service in 2020. Four additional newbuilds will be delivered to the Point Hope Maritime yard in Victoria, British Columbia later in 2021 for final preparation work, with the plan to enter service in 2022. The battery packs (2 @ 400 kWh) are supplied by Corvus Energy, based in Norway but with a BC office.

With quick port turnaround times in populated areas, ferry projects include charging “arms” – autonomous in some cases – that can rapidly hook up to shoreside charging stations. In the case of WSF, shoreside battery charging will offer estimated reductions of 53% greenhouse gas emissions (CO₂e) by 2030, and 76% by 2040, compared to a 2005 baseline. EBDG’s Waterhouse said “An operation such as the Bridgeport – Port Jefferson ferry might not use an ESS to supplement the propulsion but could use it in port for the hotel loads, allowing zero emissions when docked.” ABB, which worked with Louis Dreyfus Armateurs with its SOVs, has also been active in the passenger sector.

Most recently, ABB Marine & Ports announced that it would supply Casco Bay Lines (Portland, Maine) with an integrated hybrid-electric power and propulsion package, as well as a shoreside charging apparatus, for a new 599-passenger ferry. Serving the 2.2 nm run to Peaks Island across the Casco Bay, the new vessel would enable carbon emissions from diesel fuel to be eliminated while tied up in port. With ABB’s Onboard DC Grid power distribution system, fuel consumption can be optimized for varying loads. In a presentation to the community, CBL said that it had chosen 900kWh hybrid configuration (one of the four choices provided by EBDG, a consultant on the project). The presentation also reveals that the hybrid vessel, with a capital cost of \$13.97 million, was \$3.7 million more expensive than a diesel-powered



vessel, otherwise the same. In April, 2021, ABB announced that it had been tapped to supply power solutions for 10 hybrids to be built for Portuguese operator Transtejo, for fast ferry routes on the Tagus River around Lisbon.

ABB solutions have also been deployed in Niagara Falls, where Maid of the Mist boats carry tourists around the Falls; the 2020 season saw two new all electric boats joining its fleet. "The latest generation Maid of the Mist vessels are welded aluminum catamarans with batteries powering twin electric propulsion motors capable of a total 400 kW output," according to ABB. An onshore charging system complements the ESS afloat.

Fully battery powered vessels are already here, albeit working short runs. In 2015 Ampere, with capacity for the 350 passengers and 120 cars, began operations on Norway's Sognefjord connecting Oppedal and Lavik, a 5.5 km run. With Siemens as integrator, the 1090kWh battery pack (with DC bus voltage of 850 – 1050) can be charged in under 10 minutes. In Denmark, Ellen, 198 pax/31 cars, connects Fynshav and Søby on a 22 mile run in a protected area in the southern Baltic Sea. Fitted with two motors and a 4.3 MWh battery pack from Leclanché SA, it began service during the summer of 2019. In Canada, BC Ferries has an intention for a future conversion of its Island Class hybrids to full electric operation in the future. In Norway, the fully electric 120 TEU container feeder Yara Birkeland (which is being readied for autonomous operation) is expected to enter service later this year on the Oslofjord, for fertilizer producer Yara Corporation.

An important demonstration project is a fully battery powered bunker tanker designed by e5 Lab Inc., a consortium of seven leading Japanese companies, including Asahi Tanker Co., Ltd. and (with others including Mitsui OSK), which hopes to develop an infrastructure for fully electric vessels. The vessels which will service Tokyo Bay, will be built by Koa Sangyou Ltd. (2022 delivery) and Imura Shipyard Co. Ltd. (2023 delivery).

The vessels will be highly maneuverable, with rotating azimuth propellers at the stern (powered by an electric motor), and a bow thruster for moving transversely alongside for bunkering operations.

In late 2020, the consortium chose Kawasaki Heavy Industries (KHI) to build the ship's propulsion system. In March 2021, Corvus Energy (which also supplied the ESS on Ampere) was chosen to provide the ESS for the e5 vessels. Corvus, which will integrate its 3,480 kWh Orca ESS into the tankers; KHI says that battery operations between charges should be six to eight hours.

Looking ahead: Hydrogen

Forward thinkers are already tackling the infrastructure for distributing hydrogen to the maritime sector. The listed tanker company Ardmore Shipping (ASC), active in moving petroleum products and chemicals (including methanol), announced that it was working to team up with Element 1 (E1), developers of a technology that enables production of hydrogen from methanol, on demand at the point of consumption. As contemplated under a broad mandate to supply the maritime sector, the E1 system could bring hydrogen to fuel cells at docks.

Corvus Energy is thinking along similar lines, with a late 2020 announcement that it was partnering with Toyota, to bring its fuel cell technology to the maritime sector, with plans to develop and produce Proton Exchange Membrane (PEM) fuel cell systems for the global maritime industry. With a production plant in Bergen, Norway, it plans to offer fuel cells based on a technology developed by Toyota for automobiles, starting in 2023. The project has received \$6.25m in funding from Innovation Norway, a State agency. Corvus is thinking about a robust long-term strategy, saying: "Furthermore, a specific marine control system uniting the battery and fuel cell operation will be developed for easy integration with power management systems from a range of system integrators." EBDG's Waterhouse said "...the efficiency of PEM conversions is over 50% (energy output/energy content





of hydrogen) so it's better than an internal combustion engine." He told Maritime Reporter that "Most marine applications need to be in the several MW range. These will likely be based on designs for railroad engines since the railroad market is much larger than the marine market."

Another set of projects is underway in Europe, under the auspices of the E.U. funded Flagships project, a consortium of shipowners, equipment suppliers and service providers seeking to bring hydrogen fueling to marine carriers. One project member, the French inland shipowner Compagnie Fluvial de Transport (CFT), a subsidiary of the Sogestran Group, is set to deploy a hydrogen fueled vessel on the River Seine later in 2021, as part of a new business for urban distribution with transport vessels in the Paris area. Onboard fuel cells will be supplied with compressed hydrogen in cylinders. The consortium is also building a passenger/car ferry at the Ada Shipyard, in Istanbul, to be deployed by the Norwegian owner Norled along the coast near Stavanger.

The Ardmore Shipping hydrogen fuels distribution mandate is worldwide, but it points towards the U.S. Providing a hint of a market with likely high uptake, if the deal moves ahead, Ardmore and E1 would be bringing in Maritime Partners, a financier which has penetrated heavily in to the U.S. inland waterway markets, having financed hundreds of barges for the inland river system.

Smart money with a maritime bent is looking closely at batteries and fuel cells, in conjunction with funding from government. The SW/TCH team (tied to investor Oaktree, and to Clean Marine Energy - backers of early LNG fuel barging efforts) has developed a concept for an all electric ferry around New York's waterways, and is participating in the Golden Gate Zero Emission Marine project, where the ferry Water-Go-Round with construction underway at All American Marine, to be powered by hydrogen fuel cells, is set for a 2021 launch.

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Hydrogen fuel cells scale up to shipping's decarbonisation challenge



By **Chris Chatterton**,
COO, Methanol Institute

As the most efficient carrier of Hydrogen, Methanol is the preferred fuel source for a solution seen as critical to reducing emissions, writes Chris Chatterton, The Methanol Institute...

Chris Chatterton joined the Methanol Institute in February 2015 as the Institute's Chief Operating Officer, where he is responsible for supporting the association's CEO. This includes government and strategic relationships, membership growth, and administration of the Singapore office. Over the past 20 years, Mr. Chatterton has worked at the executive level across the power, oil & gas, biofuel and chemical sectors, where he has been responsible for creating strategy, fundraising, restructuring, and operations for both startups and multinationals.



Hydrogen's application as a direct fuel could be many decades away. But faced with the problem of needing to cut emissions quickly ahead of 2023 and 2030, shipowners are examining and investing in hydrogen fuel cell technology, with Methanol as the primary energy carrier, where it is either reformed alongside the fuel cell in a separate unit, or integrated within the fuel cell itself.

It is abundantly clear that decarbonising the transportation sector and shipping in particular poses a formidable challenge. Energies available to shoreside facilities such as renewable electricity are hard to generate onboard ship despite a handful of projects focussed on this problem.

One of the issues facing owners is that the multi-fuel future is a phased process in terms of regulation, availability and suitability, with LNG and Methanol the only practical short term choices. If the goal, as many believe, is to use Ammonia and Hydrogen as fuel then this has to be seen in the context of safe, affordable and regulated technology.

Fuel cells can already meet the electrical demands of vessels in port and supply power for applications including refrigerated containers and port equipment. And a new generation of fuel cells has the potential to provide both vessel auxiliary and ultimately main propulsion power.

Suitability

Fuel cells generate electricity through an electrochemical reaction rather than combustion; in a fuel cell, hydrogen and oxygen are combined to generate electricity, heat and water. Clean, efficient, reliable and low noise, fuel cells do not need to be periodically recharged like batteries, but instead continue to produce electricity as long as a fuel source is provided.

Unlike combustion-based power generation, fuel cells provide virtually emission-free power and do not produce particulate pollutants or unburned hydrocarbons. They emit less carbon dioxide than other, less efficient technologies and when using fuel generated from renewable sources can be net carbon neutral.

Methanol is an extremely efficient carrier of hydrogen atoms, with the highest hydrogen-to-carbon ratio of any liquid fuel. Liquid Methanol at ambient temperature and pressure packs 40% more H₂ by volume than hydrogen in a liquid state (-253C) and 140% more H₂ than compressed hydrogen at 700bar. This makes it the ideal source to be re-formed onboard ship and consumed as hydrogen in fuel cells.

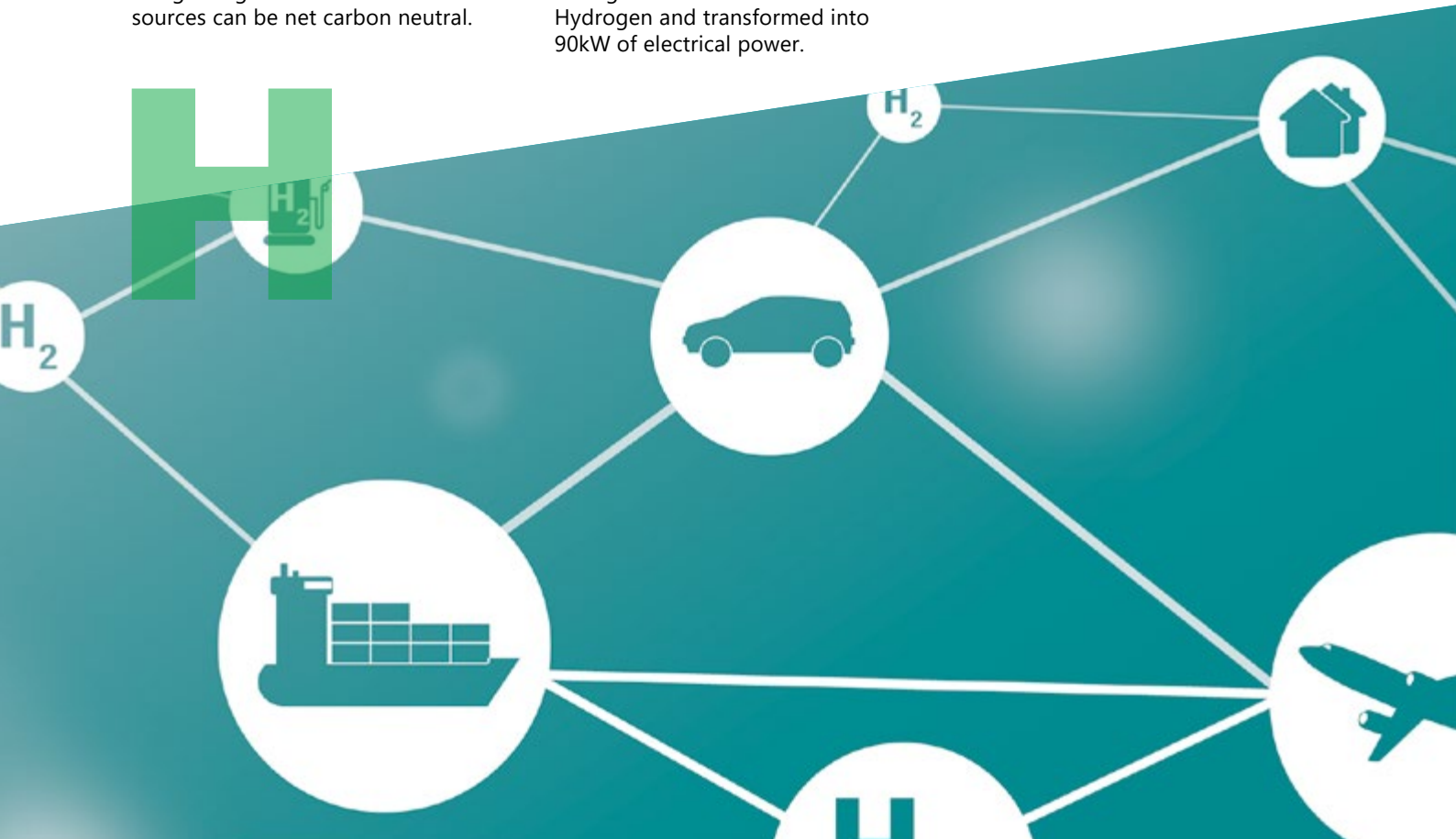
Compact and affordable processes are increasingly available for onboard reforming of Methanol to Hydrogen at qualities necessary to be used in fuel cells and using Methanol as the source reduces cost towards a competitive price with diesel for some generator applications.

Fuel cells are already in use in a number of maritime applications, notably onboard Viking Lines' ropax ferry M/S Mariella. The vessel is equipped with a fuel cell stack powered by a methanol fuel supply system designed and installed by the Meyer Werft shipyard. Mariella's Methanol fuel tank is bunkered by truck using a standard hose arrangement and is reformed into Hydrogen and transformed into 90kW of electrical power.

In other small scale applications, e1 has produced a Methanol to Hydrogen generator designed to support 100 kW mobility power applications including replacing polluting diesel generators for refrigerated containers.

New Applications

With the technology proven and accepted, the next stage of development is to further scale fuel cells to provide power for new applications and at higher loads. Manufacturer SereneU has just announced its fourth generation of fuel cell units, SereneU, with claimed advantages including longer lifetime, decreased service and maintenance and lower total cost of ownership. These Methanol fuel cells have the option to interconnect with multiple units resulting in power systems and solutions for larger power demands. A group of Norwegian companies is developing a solution to lower emissions by combining liquid hydrogen fuel cells with battery storage as soon as 2023 when the IMO's EEXI and CII regulations enter into force.





RIX Industries has licensed e1's reforming technology to create a mobile Methanol-to-Hydrogen generation system and provide green power in shipboard and marine environments. With the ability to generate hydrogen onboard and on demand, the RIX system offers users a safer and smaller shipboard volume requirement as compared to high-pressure compressed hydrogen solutions.

Without the heavy and costly footprint of cryogenic liquid hydrogen storage, these highly efficient power systems provide shipbuilders and vessel operators a readily available path away from diesel-based propulsion.

Finally, an innovative fuel cell system based on high-temperature proton exchange membrane (HTPEM) technology designed by fuel cell manufacturer Blue World Technologies is being constructed for testing by Alfa Laval.

The test installation, which will use Methanol as fuel will explore the technology's potential as a source of marine auxiliary power. Funded by Danish Energy Technology Development and Demonstration Program, the project is a joint effort between Blue World Technologies, Alfa Laval and shipowners including DFDS, Maersk Drilling and Hafnia.

The aim of the project is to establish a highly efficient and cost-effective HTPEM fuel cell, giving marine vessels a realistic alternative to combustion-based auxiliary power within the near future. The fuel cell test setup will have a power of 200 kW, but the fully developed and modular design should be possible to

scale up incrementally to a level of 5 MW.

Fuel cells offer shipowners a practical means of adopting hydrogen technology to provide increasingly significant amounts of power. Their advantages of size, reliability and suitability for marine applications make them an increasingly interesting prospect as asset owners consider their decarbonisation options.

Powered by conventional Methanol, fuel cells can already provide significant emissions reductions at prices which are increasingly attractive to owners facing up to the prospect of higher fuel bills in future, by sidestepping the cost prohibitive, cryogenic or compressed gas infrastructure required for pure hydrogen.

As fuel cell projects scale up and larger volumes of renewable Methanol become available, the ability to drive emissions even lower and meet regulatory targets ahead of time becomes a reality.

Bergen-based system integrator Norwegian Electrical Systems intends to install a 3.2MW hydrogen fuel cell onto a large vessel currently being designed by Havyard Design for the shipowner Havila. This will be the largest fuel cell ever installed on an ocean going vessel, replacing the more frequently used compressed gas. Batteries are planned to store additional energy to make the system fully emissions-free.

Leading tanker shipowner Ardmore has partnered with e1 and Maritime Partners to create e1 Marine with the purpose of delivering e1's unique methanol-to-hydrogen technology to the marine sector.

e1 Marine will have a worldwide mandate for the marketing, development, licensing, and sale of the hydrogen generation systems for application to the marine industry, including shipping, containers, offshore energy, renewable energy, passenger and leisure and certain port infrastructure and related applications.

New age of sail looks to slash massive maritime carbon emissions



By **Andrew Willner**

Andrew is a former boatbuilder, sailing vessel master, and retired NY-NJ Baykeeper. In 2013-14 he was recruited as a volunteer aboard the Vermont Sail Freight sailing barge Ceres built by Erik Andrus in his Vermont barn. The Ceres made two successful voyages from Burlington on Lake Champlain, travelling down the Hudson River to New York City. Andrew is also executive director of the Center for Post Carbon Logistics.

- If ocean shipping were a country, it would be the sixth-largest carbon emitter, releasing more CO₂ annually than Germany. International shipping accounts for about 2.2% of all global greenhouse gas emissions, according to the U.N. International Maritime Organization.
- But change is on the way. Wind, solar electric, and hydrogen-powered ships offer innovative low- or no-carbon alternatives to fossil fuel-powered cargo vessels, with wind about to make a huge comeback in shipping, say experts. New experimental sail designs include hard sails, rotating vertical cylinders, and even kites.
- Today, startup companies like Fair Transport (with its retrofitted wooden vessels Tres Hombres and Nordlys); modest sized proof-of-concept firms, with purpose-built vessels like Grain de Sail; and large cargo ship retrofits and purpose-built vessels like Neoline's new large cargo vessels, are starting to address CO₂ emissions.
- Through the late 1940s, huge steel sailing ships carried cargos on some ocean routes. By 2030 — less than 100 years since the end of the last great era of sail — fossil fuel-powered cargo vessels may give way to high- and (s)low-tech sailing ships thanks to a revolution in energy technology, that reduces shipping costs with less emissions.

In January 2010, an “unpowered” wooden sailing vessel more than 70 years old, the Tres Hombres, arrived in Port-au-Prince carrying desperately needed earthquake relief supplies from Dutch humanitarian organizations for the people of Haiti. Although not the first contemporary version of “green logistics,” Tres Hombres — propelled by a trio of clean energy technologies: sails, wind turbines and recycled vegetable oil — epitomized the entrepreneurial spirit of today's retro-revolutionary sail freight movement.

To many maritime experts, Tres Hombres' cross-ocean journey stands out as a symbol of the rebirth of cargo-carrying wind power — incorporating a marriage of old and new technologies becoming a viable alternative to fossil fuel-powered ships on the open sea.

Today's gigantic diesel fuel-reliant container ships, decks overloaded with cargo, are still a common sight in harbors from New York to Hong Kong. But the days of these gargantuan vessels, driven by massive internal combustion engines, may be numbered.



The engineless modern cargo transport sailing ship Tres Hombres. Image courtesy of Fair Transport.

An economic and climate driven sea change

Despite the present dominance of fossil-fueled cargo ships, it's well understood by industry insiders that the current maritime logistics system is both ageing and fragile. Fossil fuel transport today is up against a grim carbon reality: if ocean shipping were a country, it would be the sixth-largest carbon emitter, releasing more CO₂ annually than Germany. International shipping accounts for about 2.2% of all global greenhouse gas emissions, according to IMO's most recent data.

This annual surge of atmospheric carbon released by ocean going ships not only worsens climate change — one of nine scientifically defined planetary boundaries (PBs) we now risk overshooting — it also contributes to ocean acidification (a second planetary boundary) which is beginning to seriously impact biodiversity (a third PB). And add to that significant chemical pollution (a fourth planetary boundary) that is emitted from ship smokestacks.

All of these planetary boundaries interrelate and influence one another (negatively and positively): for example, reducing black carbon (or soot), the fine particulate

matter emitted from fossil fueled oceangoing vessels could slow global warming somewhat, buying time to implement further steps to reduce carbon emissions.

Another problem with today's vessels: when cargo ships dock, they use auxiliary engines that generate SO_x, NO_x, CO₂ and particulate discharges, while also creating noxious noise and vibrations. (Innovators are already solving this problem with cold ironing, providing shoreside electrical power to ship berths, allowing main and auxiliary engines to be shut down.)

Today's cargo industry is plagued not only by environmental issues, but by a difficult logistical and economic problem: its current fleet of fossil-fueled container ships are mostly behemoths — with immense carrying capacities. However, the "overcapacity" of these giant ships leaves them without the nimbleness to adapt to unexpected shifts in global supply and demand; the world's ports and specialized markets could likely be better served, say experts, by smaller, far more fuel-efficient cargo ships.

The current sea cargo system — reliant upon high-priced carbon-based fuels and unstable energy

markets; interwoven inextricably into long-distance, globalized world trade; and designed for just-in-time delivery that requires precisely scheduled shipments — is increasingly vulnerable to the vagaries of fossil fuel shortages, price shocks and surges, as well as geopolitical conflict and volatility in the Middle East, Venezuela and elsewhere.

Equally problematic, today's fossil-fueled ships depend upon an ability to avoid paying for negative externalities such as carbon emissions and environmental pollution, while also being governed by lax international labor, environmental, health, and other agreements.

Winds of change, especially triggered by new international commerce and climate pacts and policies, could soon push us rapidly beyond carbon into a New Age of Sail, with the need for a planet-wide cargo fleet rebuilt from the keel up.

Birth pangs for a New Era of Sail

As far back as the 1970s, the global shipping industry began struggling with both its business models and environmental issues. Oil embargoes in 1973-74, the failure of US Lines in 1986, and surging fuel prices in the 1970s and '80s led some transport companies to start experimenting with sail-assisted technology on tankers and container ships to save costs and reduce emissions. By the 1980s, Japanese shippers had designed new and retrofitted sail-assisted merchant ships.

In 2018, in response to environmental concerns, the International Maritime Organization (IMO) adopted mandatory measures under an umbrella of policies to reduce greenhouse gas emissions produced by international shipping: under the IMO's pollution prevention treaty (MARPOL); the Energy Efficiency Design Index (EEDI), which is mandatory for new ships; and the Ship Energy Efficiency Management Plan (SEEMP). Many of these mandated changes go into effect by 2030, less than 10 years from now.

An embrace of old technologies, made new

Facing these many challenges, the big question for the cargo industry is: how does it get to a new age of post-carbon shipping and sailing, with the least amount of economic pain?

In fact, change is happening now — fast — as sailing vessels get put on the water by startup companies, like Fair Transport, with its retrofit wooden vessels; by modest sized proof-of-concept companies like the Schooner Apollonia; and by firms with newly built ocean-crossing sailing ships like Grain de Sail; and lastly by large cargo ship companies launching innovative retrofits and purpose-built vessels like Neoline's new large cargo vessels.

All of these innovators embrace different technological approaches to address the same problems of CO₂ emissions, the high cost of fossil fuels, and new global economic and regulatory realities.

Wind propulsion systems cover a wide spectrum in modern commercial shipping. These range from wind-assisted fossil-fueled vessels (where wind provides auxiliary power), to purely wind-driven ships without auxiliary power, to sailing-hybrid ships where the primary propulsion come from the wind but is augmented by engines to ensure schedules are maintained.



The Grain de Sail cargo sailboat

Ceiba-Sail Cargo Inc. transports freight using a sustainable carbon-neutral sailing system. Its first ship, CEIBA, will offer something special to exporters and importers: an eco-friendly means of moving their most important organic, sustainable products.

The Hawila Project also offers an environmentally friendly way of shipping organic goods between small coastal communities, especially European producers. The vessel can transport 55 tons of cargo using only wind power.

Grain de Sail combines the best of old and new. It is a freshly built 24-meter (80-foot), 35-ton-capacity schooner with a state-of-the-art climate- and stability-controlled

hull for maintaining fragile goods. Sail powered, it is equipped with cutting-edge navigation technologies and made out of aluminum for a better weight/performance ratio and greater durability. In December 2020, Grain de Sail unloaded a shipment of wine and cognac at the Brooklyn Navy Yard, becoming the first ocean-crossing sail cargo ship to unload cargo in New York since the schooner Black Seal delivered cocoa beans by sail to Mast Brothers chocolate makers in 2011.

Of these startups and proof-of-concept vessels, Jorne Langelan, a veteran of Fair Transport's sail cargo venture, may possess the boldest old-new sailing concept. Ecoclipper, when built, will be a big new "square rigger" and full-sized replica of the Dutch cargo ship Noach, built in 1857 — with an equally big mission. "She is to be operated in the deep-sea trade: Trans-Atlantic, Trans-Pacific and around the world," says her promoter. She'll be rigged with three square-rigged masts, boasting 930 square meters (10,000 square feet) of sail, "traveling without mechanical propulsion," and able to transport up to 500 gross register tonnage (GRT) of cargo.

High-tech innovations

Maybe among the most unique innovations in the cargo shipping sector today are sails that look less and less like traditional sails. Known as sail-assisted or wind-assisted propulsion devices, the concept often is to fit existing fossil-fueled vessels with a variety of new sail technologies



Wallenius Marine is developing the Oceanbird, able to ship 7,000 cars and trucks across the Atlantic propelled only by high-tech wing sails. Image courtesy of Wallenius Marine.

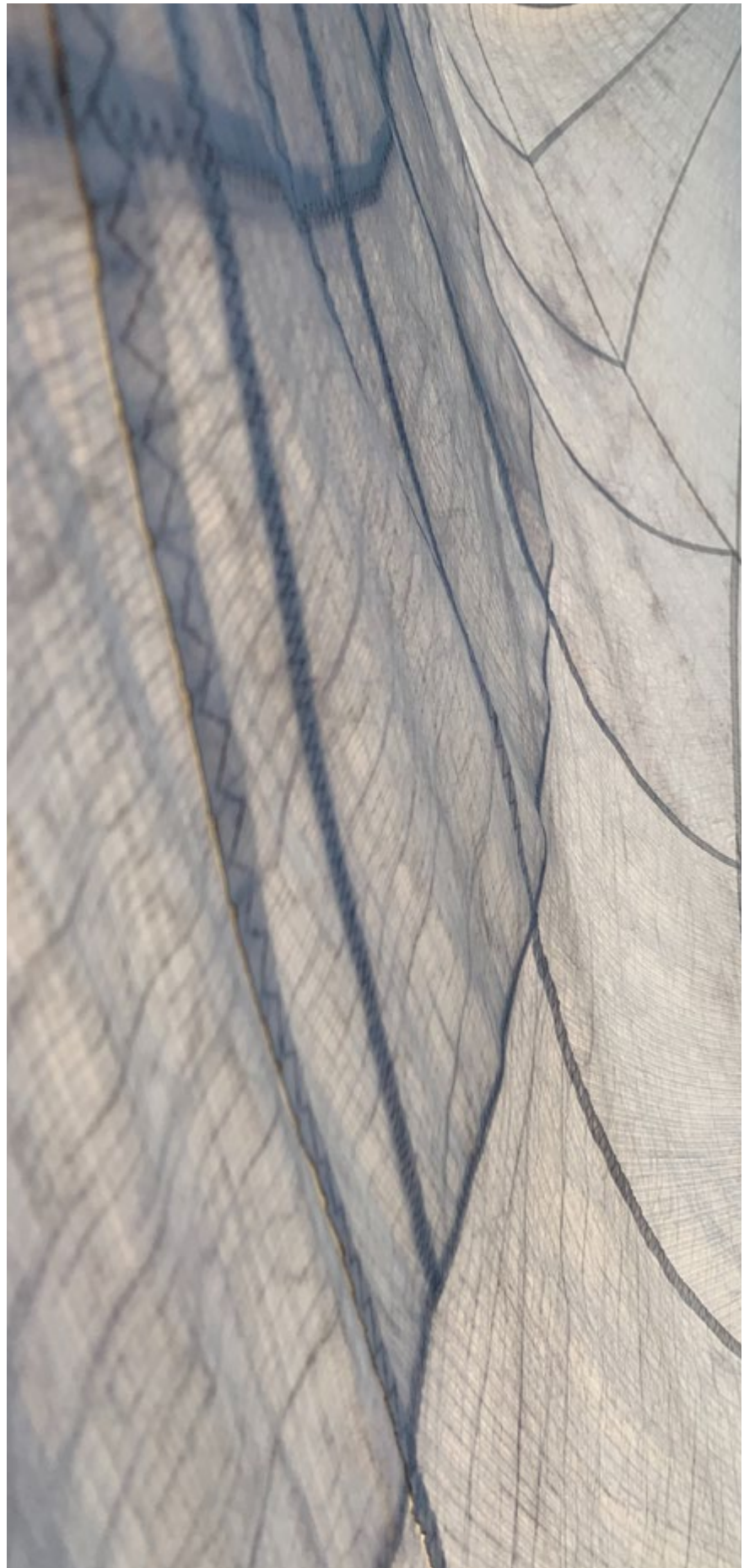
that offer a boost in power while cutting carbon emissions.

These cutting-edge approaches include wing sails, which are inflatable; “hard sails” which look like an airplane wing set up vertically; “Flettner” vertical rotor sails that resemble smokestacks (but which use the Magnus effect, a force acting on a spinning body in a moving airstream); the Dynarig, “a state-of-the-art, modern, high-tech rig, relying on the use of cutting edge, high-strength materials currently used on high-performance racing yachts”; and sail-assist kites or sky sails that look and act like hang gliders, launched from a ship’s bow with a cable to help pull the vessel downwind.

As fossil fuels grow scarce and expensive, sailing ships and alternatively powered vessels will replace fossil-fueled shipping, and the new ideas are seemingly endless: hemp and other cellulose-based plastics can replace fiberglass and other synthetic hull and sail materials; ships will ride above the waves on hydrofoils, maybe replacing airline high-speed passenger service; and many more small river, estuary and ocean ports will be renovated and updated to create an “internet” of coastal and island-linked small- to mid-sized shipping lanes.

New vessels will also require a different type of port: electric and people-powered first- and last-mile logistics, with old skills of seafaring, ship-keeping, and shipbuilding preserved, renewed and intermixed with 21st century know-how. We are fast entering a world of sail, battery, and hydrogen; cargo shipping beyond carbon.

Before he died in 1947, Gustaf Erikson, who ran a fleet of Baltic Sea windjammers in the Åland Islands, “was fond of telling anyone who would listen that a new golden age for sailing ships was on the horizon: sooner or later, he insisted, the world’s supply of coal and oil would run out, steam and diesel engines would become so many lumps of metal fit only for salvage, and those who still knew how to haul freight across the ocean with only the wind for power would have the seas, and the world’s cargoes, all to themselves.”

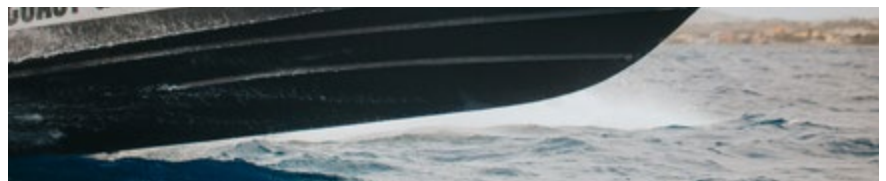


Hydrofoils, electric and the future of boating technology

By **Jared Powell**,
Editor of *Wave to Wave* magazine -

www.wavetowave.com

Last year I wrote an article about how mild hybrids could be an elegant solution for marine propulsion. A mild hybrid is a simple 48-volt system that replaces the starter and alternator, while also assisting the gas engine under acceleration. For around the dock and getting on plane, a mild hybrid would be fantastic for outboards and inboards, improving power and efficiency without adding weight or complexity. Recently, there has been big news about electric boat startups, electric boat racing and electric powered hydrofoil boats. I want to look at each of these and present an argument as to why they are poorly thought out. Quite simply, they don't work well in the real world.



Let's talk about hydrofoils first.

Hydrofoils have been around for a long time and in some cases, they offer a couple of advantages. The most basic advantage is that they indeed lift the vessel out of the water and become mostly impervious to waves, offering a very stable ride. In really rough water, open water with large spans between waves, hydrofoils suffer and become a liability, particularly in small boats. The foil simply can't lift higher than the peak of the wave and can make manoeuvring very difficult. That's not the biggest problem with foils though.

Foils have another problem, the faster they go, the less efficient they are. My earliest exposure to foils was the Russian designed Volga, a narrow hull that was 29' feet and was somewhat commercially successful. They usually ran a Volvo drive or direct drive with a small diesel and looked well ahead of their time. A

gentleman on the lake I grew up on had one, so I have seen them up close, it was so unique that just seeing it was a bit of an event. The original Volga was first made in 1958 I believe. Back to the argument, they cause drag and if you want to be efficient on the water, you want to reduce drag.

Many people see America's Cup sailboats and see how fast they are and assume that foils would also be faster on a powerboat but that's not the case. Sailboats do really well with foils because they need the lateral and directional stability in the water of a center board, keel and or dagger board along with a rudder. Foils can act as those things, offering stability, while lifting the hull out of the water, making sailboats faster. America's Cup boats are only going about 40 to 45 MPH, fast for sailing, quite slow for a powerboat. I'm not a sailing expert but I did race Laser 2 boats

for several years when I was young and have spent quite a bit of time on different sailboats and it is very obvious that what works for sailing doesn't work for performance boats at all.

The drag part is important to point out because the marketing behind some of the new foil power boats suggests they are faster and more efficient, they are not. One brand "Candela" touts "How do you massively increase the efficiency of a boat? You fly." That's actually true but foils don't fly, they drag.

If you combine the increased drag of a foil and the limited range of a battery electric propulsion system, you get a bad combination. Electric motors are ultra-efficient and incredibly powerful but the constant drag and weight sensitivity of a small boat makes for a very limited range. The only solution is low speed, long range and there is nothing wrong with that, low speed cruising is a great use for electric boats. Duffy Boats figured this out decades ago. Hinckley Yachts also has a slow day cruiser called the Dasher that can cruise for 5 hours at 8 MPH and is 28' in length. If you did want to try and combine speed and efficiency you would use the fastest hull possible, not a foil-based design. A tunnel hull or light pad V design is far superior than a foil design.

The Hinckley Dasher



The X Shore Eelex 8000

Another electric brand from Sweden, X Shore, announced recently that they received funding to increase production for their 26' open day boat. With power from Torqeedo, using BMW i3 batteries, the boat weighs a hefty 5,700 Lbs. The X shore is a combination of utilitarian meets green consumerism, with cork deck material and earth tone colors. Because electric motors produce incredible torque, it is no surprise you can achieve decent speeds in short spurts but the X Shore has a limited range, 70 to 100 NM at a slow cruise, using a 120 KW battery. Top speed is a reported 40 MPH. This is actually a pretty good execution for an electric, a practical design and a decent enough range. Starting at around \$350,000, makes it a tough proposition though.

With all the buzz about electric boats in the last few years it is no surprise there was also rumblings of an electric boat racing series. Alejandro Agag, the man behind Formula E, wants to bring electric boats to a racecourse but it will be even more challenging than electric auto racing. For one, electric cars are incredibly fast, electric boats could be incredibly fast yet might not have the appropriate range. He does have a solid team, although their lack of boat racing experience shows.

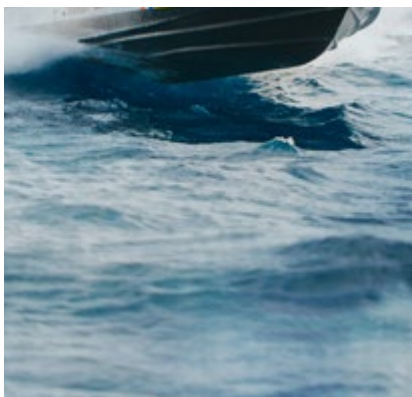
The group commissioned a design startup called SeaBird Technologies to develop a boat and unfortunately they are going with a foil design, which will be slow and cumbersome. A foil design is just the wrong direction, tunnels are vastly superior in efficiency and dynamics.

When I did our Allison Grand Sport project with the Mercury 150 four stroke, I always pointed out the fuel efficiency along with the speed. Some would remark that it is a performance boat, who cares about the fuel burn and I would reply that the fuel mileage is a mark of efficiency. Efficiency on the water is speed; the fastest boat is the most efficient boat. These companies are missing the most critical part, hull design.





The Torqeedo powered Zin Boat is trying to be more of a sport boat



The Zin Z2R boat pictured above makes all the mistakes you would expect, starting with the inefficient design. At 20' the complete package weighs about 1,750 lbs. With Torqeedo power, about 80 HP equivalent, the Zin Z2R does about 45 MPH, although the company limits it to 30 MPH for production. And with a cruising speed of 17 MPH, it can achieve 100 miles of range.

The designer claims the boat was tested up to 55 MPH but "was insane" which is another clue you have a bad design. To be fair, I think the Zin Z2R looks pretty cool and for a first time effort is pretty good. That said, it is obvious the people who designed it don't know much about boat design. It actually looks like an old runabout from the fifties. At \$250k it's mostly a novelty project. You could buy an Allison, which is far more efficient and tow it with a Tesla and still have lots of dough left over.

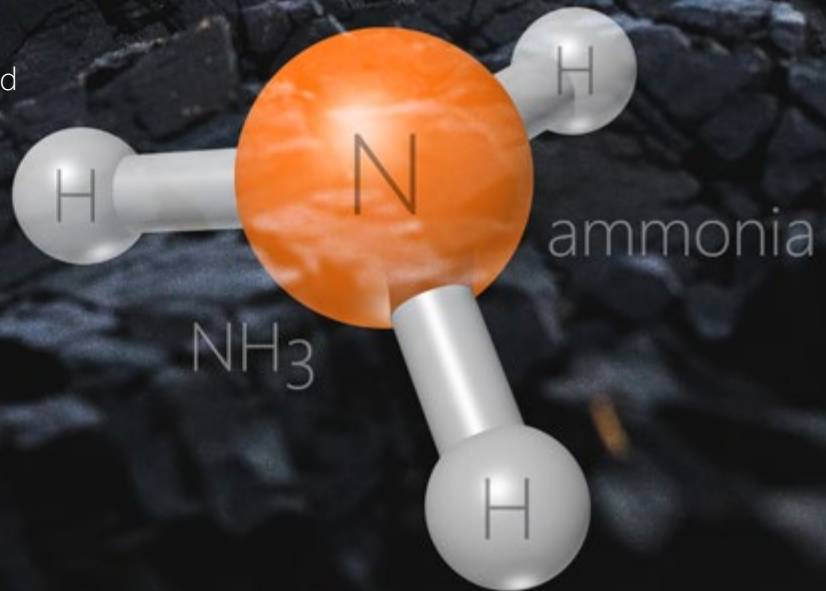
When you hear about electric technology on the water you often hear the awkward claim "It's the Tesla of boats." I can assure you none of the boats mentioned are even close to being a Tesla on the water. At best they are luxury boats with golf cart level performance. Admittedly, I have no problem with that. The Duffy and others have been making little day boats for a long time; slowly cruise

around all day, no maintenance, it's a great use case. I have even seen small vintage boats using converted small electric outboards to use in rentals on small protected waters. Again, great use case. Battery density may improve, costs will come down and the all critical charging speed will also improve further enabling more use cases for boats but don't hold your breath on the all electric 300R killer. That said, if performance was your goal, you could replace the powerhead of an outboard with an electric motor, slide a battery pack in and with the right hull you would fry all the attempts so far.

The opinions expressed in this opinion article are those of the author and not necessarily those of the International Institute of Marine Surveying.

DECARBONISING SHIPPING ... COULD AMMONIA BE THE FUEL OF THE FUTURE?

Today 80% of ammonia produced is used exclusively for the fertiliser industry. However, as pressure is placed on the shipping sector to decarbonise and shift away from reliance on fossil fuels, ammonia is looking like an attractive alternative. If 30% of shipping switched to ammonia to use as a fuel, then the current production would have to nearly double. There are challenges for up-scaling, but an even greater one for ammonia production to be carbon free which will come at a cost, but this also presents opportunity for both industries to reduce their carbon footprint and work together.



Ambitious greenhouse gas (GHG) reduction targets have been set by governments for the decades ahead. In advancing our economies from fossil-based fuels to alternative energy, every industry will be affected, including shipping. Regulators such as the IMO and European Union are turning targets into regulations. As mandatory carbon dioxide (CO₂) regulation increases in strength, it is clear no single fuel will solve all of shipping's zero carbon needs. In the future, shipowners will equip vessels for the fuel most appropriate to a ship's type, route and cargo. As well as

ammonia, other candidates for alternative fuels include hydrogen, methanol, biofuels, batteries and nuclear power.

Each fuel has benefits and drawbacks, but fuel flexibility, the ability to convert an engine to use a different fuel, will play an important role. Each shipowner will have critical investment decisions to make about its fleet, probably several times over the next few decades, particularly as the life expectancy for the average ship is 25-30 years. Some vessels will be refitted with entire new propulsion systems, others will be scrapped and replaced.

A recent survey of shipping sector stakeholders by Lloyd's List – the maritime publication – and LR identified ammonia as one of the top three fuels with potential for 2050. The survey showed the industry expect ammonia usage to grow to 7% of fuel by 2030 and 20% by 2050. Ammonia is also central to several national decarbonisation strategies. For example, Japan plans to expand ammonia fuel use to three million tonnes per year by 2030. Here we review the potential of ammonia as a fuel for shipping, looking at how it could reduce or eliminate emissions of CO₂, the main GHG associated with fossil fuels.

The case for ammonia

Ammonia is a compound of nitrogen and hydrogen. As ammonia contains no carbon it does not emit any CO₂ when used to fuel an internal combustion engine. This creates the potential for truly zero carbon propulsion. An additional small quantity of pilot fuel is required for combustion however, which should also be zero carbon. However, what must be considered is that most ammonia today is produced from natural gas and so from a lifecycle perspective it is not zero-carbon, which is something the industry needs to address if ammonia is pursued.

Acceptable energy density

One attraction of current fossil-based fuels is their high volumetric energy density. Most alternative fuels are unable to match this, meaning that they would take up valuable cargo space onboard a ship. Ammonia volumetric energy density is broadly similar to methanol and higher than hydrogen, making onboard storage economically feasible, albeit not as compact as the heavy fuel oil (HFO) used today.

Relatively easy to handle

Ammonia is often compared with hydrogen. Both are stored in liquid form, hydrogen requiring cryogenic tanks maintained at -253°C, while ammonia requires less cooling and can be stored at temperatures of around -33°C. Ammonia is manufactured from hydrogen, so for zero carbon ammonia we need 'green' hydrogen manufactured using renewable energy.

Hydrogen transport

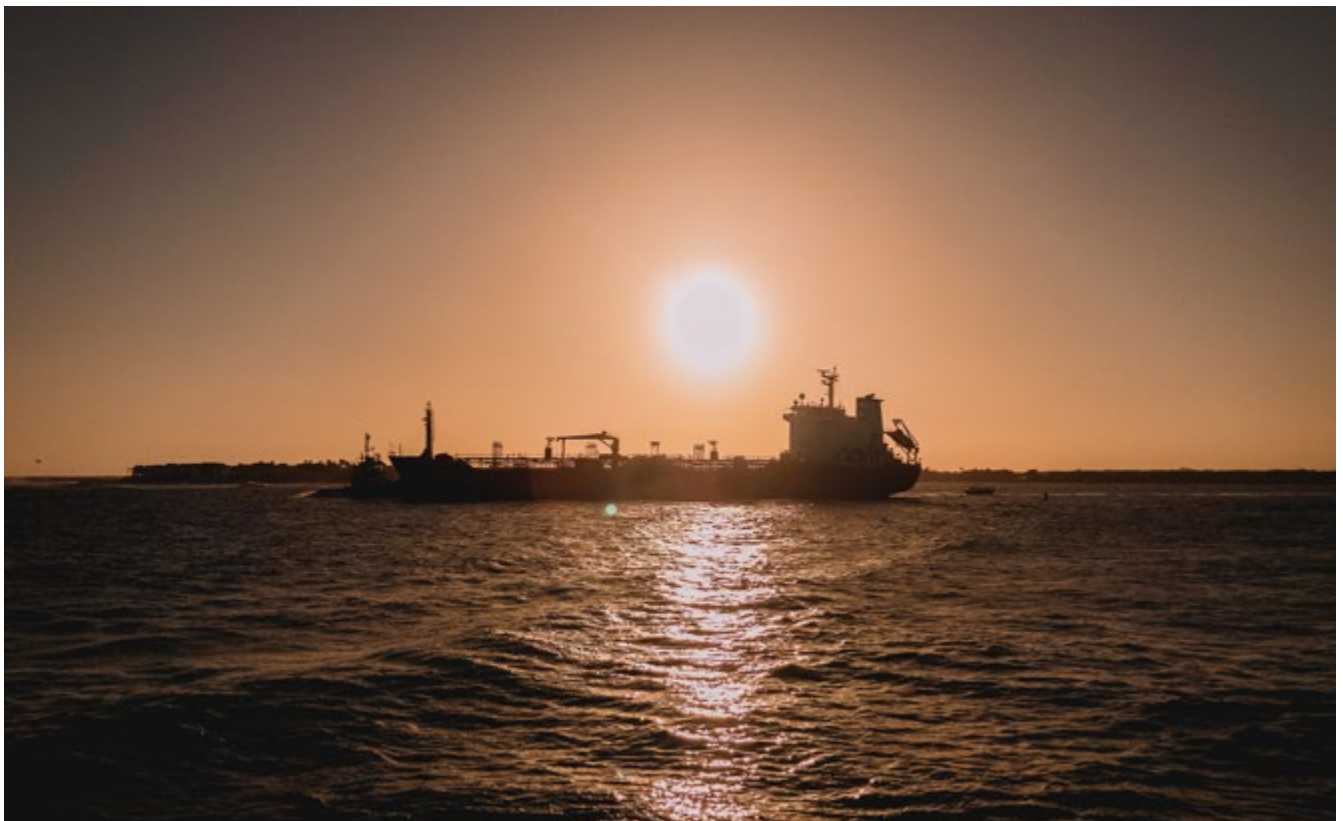
Hydrogen can also be used as a fuel for shipping or other purposes; however, the sophisticated cooling equipment and mitigation of hazards make hydrogen expensive to transport. Carrying ammonia has advantages over hydrogen in that it is liquid at ambient conditions, requiring lower storage volumes. The costs of hydrogen transportation may be reduced by manufacturing ammonia from hydrogen at the source, transporting the resulting ammonia and then reforming back to hydrogen at the destination, but more work is needed to calculate this cost reduction.

Economics have long-term potential. Ammonia is a global commodity with transparent pricing, so a market already exists. The bulk of current supply is 'grey' ammonia, manufactured from hydrogen created from natural gas, which generates significant CO₂ emissions. Shipping's goal is to produce 'green' ammonia from renewable energy. While this will be much more costly in the short-term, prices should fall substantially as production is scaled up.

The major challenges are land-based

The focus is often on carbon emissions generated from a ship's engine and ancillary systems onboard. Yet substantial emissions are also generated in the production and supply of fuel, through extraction of energy sources, fuel manufacture, transport and storage at port. To avoid simply shifting the problem upstream, the shipping industry needs to consider the whole supply chain.

A 2020 study by University Maritime Advisory Services (UMAS) and the Energy Transitions Commission found that USD 1-1.4 trillion is needed to





achieve the IMO's carbon reduction ambition by 2050. The study also highlighted that around 87% of the total investment is needed in land-based infrastructure and production facilities for low carbon fuels. In many cases the upstream challenges are also tougher to overcome, as they involve many more stakeholders, and these huge infrastructure investments could have significant impacts on people and the environment.

A worldwide ammonia distribution system is already in place, but fuel needs to be available in the right locations at the right volumes. The existing ammonia transport network connects production and storage locations that serve the industrial market; it does not reach ports in a way that would allow ships to bunker.

Perception of ammonia by the wider community, outside fleet operators, will need to change for it to become accepted as a fuel. Port authorities and regulators are presently reluctant to permit bunkering of ammonia due to toxicity hazards, while the reaction of citizens to large scale ammonia storage in ports is untested. Whilst current regulations preclude the use of ammonia as a fuel for shipping, classification societies and other groups are working to assess risk and

provide guidance that will lead to new rules and standards.

Safety issues must be addressed

While ammonia is not highly flammable, concentrations in air as small as 0.25% can cause fatalities, making the fuel highly toxic to people. Today's residual and distillate fuel oils (and even natural gas) all present lower risks than ammonia. Fuel systems must be designed, manufactured, operated and maintained to ensure the safety of the ship crews, port staff and fuel suppliers.

Today's ships are built to standard configurations in which engines and fuel systems are often in confined spaces on lower decks. The different requirements of ammonia could alter ship layouts or could even lead to complete redesigns.

Handling ammonia onboard ships will require a complete new set of skills and safety procedures. There is a need to understand the potential negative impacts on human lives, water and soil in case of leakage or accidents, and how to mitigate these types of risks. A new safety pathway is therefore needed to

adopt ammonia. Luckily there is the possibility to leverage current rules around the transport of ammonia.

In addition, the combustion of ammonia in engines releases nitrous oxide (N₂O), a greenhouse gas even more potent than CO₂. Thereby, additional equipment will be required onboard to control NO_x emissions.

Solution readiness

The shipping industry has carried ammonia as bulk cargo for 100 years and the cargo risks are understood and managed. The fuel was also one of the earliest refrigerants used onboard and remains a popular choice for fishing vessels due to its wide availability, simple manufacturing process and relatively low cost.

However, shipping has no experience of ammonia as a fuel and given the safety challenges, a rigorous process for risk assessment of fuel handling and propulsion systems will be required. Robust safety standards must also be mandated across the entire supply chain.

To enable organisations to make informed choices on the zero-carbon journey, LR has created the Marine

Solution Readiness Level (MSRL) framework. This is a standardised screening assessment that ensures consistency of evaluation across widely different fuels and technologies, enabling evidence-based decision making.

Current readiness levels

Research by LR and UMAS, 'Techno-economic assessment of zero-carbon fuels' (2020) gives an early indication of the investment readiness of ammonia as a shipping fuel in comparison with other alternative fuels, including hydrogen, methanol, biofuels, and batteries, and fossil fuels such as natural gas and HFO. Fuel is the major component of operating costs and the primary driver of vessel competitiveness. The research used a typical bulk carrier as a case study under a range of scenarios for energy price and total operating cost. A key finding was that ammonia produced from natural gas combined with carbon capture and storage (blue ammonia) is the lowest cost zero-carbon option when considering timeframes to 2050.

The research also reviewed technology readiness, identifying that some aspects of the ammonia delivery chain, including bunkering equipment, tanks and fuel supply systems, are progressing towards detailed design solutions. Other areas, such as procedures and quality standards, ancillary equipment onboard and boilers, were still at concept stage. Since then, we've seen developments in propulsion progressing rapidly and engine manufacturers are now announcing prototypes and pilot projects.

The LR and UMAS research also provided high-level indications of community readiness in relation to lifecycle emissions and the evolution of the broader energy landscape, showing that green ammonia is one of the best net CO₂ performers across the whole lifecycle. For ammonia to transition from industrial commodity to shipping fuel, the right conditions need to be in place across all community dimensions for example, sufficient cross-sector demand, efficient production processes and strong international policy and regulations.

Overcoming the hurdles

Success requires contribution from many different types of organisations across the shipping sector, collaborating to mitigate the remaining risks and uncertainties. LR is steering developments through its Maritime Decarbonisation Hub, a joint venture between the LR Foundation and LR. By identifying the key challenges and then creating partnerships to overcome them, we are advancing solution readiness across the spectrum of future fuels and technologies. Several ammonia-fuelled vessel designs have been approved in principle, including an ultra-large container ship concept in both China and Korea as well as a deep-sea tanker design due for commercialisation by 2024.

Overall, ammonia looks to be a promising alternative fuel with potential to make a major contribution to the decarbonisation of shipping. Now sector stakeholders must work together to develop and prove the feasibility of practical solutions.



Turning Tides:

The new wave of e-boats taking to the seas

By Andrew Wade

International shipping, much like long-haul flight, will not be electrified any time soon, as the energy density of batteries simply cannot facilitate it. And for an industry that's recently committed to halve its emissions by 2050, that's a fairly significant problem. But electric boats of all shapes and sizes are beginning to make a splash in the maritime sector.

While companies such as Maersk are looking to solutions like green methanol to power ocean-going ships, electrification is viable for boats that don't venture too far from the shore and can recharge regularly. From speed boats to ferries and even small container ships, e-boats are beginning to make headway in the maritime sector, inspiring some cutting-edge engineering to complement their green credentials.

One outfit leading the way is Swedish company Candela. In 2014, founder Gustav Hasselskog had a eureka moment while boating in the Stockholm Archipelago. Realising that a round trip from the summer cabin to buy his children ice cream cost around 10 times more in fuel than it did in dairy, he set out to build a more energy-efficient, planet-friendly boat that wouldn't cost the Earth to run.

"He realised that fossil fuel, planing powerboats are some of the most energy consuming craft in the world," Mikael Mahlberg, Candela's communications manager and occasional test pilot explained to The Engineer.

"Due to the high drag of planing boat hulls, they consume about 15 times as much energy as a normal family car. You can't really electrify them using current batteries. Even the best lithium-ion batteries have about one-fifteenth of the energy density of gasoline."

The solution Hasselskog came up with was submerged hydrofoils to lift the hull out of the water, all but eliminating the twin enemies of friction and drag. The result, after several years of engineering endeavour, is the Candela Seven, an electric foiling speedboat that flies above the waves. At its cruising speed of 20 knots, the boat can cover 50 nautical miles on a single charge – enough for a return jaunt to Calais from Dover. A top speed of 30 knots sees that range shrink to 32 nautical miles.

*The Candela 7 rides above the waves using submerged hydrofoils.
Image credit: Candela*





Candela 7's hull, deck and foils are all made from carbon fibre. Image credit: Candela

"Candela is really more similar to an aircraft than a boat," said Mahlberg. "It's unstable, it 'flies', and there's a lot of software and computers to stabilise it. So the hydrodynamic part is pretty challenging."

Given the nature of the project, it's not surprising that the company has brought in team members from Airbus Helicopters and Saab AB, as well as experience from America's Cup racing, where hydrofoils have become de rigeur in recent editions of the fabled sailing competition. The Candela Seven has one small hydrofoil at the back, integrated with its rudder and propeller, and a second much larger retractable foil protruding from its belly that does the heavy lifting. It's the latter of the two where the really clever stuff takes place, with hydraulic actuators operating at 100Hz, adjusting the struts on the hydrofoil 100 times per second to keep the vessel stable with the help of a flight computer and an impressive array of sensors.

"The secret to balancing this boat is that the wing doesn't really have flaps or ailerons like an aircraft wing," said Mahlberg. "Instead, we twist the whole wing using independent struts that move back and forth, bending and twisting the wing, which is flexible in the middle."

"The brain of the boat is the flight controller, which is basically a computer that we developed in-house. There are six different types of sensors. Ultrasonic sensors in the bow measure wave height in front of the boat at 100Hz, or 100 times per second, to angle the foil optimally and counter the waves. But since the

boat is unstable, you have to balance it by using the foil at all times."

Lifting a 7.7m boat from the water requires not only hydrofoils, but also some impressive lightweighting. The Seven's entire body – hull, deck and foils – is fabricated locally in Sweden using carbon fibre, its 240kg weight coming in at around 50 per cent that of a fibreglass equivalent. The 40kWh battery pack – made using repurposed BMWi3 modules – adds significantly to the overall weight of 1350kg, but this is still about 30 per cent lighter than the Candela's fossil-fuelled antecedents.

Out on the water, the boat essentially flies above waves up to four feet, with no slamming or pitching and virtually no noise or wake. It can accommodate a pilot plus 700kg, so six or seven passengers and a few pieces of luggage or a couple of well-stocked picnic baskets. The custom-built, slimline propeller hub is integrated with the secondary hydrofoil and enclosed in its own case, further aiding the boat's hydrodynamics.

"This obviously helps with drag a lot," said Mahlberg. "It's probably about six or seven times more efficient than a traditional lower unit on a 25-foot powerboat...when we're up and flying at 20 knots we use 24 horsepower on the motor and a traditional combustion engine boat will use maybe 120, so it's a huge difference."

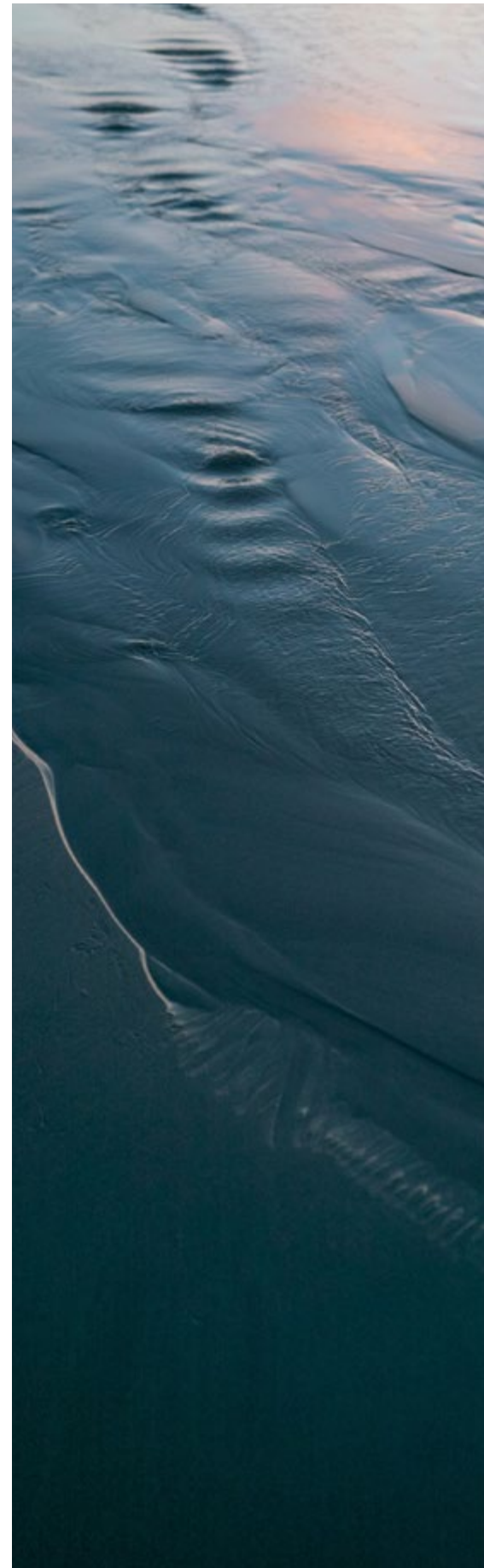
Innovation comes at a price, however, and the Candela Seven will set you back in the region of £200,000. Not exactly small change, but a long way from the upper echelons of the

boating world, and when it comes to cost per mile, owners can really start to claw some of their investment back. Three-phase 11kW chargers – common in most harbours and marinas – will take the Seven from flat to full in four hours at a cost of around £5, roughly 95 per cent less per mile than the e-boat's gas-guzzling cousins.

"In the US, maybe the prices are a bit different when it comes to gasoline, but I would still say 90 per cent (savings)," said Mahlberg. "We have one owner in the Stockholm archipelago who says that he saves 10,000 euros per year driving the Candela versus his fossil fuel boat."

For those shy of a spare £200k, a slightly less exhilarating but no less important e-boat project will soon be open for business on England's south coast. E-Voyager, formally the diesel-powered Mermaid, is a 12-passenger ferry that has been converted into a fully electric vessel. Developed by Voyager Marine in partnership with Plymouth Boat Trips and E-Marine Solutions, it is set to become the UK's first seagoing electric passenger vessel when it begins taking passengers this summer.

"E-Voyager was fitted with a 140kW motor in place of the old Ford 60hp (45kW) diesel engine," Andy Hurley, project manager at Voyager Marine, told The Engineer. "The batteries are repurposed Nissan Leaf batteries enclosed within a purpose designed and built marine casing. The inverters and DC-DC converters are also designed to be durable and capable of operating in a maritime environment."



The project has been funded through the Clean Maritime Call, a Maritime Research and Innovation UK (MarRI-UK) initiative backed by the Department for Transport, with academic support coming from the Universities of Exeter and Plymouth. During development, the team used duty cycle modelling and advanced simulation of propeller performance to make sure every bit of power could be efficiently wrung from the 20kWh battery module. At its cruising speed of five knots, e-Voyager will be able to operate for more than four hours, and 1kW of solar panels have recently been added in an effort to extend the range.

When the sun alone isn't up to the task, e-Voyager will top up as passengers board and disembark using one of two new 22kW Type 2 chargers recently installed by Plymouth City Council at the harbour's landing stage. Given Voyager Marine's plans for two significantly larger e-boats, Plymouth Council may well have to add to its quayside charging infrastructure in the near future.

"The first is the conversion of the Plymouth Princess, a domestic passenger vessel of approximately 16m and certified to carry over 100 passengers," Hurley explained. "Much of the groundwork has been completed ready for the conversion in the autumn of 2021. She'll be able to operate for up to 12 hours per day on a single overnight charge.

"We have also progressed with our design for a new-build ferry to operate on the famous Cremyll Ferry route linking Cornwall with Plymouth. This will be a catamaran with twin propellers driven by similar but larger motors to that used on the e-Voyager. The vessel will be 20m long and will be capable of carrying up to 150 passengers. We're looking to build this vessel in 2022."

What these latest plans from Voyager Marine prove is that e-boats are by no means limited to dinky leisure craft and retrofitted work vessels. Driven by cost-efficiency and environmental demands, the maritime sector is making genuine strides towards a cleaner, greener future, empowered by exceptional engineering and truly innovative technologies.

For a glimpse of what that future may look like, we can turn yet again to Scandinavia, where a pioneering project is combining electrification and autonomy on a scale beyond anything seen before. Set to begin operating later this year, the Yara Birkeland is the world's first battery-powered autonomous vessel, a 120 TEU container ship designed to load up, navigate its course, then unload its cargo with virtually no human input.

Developed for Norwegian agricultural company Yara International, the 80m vessel was conceived of as an alternative solution for transporting chemicals and fertiliser from the company's base in Herøya to the



nearby container port in Brevik. Yara exports around 20,000 containers annually from Herøya, meaning a total of 40,000 diesel-powered journeys are required to facilitate the short first leg of all cargo. The Yara Birkeland aims to replace those journeys with zero-emissions round trips as a feeder vessel for Brevik and also the deep sea port of Larvik, around 31 nautical miles away.

The 3200 DWT vessel will be powered by a 7MWh battery which will drive two 900kW azimuth thruster pods and two 700kW tunnel thrusters, providing a top speed of 13 knots and a cruising speed of 6-7 knots. Norwegian technology firm Kongsberg has been responsible for the navigation, sensor, control, communication and electrical systems. After some frustrating delays, some of which were pandemic-related, the ship was finally delivered in November last year and is set for manned sea trials before taking up its autonomous mission later in 2021.

A key part of that mission is still a work in progress, however. While the vessel itself appears ready for action, the autonomous logistics on land are proving a more difficult challenge, with Yara admitting to ongoing struggles with the electrified cargo solution for loading the Birkeland. These problems serve as a reminder that integrating complex, autonomous, electrified systems is not easy, despite the underlying technology maturing rapidly in recent times.

For world-first projects like the Yara Birkeland, some delays and hiccups are to be expected, and the challenges it has faced do not appear to have deterred others from adopting similar ideas. Norwegian grocery distributor ASKO is currently working with Kongsberg on two new battery electric freight ferries to operate in the Oslofjord, in an effort to reduce circuitous road haulage around the capital's waterways. The two vessels will operate between Horten and Moss, a distance of about five nautical miles that will take roughly an hour to travel but which has the potential to significantly reduce the company's emissions in and around Oslo.

It's perhaps no surprise that Yara and ASKO – two non-shipping firms with unique and specific cargo requirements – are the first to dip their toes into the choppy waters of electrified, autonomous shipping. Designing exclusively for a certain route allows for hull and powertrain optimisation as well as the necessary charging and logistics infrastructure at either end of the journey. Whether they can serve as pathfinder projects for more widespread adoption remains to be seen, but if the shipping industry is serious about its impending emissions targets, then large vessels – as well as small ones – will need to ride the electrification wave.

Thanks are due to Andrew Wade, an author for The Engineer web site, where this article was originally published.

Autonomous landside logistics have delayed Yara Birkeland's rollout. Image credit: Yara International





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AN INTRODUCTION TO RISK ANALYSIS

by
Eur. Ing. Jeffrey Casciani-Wood
HonFIIMS

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RISK

There are many definitions of risk. A typical dictionary definition of a hazard is the chance of, or of bad consequences, loss, *etc.*, exposure to mischance. Others include the effect of uncertainty on objectives or the probability that an event will occur. Within this text, risk is defined as the likelihood that the harm that may come from a potential hazard will be realised. The extent of the risk covers the number of persons affected and the consequences for them. The risk reflects both the likelihood and the severity of the harm. At its simplest, risk is the possibility in a given situation of an adverse outcome. It is often expressed as the combination of the consequences of a series of events and the associated likelihood of occurrence. The probability, frequency of occurrence and impact of an event are all factors which the marine surveyor should consider in his/her analysis of risk. The marine

surveyor should recognise that risk is necessarily inherent in the activities undertaken when practising his/her skill. The professional marine surveyor has a significant role to play and a legal duty of care in limiting or eliminating risk and there is a personal and moral obligation on him/her to maintain and enhance his/her competence in this particular area of practice. Risk is present in all surveying projects as a result of inherent hazards as well as general uncertainty. In all cases, there is a need for a marine surveyor to exercise informed judgement and leadership in order to manage or reduce the risk. The general public perception of risk probably differs from that of the marine surveyor and he/she should, therefore, strive to achieve clarity when speaking with non-professionals about risk and advise them in simple terms understandable to them. Through his/her effective management of risk, marine surveyors should be able to...

1. improve the reliability of a product, process or service.
2. minimise the impact of potential problems or adverse effects.
3. provide early **warning** of potential threats.
4. help ensure at least demonstrable compliance with regulation.
5. improve the resilience of their organisations.
6. maximise potential opportunities.
7. protect project revenue and enhance value for money.
8. articulate and manage the uncertainty surrounding the decisions being made.

Risk management is also practiced by other professions with whom marine surveyors work in multi-disciplinary teams and effective risk management is more likely to produce positive outcomes than total risk avoidance. A range of quantitative and systematic methods exist for the management of risk. However, the behaviour of people is central to any enterprise and this includes high-level management, the workforce and the general public who can be expected to benefit, directly or indirectly.

There are seven general principles that should guide a marine surveyor when he/she is identifying, assessing, managing and communicating about risk. Their application will help him/her to ensure that risk issues are recognised as important considerations in any given engineering activity. They should be included as part of an organisation's risk management policy, with risk management plans describing how they will be applied.

PRINCIPLE 1. PROFESSIONAL, RESPONSIBLE JUDGEMENT AND LEADERSHIP.

The marine surveyor should apply professional and responsible judgement and take a leadership role and should demonstrate, by example, a commitment to safety, reliability and ethical conduct through professional management of risk, from the start of any project. He/she should clearly demonstrate at all levels the standards by which he/she expects risks to be managed, so setting an example to others. In doing so, he/she should be prepared to...

- a) challenge assumptions and proposals,
- b) ensure that safety receives appropriate consideration,
- c) assess carefully the balance of risk and reward,

- d) strive for all those involved to be able to identify potential problems and opportunities,
- e) ensure that anyone reporting to him/her has the opportunity to maintain competence in the area of risk,
- f) lead others in improving practice.

PRINCIPLE 2. THE ADOPTION OF A SYSTEMATIC ROLE

He/she should adopt a systematic and holistic role to risk identification, assessment and management. The factors that give rise to risk are interdependent and cannot be examined in isolation. It is vital in managing risk to be aware of this interdependency and, rather than dealing with risks as they arise, use approaches that deal with whole systems. That requires him/her to...

- a) look beyond purely technical considerations, to address non-technical factors and include human, organisational and cultural perspectives.
- b) make risk assessment and management a fundamental and integral part of all activity and decision making.
- c) adopt a conservative decision making approach that is proportionate to the risk especially where a novel process is employed.
- d) aim to quantify the risks with as much precision as is relevant, sufficient and which can be supported by genuine evidence.
- e) be responsive to changes in the working environment.
- f) look for connections, patterns and relationships between risks and opportunities.

- g) consider the role that ergonomics can play in mitigating the risk or human error.
- h) bear in mind that risk assessment should be used as an aid to professional judgement and not as a substitute for it.
- i) be aware that developing over-elaborate procedures can lead to poor compliance and undermine the wider safety culture.

PRINCIPLE 3. COMPLY WITH LEGISLATION AND CODES BUT BE PREPARED TO SEEK FURTHER IMPROVEMENTS.

Regulations and Codes are generic. They can only deal with anticipated events and cannot predict every possible situation. Marine surveyors should take a thoughtful, measured, yet challenging approach to potential risks, whether or not specific regulations apply. They should...

- a) act in accordance with codes of conduct.
- b) know about and comply with the law in countries where they are operating.
- c) recognise and understand the intent behind standards and codes and understand when their limits are being approached.
- d) comply with current relevant legal requirements governing surveying risk issues.
- e) seek advice where necessary.
- f) where it is reasonably practical, seek further improvements thus embedding a culture of seeking continuous improvement.
- g) be open minded and avoid hiding behind regulations.



PRINCIPLE 4. ENSURE GOOD COMMUNICATION WITH OTHERS INVOLVED.

Shortcomings in communication are present in the majority of failures in the management of risk. Communicating effectively with customers, clients, suppliers, subcontractors and colleagues is important to ensure that risks and their implications are understood properly. Risk management should be communicated as a core value. The marine surveyor should...

- a) establish strong, honest and effective two way communication.
- b) establish a consultation and feedback process about risks with all.
- c) express clearly the balance of risk and benefit.
- d) encourage an 'open reporting' approach and a spirit of questioning and learning from others.
- e) avoid a 'good news' only or closed culture.

PRINCIPLE 5. ENSURE THAT LASTING SYSTEMS FOR OVERSIGHT AND SCRUTINY ARE IN PLACE.

He/she should understand that effective oversight and scrutiny processes are important safeguards in controlling risks. They should be challenging and carried out with independence from those creating the risk or attempting to control it. The marine surveyor should...

- a) ensure that effective oversight and scrutiny procedures are in place.
- b) ensure that roles and responsibilities are understood, especially where activities are outsourced.

- c) include scrutiny of culture and ensure that audits are not limited to paper systems.

PRINCIPLE 6. CONTRIBUTE TO PUBLIC AWARENESS OF RISK.

The perception of risk amongst the public is influenced by a range of factors, including emotional ones. The marine surveyor has an important role in raising awareness and understanding about real levels of risk and benefit and helping to prevent misconceptions. He/she should...

- a) be prepared to engage in public debate on the perceived risks and benefits.
- b) ensure that discussion with the public includes risk and its management and the interdependence of risk factors under consideration.
- c) ensure that the concepts of 'risk and reward' are communicated.
- d) recognise the social, political and economic implications in the risk assessment and acknowledge them publicly.
- e) explain the quantitative aspects of risk with clarity and supporting evidence.
- f) be honest and clear about uncertainties and be prepared to challenge misrepresentations.

PRINCIPLE 7. RECORD KEEPING.

The marine surveyor should, at all times, keep a detailed and accurate record of all decisions made, accidents or other relevant data including witness statements, photographs, logbooks etc.

RISK ASSESSMENT

In its simplest form, risk assessment is a thorough look at the workplace to identify things, situations, processes that may cause harm, in particular, to people. The marine surveyor may then evaluate the severity of the risk and put in place measures to mitigate or eradicate it. He/she should be, at all times, fully aware of the Health and Safety at Work Act known as HASAW1974 as it covers every part of his working environment. He/she should also, as a matter of regular practice, carry out a simple risk assessment on every project carried out. The Health and Safety Executive (HSE) gives practical guidance to employers and self-employed people on how to assess them and how to act on the findings of the assessment. Many marine surveyors have found the documents below adequate enough for their needs. The guide should help him/her to check that the assessment of the risks and that might cause harm in his/her work environment. It looks at the common features of these provisions, compares them, including their wording, and examines the significance of the differences between them. He/she should keep in his/her office library copies of at least the following...

- 1) Management of Health and Safety at Work Regulations 1999 (Management Regulations).
- 2) Manual Handling Operations Regulations 1992 (Manual Handling Regulations).
- 3) Personal Protective Equipment at Work Regulations 1992 (PPE).
- 4) Noise at Work Regulations 1989 (Noise Regulations).

5) Control of Substances Hazardous to Health Regulations 1999 (COSHH).

6) Control of Asbestos at Work Regulations 1987 (Asbestos Regulations).

7) A Comparison of Risks from Different Materials Containing Asbestos.

8) Control of Lead at Work Regulations 1998 (Lead Regulations).

Under health and safety regulations, risk assessments have to be carried out for all tasks that have to be done and for which hazards have been identified and there are a number of stages for the process. The assessor should...

- 1) Specify the scope of work to be carried out. In most cases this will be detailed in the contract document drawn up between the marine surveyor and his/her client. From that document he/she can then draw up a list of the tasks required to perform the work which will aid in identifying the hazards.
- 2) Identify the hazards. To most marine surveyors, both the tasks to be performed and the hazards involved will be well known. In such situations, where the tasks have been performed many times to the point of repetitiveness, a generic list can be drawn up but the existence of such a list must not detract him from undertaking a thorough assessment, but it will help the process. There are a number of what may be termed formalised hazard identification techniques. They are usually only possible and required in large organisations where a team will carry out the assessment. In the marine

surveyor's position, his/her experience and knowledge of the situation coupled with common sense will greatly help him/her complete an assessment.

The formalised methods are...

- Hazard and Operability Studies (HAZOP).
- Failure Mode and Effects Analysis (FMEA).
- Structured What-If Techniques (SWIFT).
- In carrying out a risk assessment, there are four stages...

- Identify the risks.
- Measure the risks associated with the hazard.
- Evaluate the risks.
- Implement measures to eliminate or mitigate the risks.

The risk industry has developed risk assessment probability matrices to help in assessing identified hazards for severity and probability, but the marine surveyor must take the following into account:

He/she must decide if the risks are tolerable. Using an assessment probability matrix will greatly help this part of the process but it is the responsibility of the individuals or groups who are to carry out the task to make the final decision. The term tolerable risk simply means that any risk has been reduced to the lowest level that is considered reasonably practicable.

He/she must introduce mitigating procedures. If the risks are found to be intolerable then mitigating procedures have to be put in place to bring that risk within tolerable levels by reducing or eradicating the risk.

He/she must review the assessment. It is imperative that a risk assessment continues to be effective, remembering that, in the case of a marine surveyor, his/her environment can change radically, even within the course of completing a single task. It is therefore important that risk assessments are kept under constant review. Should some obvious change to his/her local environment take place, however, then a few minutes' thought to consider the possible effect the change may have to his/her personal safety or the safety of others around him/her may avoid considerable problems at a later time.

The marine surveyor should remember at all times that wet and slippery surfaces, steep ladders, dangerous compartments and tank spaces, moving objects such as cranes and the presence of oils and greases all carry the potential for both minor and serious injury. While there is no doubt that some hazards can be designed out, there simply is not a design solution for every single one.

As part of his background knowledge and if he/she works in the marine field, the marine surveyor should be aware of SOLAS regulation II-1/3-5 which states that Administrations or recognised organisations acting on their behalf should verify that materials which contain asbestos, as prohibited under SOLAS regulation II-1/3-5, are not installed on ships by reviewing asbestos free declarations and supporting documentation for the structure, machinery, electrical installations and equipment covered by the SOLAS Convention, which should be provided to the Administration or recognised organisation by shipyards, repair yards and equipment manufacturers, taking into account the 2011 Guidelines for the development of the inventory of hazardous materials (resolution MEPC.197(62)).

A TYPICAL RISK ASSESSMENT FORM (I)

Client's Name and Address		Job	Site
Marine Surveyor's Company Name, Address and Contact Details			
ON SITE HEALTH AND SAFETY RISK ASSESSMENT RECORD			
Task	Person Assigned	Job Number	Date and Time

HAVE ANY SIGNIFICANT RISKS BEEN IDENTIFIED WITH THE TASK? YES/NO
If yes, the risk assessment must be completed in its entirety

<p>(A) Identify ALL hazards and insert a score as Likelihood of Harm x Severity of Injury (Refer to the evaluation matrix below to determine the rating. Insert N/A if no hazard is identified)</p> <p>(B) Insert category of persons affected i.e. E for employees, S for subcontractors or other workers, GP for general public.</p>								
Physical Injury Hazards	A	B	Physical Agents	A	B	Miscellaneous	A	B
1. Crane Swept Areas			12. Hot objects			22. Climate effects		
2. Moving Machinery Parts			13. Cold objects			23. Lone working		
3. Hand/Power Tools			14. Temperature			24. Confined space		
4. Falls from Height			15. Noise			25. Restricted Access		
5. Access/Mobile Plant			16.Vibration			26. Overhead Obstructions		
6. Working above water/people			Hazardous Substances			27. Transport Movement		
7. Slips/Trips/Falls			17. Asbestos or Chemicals			Electrical		
8. Pressure Systems			18. Micro-organisms			28. Shock, Burns, Explosion		
9. Hot work/Fire			19. Vermin Disease			29. Overhead Cables		
10. Explosion			20. Fumes, Gases Vapours, Dust			30. Lighting levels		
11. Dropped objects			Manual Handling			31. Other		
			21.Manual handling injury					
Confined Space Work required	Yes	No	Confined Space Risk	High	Low	Emergency Arrangements in Place	Yes	No

This Risk Analysis Form must be kept on file and updated annually

A TYPICAL RISK ASSESSMENT FORM (II)

Significant Risks Identified (All risk evaluations over 4 are to be listed).					
.....					
Persons Affected (Tick as appropriate)					
Employees		Subcontractors/ Other workers		General Public	
Control Measures					Residual Score
.....					

RISK ASSESSMENT EVALUATION MATRIX					Risk Evaluation	1	Acceptable	Unlikely to cause injury, risk to health or property damage
		Severity of Injury				2	Acceptable	Unlikely to cause injury, risk to health or property damage, work to be carried out by competent person
		Slight 1	Serious 2	Major 3		3	Acceptable but	Possible risk of injury, risk to health or property damage, control measures must be in place
Likelihood of Harm	Unlikely 1	1	2	3		4	Acceptable but	Supervision, control measures and written records must be in place and attempts must be made to reduce the risk
	Possible 2	2	4	6		5	Not Acceptable	Re-visit work procedures to reduce the risk to the lowest acceptable score possible
	Likely 3	3	6	9		6	Not Acceptable	Refer the operation to the person responsible to consider alternative methods of working

I confirm that all residual risk evaluations are acceptable (rated as 1, 2 or 3) after ALL the control measures have been implemented. If the risk evaluation remains at 4 or above, after all the control measures have been implemented, inform the person responsible before undertaking the task	YES	NO
--	-----	----

.....
Signature of Marine Surveyor

Name.....
Block Capitals

RISK ASSESSMENT EXPERIENCE

The following comments were distilled from a paper read by David and Linda Green before the International Institute of Marine Surveying and make an interesting comment on the above.

In 1998, for example, according to the Health and Safety Executive, there were no fewer than 666 injuries of various kinds within the dock's environment. Of these only four were to self-employed people and the rest were to general employees of various kinds.

Those facts have to be viewed against the widely accepted truth that the self-employed are very poor reporters of work related injuries as they consistently report fewer than 1 in 20 reportable accidents. A breakdown of these injuries makes interesting reading and sounds a note of **warning** to the marine surveyor.

- slips and falls on the same level - 61 number including 12 major injuries.
- falls from a height – 54 (34 from a height over 2 metres) including 19 major injuries and one fatality.
- hit by objects free falling from lifting machinery – 15 including 6 major injuries.
- hit by flying objects or moving objects in ways unspecified – 75 including 18 major injuries.
- asphyxiation – two deaths.
- finally, there was one three day injury caused by the person being assaulted.

David rather wryly remarked that one could only assume that, in the case of the flying objects, the flight was probably uncontrolled and in the case of the final item it clearly does not pay to irritate people too much. The item concerning asphyxiation is a case in point for those marine surveyors who inspect the inside of tanks. In the incident concerned, a surveyor entered the access trunking between the holds of a ship carrying grain and collapsed due to oxygen deprivation. So too did the chief mate of the vessel who, like other lemmings before and since, went down the trunk to rescue the engineer without breathing apparatus. Both men died. For a few pounds or dollars, it is possible to purchase a simple bleeper alarm that will warn the marine surveyor when the space in which he is working has bad air.

The marine surveyor should never stand under a load suspended from a crane. Strops, both wire and rope, can and do break. An accident of that kind in the London docks was generally called a greenacre¹.

HASAW - INJURIES

Injuries fall into four categories...

- slight or minor injuries.
- serious or three day injuries.
- major injuries.
- death.

Minor injuries are those that can be treated from the first aid box, serious or three day injuries keep the sufferer off work for three days, major injuries include amputations, limb fractures, loss of sight and similar items.

Death tends to be final and permanent and needs no elaboration!

HASAW - REPORTING OF ACCIDENTS

All countries, not only maritime ones, require that any work related accidents be reported to the appropriate authority. The legislation implies that the marine surveyor is bound by law to report any accident whether or not he is personally involved. Such accidents include those involving a death which has to be reported to the police by law. Accidents which involve injuries such as fractures, amputations, dislocations, loss of sight, chemical or hot metal burns, injuries from electric shock, any other injury leading to hypothermia or loss of consciousness, loss of consciousness due to asphyxia, acute illness from absorption of any substance and illness due to exposure to a biological agent also have to be reported. Occurrences not necessarily injurious also have to be reported and they include the collapse, overturning or failure of load bearing parts of lift and lifting machinery, explosions, collapse or bursting of any closed vessel or attached pipework, failure of any freight container or any of its load bearing parts, plant or equipment coming into contact with overhead power lines, electric short circuit or overload causing fire or explosion, and unintentional explosion, misfire, failure of demolition to cause an intended collapse, projection of material beyond a site boundary, injury caused by an explosion, accidental release of a biological agent likely to cause severe human illness, failure of industrial radiography or irradiation equipment or de-energise or

¹ London Dockland legend had it that, at the end of the nineteenth century, a certain dock worker named Greenacre was found guilty of murdering his wife and, in accordance with the criminal code of the time, was sentenced to be hanged. On the due date he was taken out to the gallows and the rope broke three times. It was judged that he had suffered enough, and his sentence was commuted to life imprisonment. Whatever the truth of the story, certainly within the author's memory, the word lived on for any kind of accident aboard ship along the London River particularly those involving broken strops or slings and the author still uses it so.

his sentence was commuted to life imprisonment. Whatever the truth of the story, certainly within the author's memory, the word lived on for any kind of accident aboard ship along the London River particularly those involving broken strops or slings and the author still uses it so.

failure to return to its safe position after its exposure period, malfunction of breathing apparatus when in use or during testing immediately before use, failure or endangering of diving equipment or the trapping of a diver. Reportable diseases include conditions due to physical agents or physical demands of work, ionising radiation, decompression sickness, infections due to biological agents, anthrax, brucellosis, conditions due to substances, poisoning by carbon disulphide, ethylene oxide or methyl bromide.

HASAW - TYPES OF RISK ENFORCEMENT

The HASAW 1974 Act & Regulations can be enforced by...

- Improvement Notices that require the offender to comply within a given time frame under pain of prosecution.
- Prohibition Notices that forbid the offender to continue the given practice.
- Prosecution where the offender is taken to Court and, if found guilty, may face fines and/or imprisonment.

HASAW - FIRE AS A RISK

The wise marine surveyor will note the position of the fire point and any hoses or extinguishers. Anybody who has ever witnessed an frp boat, for example, on fire will know that they can burn very fiercely² indeed and rapidly leaving behind nothing but a pile of old glass fibres and a heap of twisted metal.

HASAW - FIRST AID

Similar comments can be made about First Aid points and the wise marine surveyor will carry a small but adequately supplied and readily accessible First Aid Box in his/her own car. He/she may find it prove to be very useful.

HASAW - RESPIRATORY RISKS

When surveying old, laid up, particularly wooden structures, the marine surveyor may find considerable amounts of mould, mildew, fungus and all sorts of malevolent growing things many of which give off health risk spores. A similar health risk is a badly internally corroded steel structure. If, later, he/she develops a cough he/she should attend the local hospital A&E department as soon as possible as such conditions are conducive to the development of, *inter alia*, pneumonia. He/she should wear, in such circumstances, a properly fit tested, HEPA filtered, half face respirator and have appropriate training in its use and **recommend** a full, proper decontamination of the area. For dust protection, the life of (preferably circular design) filters can be extended by the application of a circle of regular kitchen roll held on by a rubber band over the top of the filter. If the marine surveyor sports a beard, it also makes a better dust proof interface between the mask and his skin. He/she should also have the mask and a silicone mask with a new charcoal filter is a must also when exposed to epoxy and polyester fumes. The marine surveyor should also be aware that *Escherichia Coli* bacteria can grow in freshwater tanks, piping and watermakers that have been idle or abandoned for a long time. That is particularly the case in the eastern Mediterranean countries where items can wait a long time for a buyer. Just by smelling the freshwater coming from the tap it is possible to get infected. If sent to inspect such a plant, therefore, the diagnostic engineer should **recommend** that the whole system be thoroughly flushed through several times and the water tested by the local Health Authority before use.

GUIDE TO THE ASSESSMENT OF MATERIAL HAZARDS

DON'T TOUCH IT.
IT MIGHT BE DANGEROUS.

PARENTAL ADVICE IN WWII.

In the course of his/her normal work the marine surveyor will often come across materials that are hazardous to health and he/she should know how to deal with such material. The materials which may be solid, liquid or gaseous should carry with it in one form or another but usually a paper pamphlet what is called its assessment. Resins and paints are familiar examples of these materials. Each assessment should contain a front sheet detailing the hazards associated with the particular material together with any first aid, spillage and fire precautions and a back page detailing the precautions to be taken to ensure that the risk is minimal when undertaking defined work activities. The front sheet is compiled using information from the material supplier's safety data sheets, guidance together with information provided by the Health and Safety Executive and standard texts and research material.

EXPOSURE LIMITS

Included in the leaflet should be details of time limits to which a human being may be safely exposed to the material. A single type of exposure limit has been introduced with Workplace Exposure Limits (WELs) replacing

² The author once witnessed a gas explosion/fire on board a boat afloat at Maidenhead and, although the fire brigade arrived within six minutes of the explosion, three frp boats were completely burned to the waterline and totally destroyed. The whole affair was over in about fifteen minutes. Fortunately nobody was injured.

the outdated Maximum Exposure Limits (MELs) and Occupational Exposure Standards (OESs). As the numerical values of the other limits being transferred to the new system are unchanged, suppliers may exhaust stocks of safety data sheets that refer to MELs and OESs before producing new ones that refer to WELs. Similarly, COSHH assessments can be updated as part of duty holder's periodic reviews.

WORK ACTIVITIES

It is common for the same materials to be used in different ways on site. Each method of using a material should be assessed individually noting that the controls needed to ensure a minimum risk, vary from activity to activity. Spray painting, for example, is potentially more risky than brush application as there is more of the hazardous material in the air to breath. Each assessment activity coupled with the relevant front sheet forms a risk assessment and it is of utmost importance that the correct activity is chosen from the selection available.

All activities are defined in 3 ways...

- the method of use i.e. hand (brush, trowel) or spray.
- work environment i.e. outside, inside, or confined space

noting that, if the work is to be inside whether the workplace is well or poorly ventilated.

- length of time of work i.e. up to 1/2 hour 1/2 to 2 hours 2 to 4 hours etc.

CHOOSING THE CORRECT ASSESSMENT - THE FOUR STEP GUIDE

If it is necessary to use one of the hazardous materials, the marine surveyor should follow the following four step guide.

He/she should check that an assessment is available in the file for the material in use.

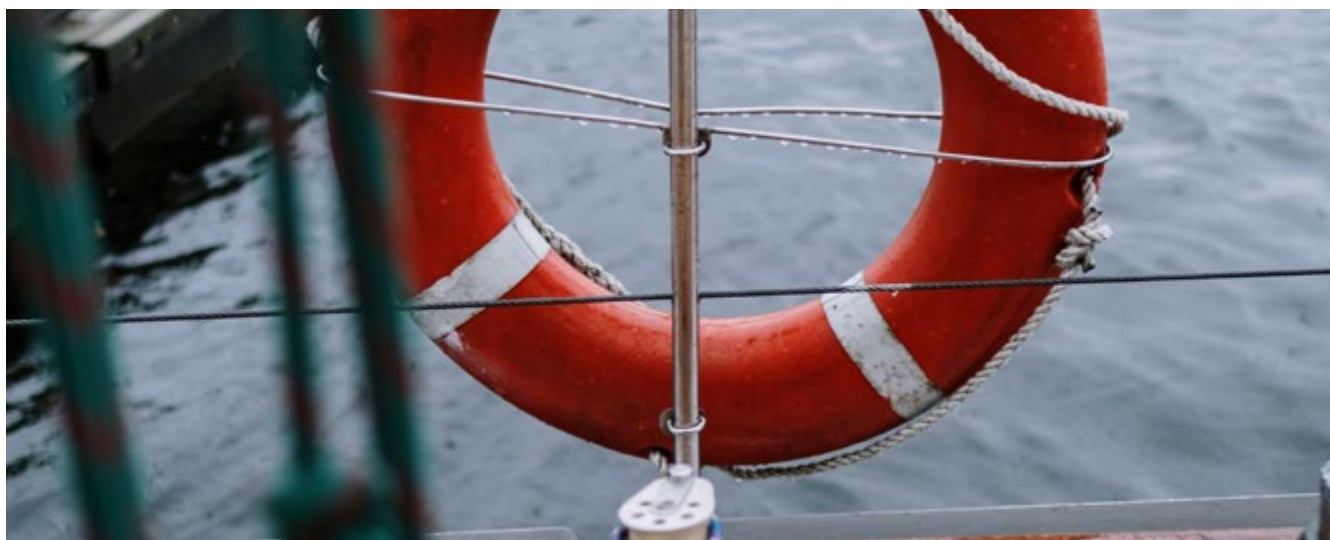
1. He/she should then check the work to be done, choose the relevant activity and tell the operatives what they must do.
2. He/she should ensure that other personnel involved should co-operate. If the assessment calls for washing hands after use or wearing a dust mask, they, as well as he/she, must comply.
3. If the assessment is not available or the relevant activity is not covered, he/she must produce a local assessment based on information from the supplier.

USING GENERIC ASSESSMENT

Some of the assessments contained in this online COSHH management system are generic or are in so-called family group assessments. Materials such as general purpose cleaners, solvent based adhesives, mineral oils and cement etc. although supplied under many different trade names do, in numerous cases, pose very similar risks to health. Generic assessments can therefore be used to cover family groups of similar materials. Using generic assessments where appropriate, can substantially reduce the number of assessments required and also allows operatives to become familiar with a general set of precautions to be followed.

ALLOCATION OF MATERIALS INTO GENERIC CATEGORIES

The marine surveyor should obtain the Material Safety Data Sheet for a given material to be allocated into a generic category. He/she should identify the keyword or family group for the material e.g. adhesive, solvent cleaner. He/she should identify the constituents of the material. He/she should then place the material into the correct category, depending on keyword and constituents.



HAZARD EXAMPLES

TABLE 1
GENERIC CATEGORIES

Generic Category	Solvent	Cleaner (acid)	Paint (resin)
Keyword	Adhesive	Cleaner	Paint
Constituents	Xylene	Hydrochloric Acid	Isocyanate monomers, Xylene

He/she should also check any occupational exposure limits from the Material Safety Data Sheet against those quoted on the assessment. The Data Sheet standard must have a higher or equal numeric value to the generic assessment for the generic to be applicable. He/she should check the assessment activity to make sure that it is suitable for the work to be carried out. If, for example, the material is to be sprayed then there should be a specific activity *i.e.*, SPRAYING.

HAZARD SYMBOLS AND PICTOGRAMS

The symbols used on the front page of the COSHH Assessment refer to the inherent hazard associated with the material. Each material assessed in the online COSHH management system is designated, where possible, a hazard symbol. The designation is based on the information provided on the Chemicals, (Hazard information and Packaging for Supply) Regulations 2000 (CHIP 2 Regulations). The

CHIP Regulations list substances that are considered dangerous and indicate the relevant hazard symbol to be used. In some cases, substances are not given a symbol because they are not considered hazardous enough to qualify. A LOW HAZARD symbol (a tick) is used to indicate when that is the case. The current 2009 Hazard symbols in general use are shown below and the marine surveyor should be familiar with them...

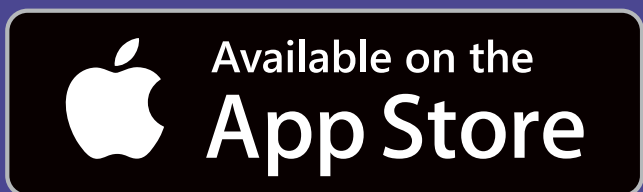


FIGURE 1
HAZARD SYMBOLS

MARINE
SURVEYOR
SEARCH



THE MARINE SURVEYOR SEARCH APP



New Zealand IS the *Innovation Nation* for Marine Technology

This article is written by New Zealand Trade and Enterprise (NZTE), the New Zealand government's international business development agency. It aims to highlight the excellent track record that New Zealand has in the maritime sector, something the country should be rightly proud of.

The ocean has been a natural playground for generations of New Zealanders. With over a third of the population participating in boating each year, coupled with our undeniable love for the sea, New Zealanders are true marine enthusiasts. It's a mindset that has contributed to New Zealand's long

legacy of innovation in the industry. New Zealanders were first in the world to pioneer the development of water jet propulsion, and they were the first to develop the technology to transform all-terrain vehicles into oceangoing speed boats, among many other innovations.

Why Choose the Innovation Nation?

New Zealanders never settles for less, and our marine products and services are no exception. Our willingness to take innovation to the next level - encompassing everything from boat building and sail making to electronics and equipment hardware - has earned us global recognition. With our ongoing commitment to R&D, prototyping and testing, we continue to work tirelessly to turn our ideas into reality.

Our world-leading technology is the result of our marine industry, which is the largest and most specialized manufacturing industry in New Zealand. The sector extends beyond manufacturing, touching research and education, construction and tourism as well. New Zealand's marine industry currently totals \$2 billion in sales and employs over 10,000 people, and it is expected to double in size over the next 10 to 15 years.

Innovative Kiwi companies like Hamilton Jet, Marine Flex, Sealegs and

Photo courtesy of Hamilton Jet



Stabicraft have been at the forefront of technological advancements in the marine industry for decades. In the 1950s, Sir William Hamilton of Hamilton Jet was a pioneer in waterjet propulsion. Paul Adams and Bruce Dickens of Stabicraft built the first rigid hulled aluminum chambered boat in 1987. Marine Flex is the industry leader in screw anchoring systems and elastic moorings, and Sealegs is known around the world for its patented amphibious vessels.

A Different Class

Driven by the environment we patrol, New Zealand has an impeccable reputation for high-performance commercial inshore patrol, search and rescue, and security craft and technologies used by coast guards, navy, fire, and police in a range of coastal environments around the world. New Zealand’s willingness to explore new frontiers in marine innovation, encompassing everything from boat building and sail making to electronics and equipment hardware, has earned New Zealand global recognition. Through our advanced marine technologies, we are always working to make people safer on and off the water.

Technology leaders like Vesper Marine and Navicom Dynamics use this environment to make boating safer. Vesper Marine has revolutionized the use of AIS and communications systems for a safer boating experience. Navicom Dynamics is a global leader in the precision positioning and orientation technologies and monitoring systems market. They are known for specialized piloting and navigation systems, customizable docking aids and bespoke GNSS technology applications for maritime navigation.



Stabicraft 2250 Ultra Centrecab. Photo courtesy of Stabicraft

World-Leading Technology, User-Driven Design

You’re never more than about 80 miles from the sea on the island nation of New Zealand, whose boatbuilding legacy has spawned a new generation of technological advances. These advances are often practical solutions for today’s boaters and boat builders. Vetus Maxwell has designed reliable and attractive anchoring solutions for pleasure boats, superyachts and commercial vessels for over forty years. Bowmaster created state-of-the-art anchoring deployment solutions beginning in the early 1970s and has worked with some of the biggest boat builders in the business. For nearly 50 years, Manson Anchors has produced some of the most reliable and innovative anchors on the market.

Designed for the Extreme, Built for Safety

Whether it’s for commercial or recreational markets, we pride ourselves on testing, refining and perfecting our marine products – which is why they are among the

most reliable and durable in the world. They are designed and built to perform in the harsh conditions of the Southern Ocean, and if they work here, they will work anywhere. Everything is created by and for the world’s most passionate marine enthusiasts, which is why we uphold the highest safety standards.

Take for example Prospeed. The industry leader in foul-release coatings, the Prospeed coating system is recognized globally as the best prevention for marine growth and fouling of propellers, running gear and other underwater metals. Tru Design specializes in the design, manufacture and marketing of high quality marine valves, skin fittings, hose nozzles and other products. McKay’s marine division, one of the world’s leading marine electrical companies, is the market leader in its segment and has added value to many complex and unique marine projects all around the world. Boxfish Research set out to build a better ROV and they did just that, producing one that is lightweight, easy to use, easy to deploy combined with unmatched image quality, manoeuvrability, range and depth.

Anchor Deployment Carriage. Photo courtesy of Bowmaster



Photo courtesy of Prospeed



The reinvention of our ports is underway as part of the Green Transition

When it comes to launching the energy transition, maritime policy is one of the key battlegrounds. But many ports, aware of their ecological and economic vulnerability, have committed to sustainable development strategies.



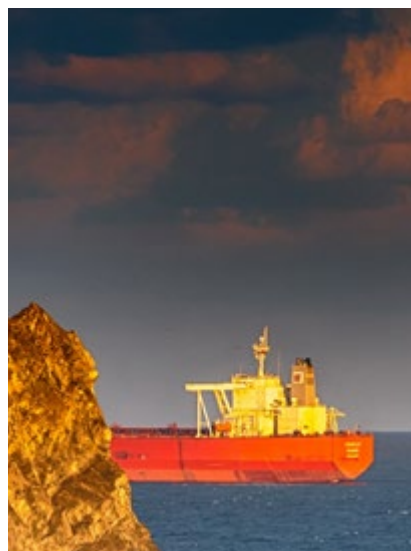
By **Sylvain Roche**,
Associate researcher focused on energy and territorial transition at Sciences Po Bordeaux.

According to the latest research, sea levels will rise considerably (from 1.1 to 2 metres, on average) by 2100, putting about 14 per cent of the world's major maritime ports at risk of coastal flooding and erosion. Ports in France, including 66 that are used for maritime trade, are also under threat, and will have to adapt their infrastructure.

Maritime transport accounts for about 80 per cent of global merchandise trade by volume. Shipping is responsible for three per cent of global CO₂ emissions, which have increased 32 per cent over the past 20 years. If nothing is done, shipping emissions could climb to 17 per cent of global emissions by 2050.

Enter the "ports of the future." Ports govern globalized economic activity and are true "energy hubs," bringing together all kinds of transport (maritime, land-based, waterway

and aeronautic). Now, they're aiming to cut back on real estate, be more respectful of the environment and better integrated into cities, particularly through the concept of "urban ports."



Freedom from oil

At least US\$1 trillion will have to be invested between 2030 and 2050 to reduce shipping's carbon footprint by 50 per cent by 2050. As of last year, oil-derived fuels accounted for 95 per cent energy consumption in transportation. Meanwhile, maritime traffic is predicted to increase by 35 to 40 per cent over the same period.

This dependence on hydrocarbons also represents an economic vulnerability for the maritime shipping sector due to new environmental standards.

In France, liquid bulk transport has been in decline since 2009 (decreasing three per cent on average since 2016), despite a slight uptick in 2017 (2.1 per cent). Fuel shipping (50 per cent of shipping by weight in major maritime ports) has also decreased by 25 per cent since 2008.

The golden age of oil cannot hold for much longer, given its environmental impact and increasing scarcity. As the consumption of hydrocarbons and coal drops, we should also see a steady decrease in fuel shipping.

The French government's National Low-Carbon Strategy ("Stratégie nationale bas carbone," or SNBC) aims to reduce emissions from the industrial sector by 35 per cent by 2030 and 81 per cent by 2050. This will mean a nearly complete decarbonization of maritime transport, creating a real technological challenge for the sector.

To meet these targets, ports are working to become carbon-neutral by redesigning their logistical operations (flow management) and means of production (value creation), as part of an industrial reconversion approach. They're banking on new environmental technologies to generate a double dividend, both environmental and economic.

Three approaches could be used to achieve these goals: energy efficiency, renewable energy production and industrial ecology.

Building the ships of tomorrow

A 2021 study by the Getting to Zero coalition found that zero-carbon fuels had to represent at least five per cent of the fuel mix by 2030 for international shipping to comply with the Paris Agreement. Around 100,000 commercial vessels will be affected by this energy transition, according to GTT, a company specializing in the transportation and storage of liquefied natural gas (LNG).

In this vein, an ambitious environmental certification program, Green Marine Europe, launched in 2020 in order to create the European maritime industry of tomorrow.

New fuels with smaller carbon footprints, such as liquefied natural gas, ammonia and ethanol, and the accelerated adoption of alternative propulsion systems will be needed for the sector to become greener.

In 2020, Bordeaux's port was fitted out with an LNG-powered dredger, which requires less energy and



is more environmentally friendly, thanks to its water injection-dredging mechanism.

Hydrogen fuel (initially "grey," now increasingly "green") represents another viable alternative in the medium-term for fleets subjected to heavy rotation. Although the project is currently in its early stages (involving small vessels of 60-80 seats), more ambitious initiatives have been launched, such as the Hydrotug boat in construction for the port of Antwerp.

The arrival of steam-powered engines put an end to the use of large wind-propelled clippers in the late 1800s. But technologies that harness the wind could make a major comeback, with ships using sails and kites to reduce fuel use.

Offshore wind turbines, a promising solution

Developing electric facilities and technology is also essential to the energy transition, whether through electrified wharfs, turning port seawalls into energy producers, or developing electric ferries that use solar power, bioenergy, or marine power.

As the energy transition progresses, we will see ports go from consuming large quantities of a single energy source to using multiple energy sources and becoming electricity producers.

On that note, offshore wind turbines will profoundly change French coasts over the coming years. The first sites will be near ports (with the first French offshore 80-turbine wind farm due to launch in Saint-Nazaire in 2022). In the medium term, the objective is to reach a capacity of 5.2 to 6.5 Gigawatts of offshore wind energy in France by 2028.

This technology brings a new vibrancy to port areas in search of industrial diversification, optimized real estate revenue and local expertise (construction and maintenance operations).

The forthcoming offshore wind farm near Quai Hermann du Pasquier in

the city of Le Havre, which will launch in 2022, is being presented as the “biggest industrial renewable energy project in France,” and symbolizes the port’s industrial and energetic transition. What’s more, after 53 years of service, the thermal power station in this area, which used 220 tonnes of coal daily, closed down on 31 March 2021.

Finally, it should be noted that offshore wind farms represent an opportunity for ports to produce their own hydrogen by electrolysis of seawater.

Bringing city and port closer together

The energy transition forces governments to reconsider the connections between city and port. Development projects based on an entirely oil-based economy and the globalized boom in shipping container transport in the second half of the 20th century disconnected city and port at every level. Ports were removed from urban settings due to a lack of space, with huge industrial port zones created on the city’s outskirts.

Now this separation is being questioned, marking the return of the port as a space that’s open to the rest of the city.

For port cities, where ships coexist with residents, industry, businesses and tourism, pollution has motivated citizens into action. Local environmentalism has pushed ports to become open to cities, by promoting the development of circular economies and industrial ecology.

Many ports have launched energy transition projects, aiming to transform city-port relations. The port area is turning out to be an excellent setting to try out new practices founded on greater co-operation between local players.

In La Rochelle, for example, environmental and energy-based issues provided an opportunity to start a shared, collaborative discussion about the future of the metropolitan area. The La Rochelle Zero Carbon Territory project, where



the greater urban area aims to become carbon neutral by 2040, the energy transition is being undertaken through concerted planning between the city and its port. The port has committed to initiatives that limit its environmental and energy-related impact, while providing benefits to the local economy.

The roof of the submarine base in the La Rochelle port was fitted out with 7,580 solar panels in 2018.

In Le Havre, as in Bordeaux and elsewhere, this city-port interconnection is being strengthened by combining energy-related challenges and digital opportunities.

In time, this should lead to the birth of “smart port cities” (connecting “smart cities” with the “ports of the future”), for a “new model for urban and industrial port areas, blended together by innovation.”

Making ports the site of modern energy

Although the environmental challenge is clearly huge and complicated, this energy transition gives us the opportunity to reinterpret ports as laboratories, and to test new practices and technologies. Case in point: the Port of Rotterdam decreased its CO2 emissions by 27 per cent between 2016 and 2020.

Ports have always been showcases of industrial revolution, with the arrival of steam, propellers and then metal hulls. They often feature the most recent energy-related technology, as shown by the painting of the port of Le Havre, by Camille Pissarro.

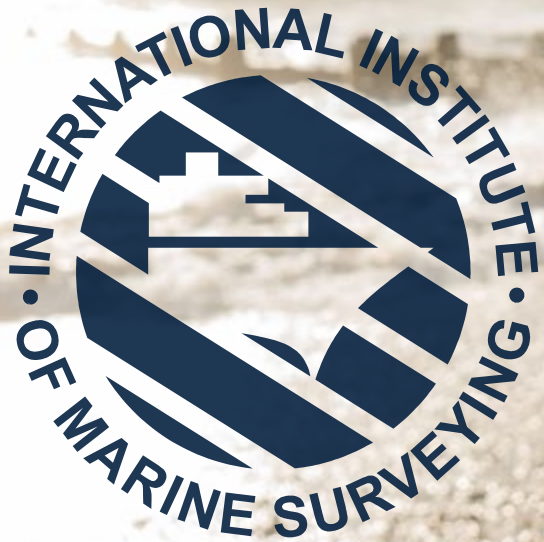
Now it’s up to them to keep this legacy alive, as true gateways to a more durable and resilient economy.



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Could the X-Press Pearl Disaster Have Been Prevented?

Hundreds of dead turtles continue to wash ashore in Sri Lanka, almost two months after a newly built container ship caught fire while anchored off Colombo's port.



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By Dr Claudio Bozzi,
lecturer in law at Deakin University.

Joining the Deakin Law School in 2011, Dr Claudio Bozzi is a highly experienced commercial barrister with a career that's spanned numerous and diverse fields.

A unit chair and lecturer in Deakin's undergraduate and postgraduate law programs, Dr Bozzi is also Executive Director of the Centre on the Legal Profession and now a director in the school's newly established law clinics.

The X-Press Pearl was carrying 1,486 containers and burned for two weeks. It then sunk in early June, causing one of Sri Lanka's greatest environmental disasters.

Chemicals contaminated waters, killing marine life and destroying breeding grounds. The contaminants include nitric acid, sodium dioxide, copper and lead, and tonnes of plastic nurdles (pellets) which can take centuries to decompose. Local communities entirely dependent on fishing for their livelihoods have been ordered not to fish. Now, the environment faces the threat of an oil spill, which authorities, with international assistance, are desperately trying to contain. Local police have launched a criminal

investigation. Meanwhile, the Centre for Environmental Justice has filed a fundamental rights petition in the Sri Lankan Supreme Court.

In the wake of the disaster, many commentators have sought to explain what went wrong. But these have largely missed a broader, though crucial, issue this disaster exposed: the tension between economic development and environmental protection. This makes shipping a realm of ultra-free trade distant from, and sometimes untouched by, regulations.

I'll help unravel what went so drastically wrong, and how we can try to prevent similar disasters in future.

WHEN CARGO SHIPS CATCH FIRE

It is believed the leakage of properly declared, but inappropriately or incorrectly packed or stowed nitric acid caused the X-Press Pearl fire. Nitric acid is a corrosive, toxic and flammable liquid — and the X-Press Pearl was carrying 25 tonnes of it. Nitric acid is an essential component of ammonium nitrate — a popular fertiliser around the world and a raw ingredient in explosives manufacturing. Impounded ammonium nitrate is what triggered the 2020 explosion that obliterated the Port of Beirut.

Any fire on board a ship is a clear risk to the lives of the crew and the

environment. Yet, container vessel fires occur frequently. Insurers are notified of fires about once every two weeks and major fires every 60 days. The source of these fires is changing. Fires once emanated from engines, but they are now just as likely to originate in the cargo itself, with incorrectly packaged or misdeclared chemicals the second-most prevalent cause of fire after charcoal. In fact, data indicate the possibility of more than 150,000 annual cases of undeclared or misdeclared dangerous goods capable of causing fires. The incidence may be higher depending on the shipping route.

Another fire risk has to do with competition between shipping companies, which is based on carrying capacity and efficiency. This has forced an exponential growth in container ship sizes, which escalates the probability of a fire. It also makes detecting a fire difficult, if not impossible, until it is well advanced. Fire safety on ships could be improved with better training to promote best practice in protecting and preserving the integrity of cargo.

SOLAS (Safety of Life at Sea) regulations govern on-board firefighting. But these are outdated, having come into force in 1980. They need to be amended to suit the current era of large and ultra-large vessels, like X-Press Pearl. Organizational procedures, such as those of the American Bureau of Shipping, promote earlier fire detection and more efficient methods of fire suppression. They're better suited to the design and operations of ships in modern maritime industries.

A TALE OF TWO PORTS

The nitric acid leak aboard the X-Press Pearl was discovered at Hamad Port in Qatar, which refused the ship's request to discharge

the container. The ship made the same request later to Hazira Port in Gujarat, which was also denied. The disaster at sea could have been avoided had either port offloaded the container. Why did they refuse? And what were their obligations in these circumstances?

It's unlikely their actions will be examined in the official investigation, which will focus on the causes of the fire and actions of the crew. However, these answers reveal the hugely problematic conditions of shipping operations. Both ports claimed they lacked the manpower and equipment to discharge the leaking container. But it's hard to imagine such recently built, state of the art, and well-resourced facilities — according to their corporate websites — lacking the means to deal with a nitric acid leak.

Ports may be reluctant to accept hazardous vessels because they lack emergency and contingency plans and preparedness. It's one thing to adopt hazard and environmental policies, but quite another to actually implement them. This would require providing the training, and maintaining the necessary equipment, to address potential threats.

Port services are just as competitive as shipping companies. Ports aim to maximize the moving of containers through terminals. This makes the physical investigation of the contents of containers impossible, and any processing delay unaffordable. Nevertheless, efficiency and profitability don't mean quality services should be sacrificed. There are three ways to begin addressing this issue:

- rigorous enforcement of the International Maritime Dangerous Goods regulations, which control their handling and stowage
- better training for supply chain workers who apply these regulations

- stronger sanctions issued by states where cargoes originate, and by shipping companies.

COULD THE CREW HAVE SOUGHT SHELTER?

The investigation into the X-Press Pearl disaster will reveal whether the crew sought a priority berth for shelter while the ship was engulfed in flames at Colombo port. Arguably, ships in distress have traditionally enjoyed the "freedom of ports" to seek shelter in the territorial waters of nations if they are facing the total loss of the vessel and its cargo, or the lives of its crew. But states may deny ships entry if, for instance, they pose a serious threat to the environment or the safety or security of its people. Given the increasing size of vessels and the uncertain nature of the threat they pose, refusal of entry is the norm.

In 2003, following several high-profile incidents, the International Maritime Organization adopted resolutions creating "places of refuge" for vessels in distress. These are sheltered waters, and not ports with the infrastructure to counteract serious problems on board. So, while refuge may address the threat of fire, it does not avert the far greater risk of environmental pollution. Places of refuge have assuaged some concerns, but they are not an international obligation. They also tend to be concentrated in developed maritime regions and are virtually non-existent where they're most needed — where substandard vessels carrying illicit dangerous cargoes ply their trade.

It's important we do not let the X-Press Pearl settle into the background as another spectacular story about a ship ablaze at sea. It should spark change and serve as the cautionary exemplar of what happens with alarming frequency when we want our goods cheap and now.



NEW PRODUCTS

Each quarter The Report brings you an update on some of the new products and innovations to hit the boating, shipping and maritime industry.

MAN Engines to power UK pilot boats

A German manufacturer is entering the UK pilot boat market with a hefty order of 18 diesel engines for boats in build over the next 5 years. This is the first time MAN Engines will provide the engines for new pilot boats manufactured by shipyards in the UK. Three pairs of MAN D2676 LE425 engines, each with an output of 478 kW (650 hp), will be installed in 17-metre-long ORC-171 pilot boats. Six more pairs of MAN D2676 LE474 engines, each with a lower output of 368 kW (500 hp), will be installed in the smaller ORC-136 boat class; these boats are 13 metres long. Both engine types meet the latest strict IMO Tier III emissions standard.



New VIMMS system will monitor shock and vibration levels during operations in waves and at high speed

Dyena's new Vessel Impact and Motion Monitoring System (VIMMS) system was developed in collaboration with SHOCKWAVE Seats to US Coast Guard specifications. It is designed to monitor crew and vessel levels of shock and vibration during operations in waves and at high speeds, particularly vital in RIBs and other high velocity craft.

The VIMMS system comes complete with a helm unit and two remote sensors for measuring accelerations on the vessel structure and at the helmsman's seat. A twin LED display provides simultaneous feedback on the impacts received by the vessel and crew.

With real-time feedback, helmsmen can adjust their speed or course before limits are exceeded, reducing repeated shock and whole-body vibration exposure to the crew or damaging shock impacts to the vessel and equipment.

"VIMMS was developed in collaboration with SHOCKWAVE Seats to the US Coast Guard's specification, so we know that our system directly meets their stringent requirements," says Dyena MD James Glover.





Electric pod drive for small commercial vessels

The Fischer Panda electric pod motor provides boat builders, operators and owners with a convenient propulsion option with minimal servicing requirements and installation flexibility. The motor is available in two versions depending on the voltage, increasing the potential for

different battery set ups and offering the choice of a 24 V solution in pod format.

Located under the boat's hull, both the 1,7 kW pod with 2300 rpm (24 V) and 3,8 kW pod with 3000 rpm (48 V) provide reliable low-speed operation and high manoeuvrability for small boats and USVs, with maximum torque throughout the speed range.

Equipped with a three-blade Yamaha DELTA propeller, the motor is water-cooled, brushless and sensorless. All electronic components are housed within the Fischer Panda Easybox controller unit which is installed inside the boat with the battery bank. Encased within a compact and watertight stainless-steel housing, the pod can be rotatably mounted, while the three-stage sealing provides maximum safety and minimum maintenance. Fischer Panda can supply appropriate brackets for the pod to be used as an outboard motor.

Powerful electric outboard from Vision Marine

Canadian company Vision Marine has developed what it claims is the 'World's most powerful electric outboard'.

"Vision Marine Technologies' E-Motion powertrain is exactly the solution sought by eco-conscious consumers and environmental regulators," said the CTO Xavier Montagne. "E-Motion is the world's first purpose built, production ready 180 horsepower electric outboard engine."

This new powerful outboard operates on a voltage of 650 volts which is high for marine applications but offers the possibility of reducing cable and motor sizes. Partly because of this high voltage, Vision is only offering this electric outboard with their own battery package and control system. The batteries have a capacity of 60kWH, enough to give an electric boat a useful range.



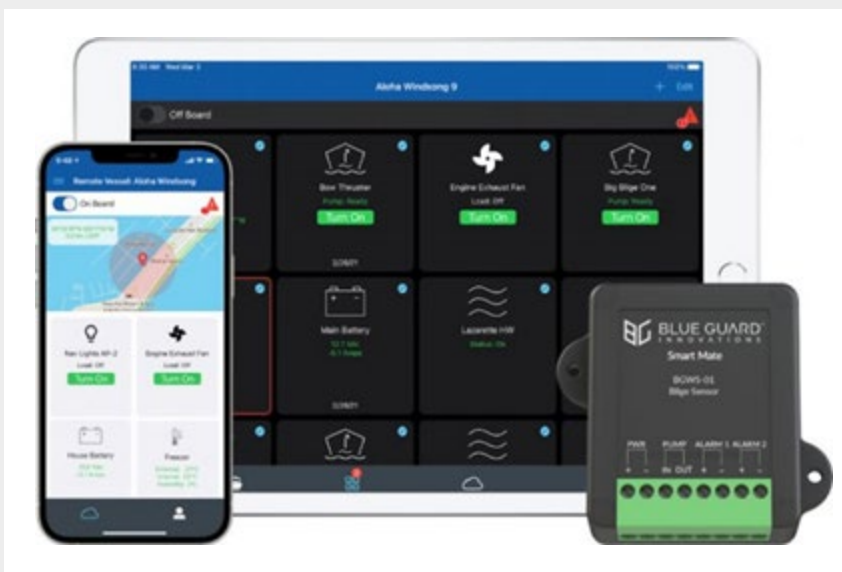
NEW PRODUCTS

New XRP laminate sails from Kayospruce

With sailing undergoing an unprecedented boom, Kayospruce is experiencing more than double the demand usually expected for the time of year. With the biggest demand being seen in dinghy sailing, Kayospruce has responded with the introduction of the new XRP Laminates by Challenge Sailcloth. This is aimed at the club sailor, who wants a better performing sail than a conventional woven Dacron.

The XRP is a polyester laminate with a 60-degree ply and a warp inset, making it ideal for radial construction sails. It is available in XRP 6 (3oz), 9 (3.7oz), 13 (4.4oz), 18 (5.1oz), and is suitable for small dinghies to dayboats and sports boats.

"XRP Laminate is the affordable, yet highly desirable, alternative to the high-tech carbon fibre fabrics that are the most expensive on the market," explained Kayospruce's Chris Owen.



Smart Skipper boat monitoring and control system unveiled

Blue Guard Innovations has introduced a new boat monitoring and control system, Smart Skipper, enabling owners, operators and captains to monitor the security and safety of their unattended vessels. The system consists of Smart Mate devices and the Smart

Skipper app. Smart Mate uses Bluetooth mesh technology to improve connectivity and ease of installation.

Security features include geofence and unauthorised entry while safety features include fire detection, high-water alarm, bilge pump activation and run time. The system can remotely control lights, fans and pumps. Once an alarm is triggered all designated users receive real-time alerts via email, push notifications and text.

The Smart Skipper system uses smart tablets and smartphones to connect to the Smart Mate device's Bluetooth 5.0 mesh network. The smart tablet then transmits the gathered information to the cloud using a mobile or wi-fi connection.



Hybridisation offers possibilities

With its electric drive systems now powering a range of vessels and special projects, Fischer Panda UK says its custom designed solutions prove the potential of hybrid propulsion for a range of applications, including ocean crossings. The company's electric systems can be charged by wind and solar energy with diesel generators installed as back-up.

The installation of equipment such as the 48V Fischer Panda 20kW 600rpm Easybox shaft motors and 48V DC generators form hybrid propulsion systems which provide speeds up to 10 knots and demonstrate the possibilities of creating various solutions.

"From sailing yachts to narrow boats, to motorboats, hybridisation to power the boat is a viable solution that offers a range of benefits," said Robert Tuck, marine sales executive, Fischer Panda UK. "Hybrid power can reduce emissions as well as drive-up efficiency, plus the systems have a compact footprint due to the use of integrated variable speed generators producing only the power required."

S.M.A.R.T Engineer outboard monitoring and remote tracking system launched

The new cloud-based S.M.A.R.T Engineer can minimise downtime for Proteum's commercial customers, explained Nicky Yeoman, head of marketing and sales operations at Proteum, an SC Group company.

The system monitors engine RPM, engine hours, engine coolant temperature, engine oil pressure, fuel flow rate, fuel pressure, engine load, exhaust temperature, turbo boost pressure, battery voltage and total fuel used. S.M.A.R.T Engineer can monitor up to four engines installed on one boat, with the facility to monitor an unlimited number of vessels in the fleet via its customisable online portal.

All data collected by the S.M.A.R.T Engineer is archived in the online portal. From this portal detailed customisable reports can be exported, providing the operator with insight which could save costs and provide operational benefits.



NEW PRODUCTS

New electric sterndrive from Mitek

Italian electric propulsion specialist Mitek has launched what it says is the only sterndrive electric motor able to rotate on its own axis to switch from ON to OFF mode, making its footprint almost zero.

Revolve features a unique patented system that offers an innovative and elegant solution to eliminate the hassle of assembling, disassembling, and storing traditional outboard engines. The movement takes place thanks to a rotation parallel to the axis that allows the user to switch from ON mode (propeller immersed in the water and ready to operate) to OFF mode (propeller out of the water in closed position), eliminating the external dimensions of the motor.



Manta, the sea-cleaning sailboat that feeds on plastic waste

The giant sailing boat Manta will be the first of its kind capable of collecting, processing, and recovering large quantities of marine plastic waste. Built from low-carbon steel, the Manta features a custom electric hybrid propulsion system that allows manoeuvring at low speed for sensitive operations (such as the entry to and exit from ports), as well as waste collections, which are carried out at 2 or 3 knots. Agile and energy-efficient, the Manta can reach a top speed of over 12 knots.

Around 500kW of onboard renewable energy is generated via two wind turbines, 500 square meters of photovoltaic solar panels, two hydro-generators under the boat, and a waste-to-energy conversion unit (WECU). The power supply from renewable energy sources will allow the Manta to operate 75% of the time autonomously, without using fossil fuels, and with a minimal environmental footprint.

Thanks to a unique combination of collection, the Manta will be able to pick up both floating macro-waste and smaller debris from 10 millimeters upwards and up to one meter deep. Depending on the density and closeness of the layers of waste, the ship can collect between 1 to 3 tonnes of waste per hour, with the objective of collecting 5 to 10,000 tonnes per year. The vessel is said to be the first self-sufficient workboat capable of processing 90 to 95% of the collected plastic waste whilst at sea.



A day in the life of...

Oli Byles

MIIMS



Oli Byles is at the younger end of the IIMS membership age range, one of the new breed of marine surveyors one might say, and he has recently upgraded to Full membership. Oli is based in southwest England and specializes in pre purchase and damage assessment surveys in the yacht and small craft arena. Mike Schwarz sought out Oli for his views on a range of topics.

Question 1

When you left Southampton Solent university with a marine based degree was it your goal to eventually make a career as a marine surveyor, or was it something that you slipped into?

It was very much the latter. Much though my degree was highly relevant to marine surveying, the profession found me rather than the other way round. Following the completion of my degree, I was very fortunate that my first job led me, fairly quickly, into a management position at an all-service boatyard in my mid twenties. Predominately, I was responsible for the day-to-day running of the yard facility and repairs workshop. After six years in the job, I developed itchy feet, but there was a lack of opportunities in comparable roles locally. My wife and I had settled in Exeter; she had a good job working as a BBC producer. I spent around a year trying to work out my next move; always feeling that I wanted to make the most of my qualification and experience and so I also spoke to a well-known surveyor, Nick Vass. He was a regular at the yard I managed and had been encouraging me to look at a career in surveying for some time.

My family went through a very tough time that year with the sad passing of both my grandfather, to whom I was very close, and also my brother-in-law, both too young. My wife and I took some time out of work to travel following the funerals and I was able to make decisions with a clear head and a renewed perspective. When we returned home, I wrote my letter of resignation to the boatyard. No sooner had I handed in my notice at my steady and reliable job, ready to plunge into the unknown than we found out my wife was pregnant with our first child. No pressure! The rest is history...

Question 2

How important do you think it is to have had a background and interest in yachts and boats from a young age, coupled with knowledge of working in a boatyard, to become a successful marine surveyor?

I like the fact surveying is a career you can take any number of different paths to arrive at. However, strong interest in yachts and boats, whenever that starts in life, is essential in my view. My maritime interest started on canal boat holidays with my family as a child. I then moved into dinghy sailing in my teens, long distance delivery crew in a year out after A-levels and yacht racing in the Solent whilst at University. Hands-on practical experience in the marine industry has also proven invaluable. Working in an all-service yard provided me with a breadth of experience and is the part of my past I value the most in leading me to my surveying career (probably just in front of three years theoretical training at University). I regularly find myself having to converse with repairers and yard staff in the course of my work, so inevitably having a boatyard background is a huge help in this regard.

Question 3

I recall chatting with you some years ago and you highlighted some of the hurdles you faced in the early stages of setting up your business, for example getting known among local brokers. What were the key challenges you faced in your early days as a surveyor, and do you have any practical tips to help other up and coming surveyors to overcome them?



The biggest challenge, particularly if you're starting up as a young professional on your own, is getting a foot in the door and becoming a recognized face in your industry. It was something which I underestimated. For the most part, the reaction I found early on in my career was that it was too easy for people to reject someone who was unfamiliar. Whilst I had some good contacts, as a new surveyor, I was suddenly in a position of needing to sell my services to people who didn't know me or my capabilities. My advice to anybody embarking on a new career in the industry would be that you have to keep knocking on the door, almost regardless of whether you were rejected last time. Leave a packet of biscuits in the boatyard tearoom or brokerage office, but also leave a few business

cards. It's a little old-fashioned, but it still works. I'm also hugely grateful to Nick Vass, who not only encouraged and mentored me, but passed me some survey work in my early days. I would be very happy to give someone else that support. Once you have done a few surveys in a few different places, you start to be known to others in the industry, and life begins to become a little easier and the nights are little less sleepless (new baby or not).

Question 4

What do you think are the key personal qualities and personality traits required to be a successful marine surveyor in today's world?

Inquisitiveness, adaptability and good communication.

The first thing is to have an enquiring mind and to trust your own judgement. That includes admitting to yourself when you don't know or understand something that you have found. If I find something unfamiliar, I work on the premise that if something looks wrong, it has to be assumed wrong until proven otherwise either by further investigation on site, or desk research later. There are always new things cropping up, so you need to have a drive to want to constantly expand your knowledge.

The second thing is the ability to adapt. Marine surveyors can work for a very wide range of clients; first-time boat buyers who are complete novices and to whom buying a boat is a very significant step and a huge investment, to somebody who has had boats for most of their life. The range of situations and environmental conditions that we have to work in is equally large. This leads into the third quality, which I think is the ability to communicate freely. Being friendly and approachable is something I have found to help enormously. I think one of the key tricks to this trade is being able to read the situation in front of you and adapt the way you communicate accordingly. I have been known to break out a strong Devon accent whilst trying to persuade a fisherman that a disintegrating seacock should be renewed, whilst adopting a very different tone in a plush marina aboard a three-year-old Sunseeker!

Question 5

There is a shortage of quality marine surveyors worldwide and fewer are attracted to this way of life than in the past it seems. Why do you think this is and what advice would you offer to someone considering a career as a surveyor?

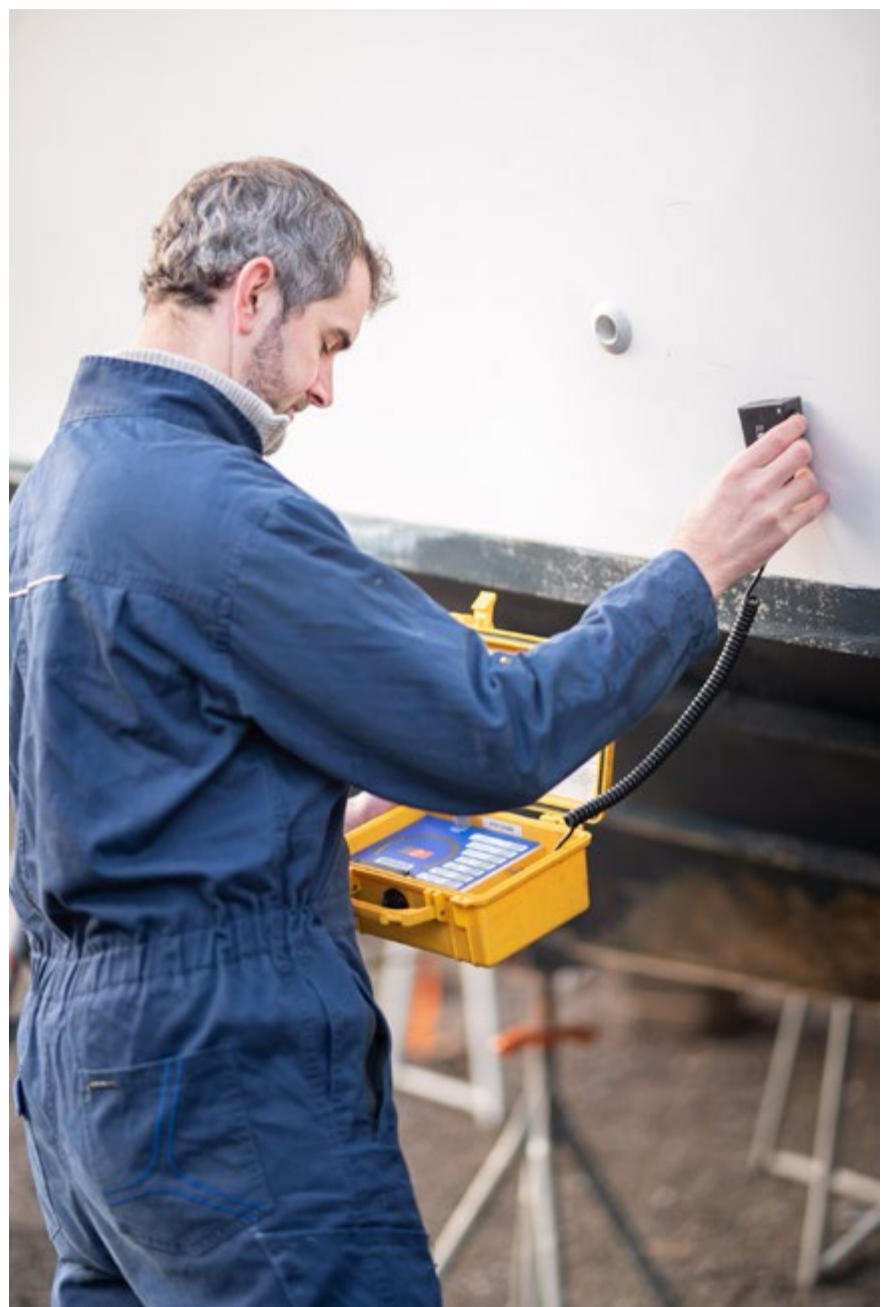
Sadly, we live in a world which is becoming ever increasingly litigious. "I wouldn't want your job" is something I hear surprisingly often. When I ask why, normally the answer revolves around the perception that surveying is full of risk and stress and the marine surveyors have a target on their backs for legal action against them. Whilst this is true to some extent, the same could surely be said for many other professional consultancy-based careers. Happily (tapping my wooden desk as I type this), I have experienced issues with

less than 1% of my clients since I started. I would advise anybody new to the profession to take time to talk to other surveyors, even some of your competitors about the job; attend training events, don't be afraid to ask questions, be engaging and honest. In this regard, I have found the IIMS to be particularly helpful. It's a really good idea to get a range of perspectives on the profession from people who've been in it (both the "old" generation and new). It's also worth having a good relationship with your indemnity insurers, remembering that they are there to help you. Although difficult to remember when you are dealing with a one percenter, 99% of the time the job is rewarding, stimulating and always highly varied.

Question 6

As a younger surveyor who is perhaps more comfortable than some using modern technology as a communications tool, how important is the internet, your web site and social media as a means of attracting new business?

It's absolutely vital. Word-of-mouth is always the best way to develop any business. However, rather than words spreading through boatyards, brokerage offices and yacht club bars, word-of-mouth is very heavily Internet-based. Early in my career, I tried numerous sources of advertising, predominantly in tide tables, yearbooks and other publications and by dropping business cards in every office and



marina where the door was open; all with limited success. Whilst I still keep my face in the door when I get the chance, paid-for advertising is now done exclusively through Google. Whilst this is highly targeted with quantifiable results, I think the best advertising I get is through people leaving reviews for my services online, either through a social media channel, on Google or on my own website. I've realized that my name has also spread through some marine online forums which is helpful. I send every client a testimonial request with their survey report. Many clients employ me because they have read what other people have said about my work. I would never buy anything online unless I had looked at the star rating and customer reviews. Why should my services be any different?

Question 7

What is your most used and least used item in your toolbox and why?

The vast majority of any survey is done with the right hammer for the material, a decent torch and a keen pair of ears and eyes to use them. Those are the main tools and skills you need. For that reason, I have my torch and hammer somewhere on my person at all times, rather than in my toolbox. The notepad and camera (I use my iPhone for this) are also essential. As my career has developed, I now carry more technology in the bag and rely slightly less on blunt instruments. I have a couple of pry bars in the tool bag which don't come out too often, especially in front of boat owners!

Question 8

Many surveyors I chat with tell when they look back at their early reports and review them, they are shocked at their poor quality. Is the same true of you and what do you think are the key components of a good report?

I'm no different to everybody else in that regard. My reports have definitely improved in content and structure over the years, which has come both from client feedback and working things out for myself. Being self-critical is quite important, along with the ability to be able to take criticism from others and use it in a constructive way to make



improvements. I'm always looking for a better way of doing things to improve the service I provide, and the reports are no different. I think a good report will lay everything out in a logical fashion, explaining the findings clearly and succinctly. The aspect of my reports that clients seem to value most, is having the recommendations categorised through the report and then set out in a summary, giving them a prioritized works list.

Question 9

What is the toughest challenge you have faced whilst on survey?

Other than tough time starting up, I could probably list several challenging conversations between myself, the client, the vendor, the boatyard or the broker in answer to this.

The toughest single challenge I have faced was when travelling to Spain to do an inspection on a big old, converted fishing boat. Ryanair helpfully decided to leave my suitcase (packed with all the equipment I needed) in Birmingham airport, being unable to get it to me until after I was due to fly home. Luckily, I had my torch in my laptop bag along with my notebook. I was able to beg, borrow and steal two hammers, a sharp screwdriver and a very ill-fitting pair of overalls from the local yard, mostly using hand gestures and pigeon Spanish. A two-day survey was completed wearing only said overalls in 35° C. Suffice to say that the resulting limitations were quoted in the report! Having to buy toiletries, I accidentally picked up denture adhesive rather than toothpaste. I now know the Spanish for both. Yes, the adhesive did make it all the way to my toothbrush!

Question 10

I know you have a young family. Given the nature of surveying, how easy do you find it to juggle the work life balance?

This can be tricky at times. The job comes with high mileage and long hours. My daughters are 5 and 4 years old and don't particularly enjoy it when I have to go away for work. One of the benefits is that I do work from home on report writing days. I make every effort to get in from the office at the

bottom of the garden for the girls' dinner and bath time. My wife's work, latterly in the commercial sector of broadcasting, was impacted by Covid last year which led to her losing her job. However, this coincided with a large increase in work volume for small craft surveyors, so it was an easy decision to bring her on board. This has actually balanced things really well and the business has expanded as a result of her input, and I would say we both get to spend more time with the kids.

Question 11

How might we find you unwinding and relaxing when the work is done and what was the last book you read?

I'm a keen sportsman, and whilst my body is still putting up with it, you will find me on a cricket field on Saturday afternoons in the summer. Sailing is a passion of mine which gets indulged less often than I would like these days, but I still jump at the chance when it comes along. Cricket will be replaced with the family yacht when the girls are a little older and have learned to sail. I also like to play golf and watch the rugby union at Exeter Chiefs. With life being so busy, I read far fewer books than I probably should (I'm normally asleep as soon as my head hits the pillow). I tend to read quite a lot of technical articles along with keeping up with current affairs and the latest score. On my bedside table at the moment is a book called "The Wicked





Pilgrim” by Randal Charlton which is the story of the replica Mayflower that was built by an Englishman and donated to the USA in the fifties.

Question 12

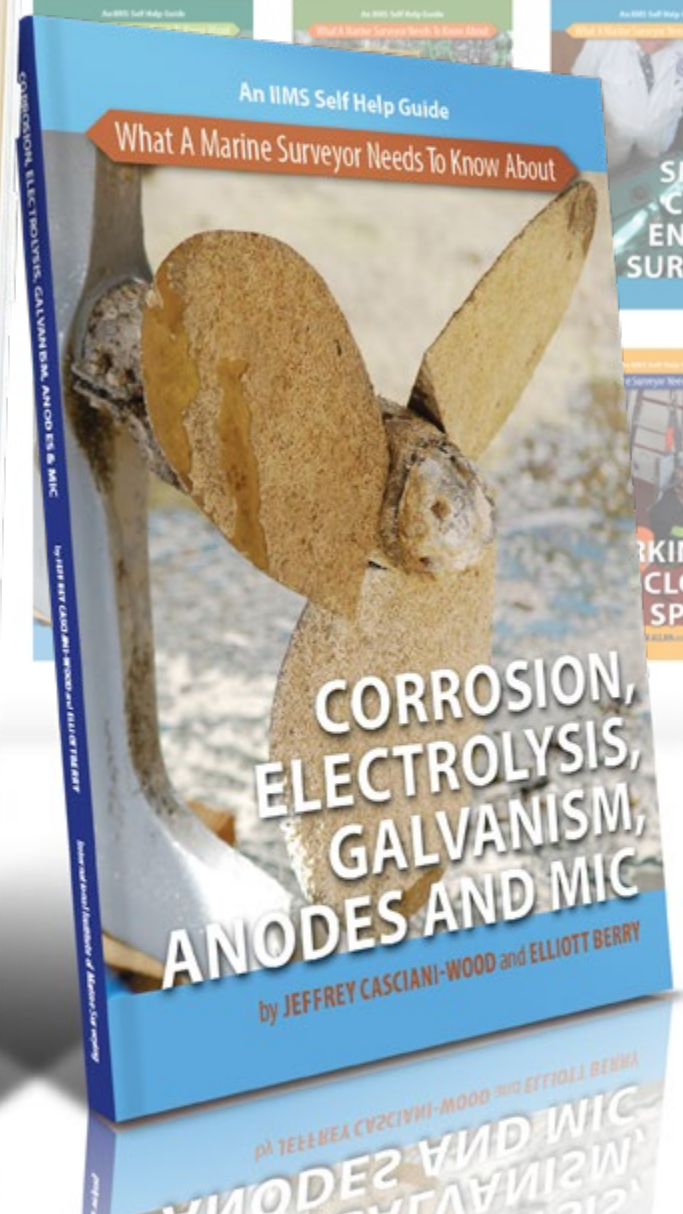
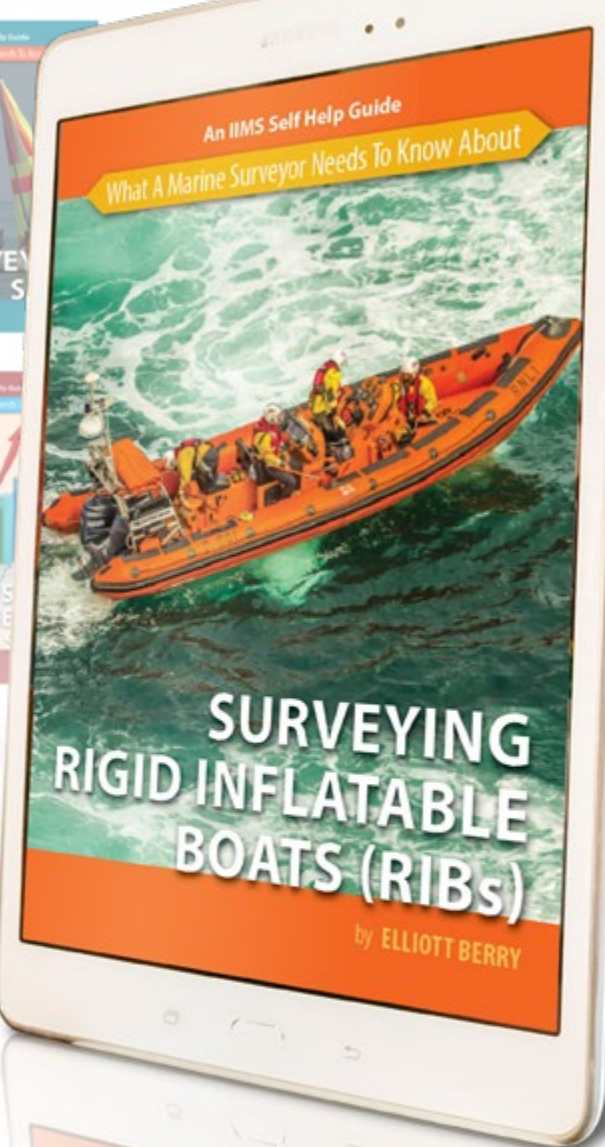
We often hear it said that every day is a school day. What have you learnt in the past week?

I did a survey last week on a small steel Dutch cruiser. “How long will my anodes last?” My usual answer to this is along the lines of “that depends on a few factors, probably about two years.” For the first time this week I was able to flesh out my answer with proper technical analysis and calculations thanks to Jeffery Casciani-Wood’s excellent article in the June issue of The Report. It took me longer to explain it all to the client than it did to measure the boat, measure the anodes and do the calculations. Other than that, I was once again reminded to avoid bowling short and wide on a hard pitch to an in-form opening batsman!



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