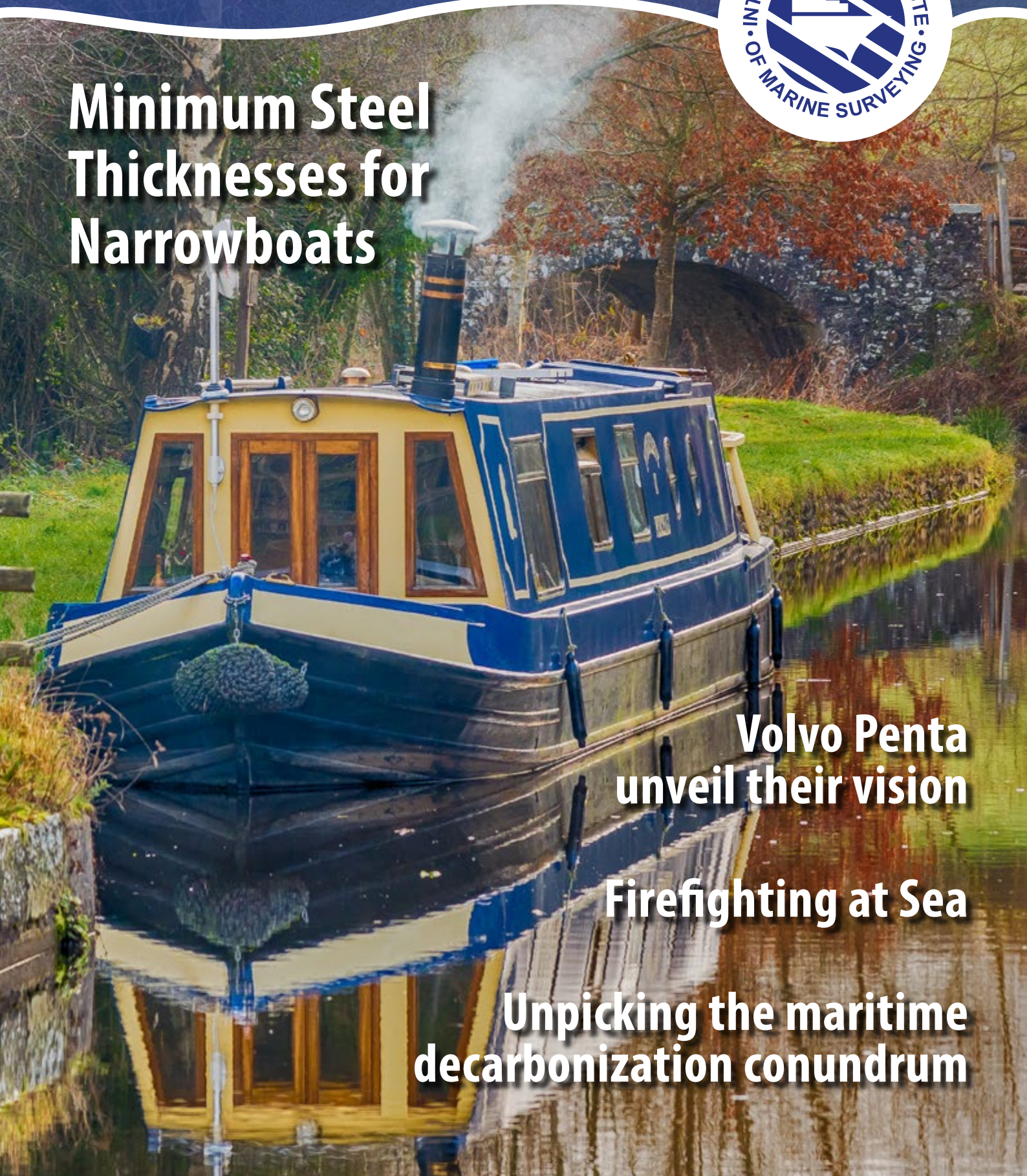
THE REPORT

MARCH 2023
ISSUE 103

The Magazine of the International Institute of Marine Surveying



Minimum Steel Thicknesses for Narrowboats

Volvo Penta unveil their vision

Firefighting at Sea

Unpicking the maritime decarbonization conundrum

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THE REPORT

The Magazine of the International Institute of Marine Surveying

MARCH 2023 • ISSUE 103

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Editor's Letter

Dear Colleague

Welcome to Edition 103 of The Report Magazine, March 2023. It's spring here - a time of renewed optimism as we look forward after what has been a chilly and exceedingly wet winter by recent standards in the UK. The shipping and boating business is changing rapidly before our eyes, perhaps faster than at any other time in our lives, and the sector is looking forward too with huge optimism. Yes, opportunities abound, yet significant challenges rear up to counter this mood of optimism; and sometimes we have to look back before looking ahead for history can teach and guide us.

This edition of The Report features articles that outline some of the opportunities and challenges that lie ahead for the sector, from lithium-ion battery technology to decarbonization strategies. These are huge topics that are exercising the finest technical minds in our industry and we must applaud the efforts being made. And what a significant challenge this imposes on marine regulators too. I referred to looking back in time at historical events a moment ago. My comment relates directly to the MV Estonia ferry disaster in 1994 with the loss of 852 lives, making it one of the worst disasters of the 20th century. That vital new evidence not discovered before should be forthcoming nearly 30 years after the event, following the publication of a fresh investigation report, seems incredulous. Read the item in marine news on page 9, then draw your own conclusions.

Another hot topic that inland waterways surveyors (and others) have been grappling with for years is knowing what is the minimum acceptable thickness of steel on a narrowboat hull. I am grateful to Peter Brookes and Tom Keeling who have authored this authoritative feature article entitled, *"Minimum steel thickness for narrowboats"* – page 58.

Once again, the subject of report writing is in the spotlight. I have co authored an article with Geoff Waddington, with comments from Craig Norton (InspectX President). Our concerns surround the use of report writing software based on recent evidence seen. There is nothing intrinsically wrong with the software, but some surveyors are not getting the most from the programmes and leaving themselves exposed. See page 49.

The ramifications of the Ever Given incident, when she blocked the Suez Canal, are rumbling on. Graham Inseal's article on page 111 provides thoughtful reflection on the events and the lessons learned.

The topic of lithium-ion batteries remains very much a focus in people's minds and won't go away. Last year saw a number of accident reports citing lithium-ion batteries as the probable cause of several high profile fires and explosions on ships, superyachts and ferries. The article on page 78 entitled *"Is Lithium-ion the ideal battery?"* covers safety aspects of this technology, but it also explains the science behind these batteries in a balanced way, explaining their advantages, disadvantages and the associated risks.

I am grateful to Ian Bartle, who has authored the simply named article, "*Lithium-Ion Batteries in marine applications*" on page 82. Ian introduces us to the phrase thermal runaway, perhaps unheard of by some yet, but one I feel is going to become common to us all soon enough.

Sticking with batteries for a moment, the article entitled *"What to consider about the storage of batteries and their on-board maintenance"* is worth a read. Good practical advice is offered - page 104.

Perhaps you have never heard of the FSO Safer, I hadn't? The cost to the shipping industry for the Ever Given being stuck for less than a week was an estimated $416 million per hour. "That will be nothing compared to the disruption to the global economy if the FSO Safer spills its cargo," claim the joint authors of *"If you thought the Ever Given incident was bad, wait until you see the FSO Safer"* – page 114.

All in all this feels like a well-balanced edition of The Report Magazine, one which I hope you will enjoy.

Regards

Mike Schwarz,
Chief Executive Officer

The President's Column

Dear Members,

Welcome to the first Report Magazine of 2023. May the year bring you fair winds and safe passage.

For our vessels to sail with 'fair winds and safe passage' we must carry out our responsibilities as marine surveyors. Whether we are engaged to carry out a condition survey of a yacht, inland waterways craft, tug, and barge, or a large commercial vessel, if it is for insurance purposes or pre-purchase, or for Class, or for Flag, 'we' have a duty of care.

The duties of care that 'we' Marine Surveyors must always remember are as follows:

1. Is this vessel safe to proceed to sea?
2. Is this vessel and its equipment safe for the crew to operate?
3. Does this vessel present any risk to life, property, or the environment?
4. Is this vessel safe to operate for its intended purpose (eg. sailing for pleasure or carrying cargo)?

Once we have established if the vessel fits these criteria, we need to write our report to inform our instructing party (Client). This is where 'we' can so badly let ourselves down and potentially cause problems for the vessel's safe operation.

I have assisted a ship owner over Christmas and the New Year period for the Third Special Survey and Docking (15 years), and the Refit of a Product Tanker. I have been shocked at the lack of competence and lack of experience of a surveyor who has been attending on behalf of a Flag State (no names). It seemed to be the surveyor's intent to find as many 'deficiencies' and to write them down officially, while the ship was in refit (undergoing repairs) to 'score points' with their superiors. The trouble is that every written (perceived) 'deficiency' needs to have a written reply with corrective actions. This takes unnecessary time and resources for the Technical Managers / Superintendent to manage the surveyor's observations and provide official replies. Many of the 'observations' were works in progress and did not need to be reported. Others were not structural or safety critical. Some were just cosmetic. While on the other hand, I have been very impressed by the high level of dedication and integrity that I have seen from the attending Class Surveyors.

It is not the surveyor's responsibility to 'STOP' a vessel from sailing. It is a surveyor's responsibility, to the best of his/her ability, to make sure that the vessel is safe to sail and to carry out its intended purpose safely and to minimize any disruption to the commercial operations of that vessel, by being proactive in working with the owners / technical managers and reporting findings in a timely, clear, and concise manner.

This also brings in our previous comments about having a peer review of reports before they are issued to the Owner / Technical Managers / Instructing Clients. It is so important to present a clear and concise report that is reasonable, unbiased, based on facts, and where necessary referring to the necessary Class Rules and or Statutory Codes. If you are asked for an opinion

IIMS President, Peter Broad *FIIMS*

then that clearly needs to be stated that this is 'your opinion', but as a surveyor, 'we' must not lead a client to make commercial decisions that may impact on the subsequent operations of the vessel. That is the Superintendent's job.

So now I am on the subject of report writing. IIMS receives a steady number of complaints about surveyors' reports. These are all reviewed by suitably experienced Board Members and Mike as CEO, so that we can provide an independent peer review, after the fact, of a surveyor's report. There is a very well-defined complaint and reporting procedure at IIMS.

One such complaint relates to a surveyor who has used report writing software. The complainant deemed the report to be not well written and missing details – in other words deficient. However, is there anything wrong with the report writing software? Actually, we have reviewed this and found that the software is well-prepared and offers the capacity to enable the surveyor to write and present clear and concise reports.

In the case of the complaint the surveyor either did not have (1) experience to carry out the survey, (2) did not have experience of the report writing software, and (3) did not have a peer review of his report before sending it to the client.

I'm not condemning the concept of report writing software at all. It is a tool in the surveyor's tool kit and only as good as its operator. Nothing replaces experience, mentoring, and peer reviews. To round off this discussion, I would encourage you to read a special feature in this edition on page 49 co-authored by Geoff Waddington and Mike Schwarz with contributions from Craig Norton from InspectX. It goes into considerable details about the opportunities and challenges of report writing software.

IIMS has a marvellous selection of courses available to Members and non-Members. Please consider upskilling or refreshing your knowledge by taking an online Report Writing Course.

From the IIMS Education website, Reporting Writing module:
'As a practicing surveyor, your product is your report. It is the survey report that will define the surveyor and on which the surveyor's competence will be judged. As an industry professional, your entire career and reputation is based on the quality of your product just like any other industrial sector and there are often no second chances.'

Stay safe in 2023 and I hope to meet some of you throughout the year at the various events that we have planned, especially at the hybrid AGM and Annual Conference in the UK on 6/7 June 2023.

Peter Broad,
CEng, CMarEng, FIIMS, FIMarEST
President IIMS

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INTERMEDIATE REPORT OF THE PRELIMINARY ASSESSMENT OF MV ESTONIA PUBLISHED

Photo credit HAVCOM

It is nearly thirty years since the MV Estonia accident that claimed the lives of 852 people occurred, yet the speculation and mystery surrounding one of the worst maritime disasters continues to this day with unanswered questions. A new intermediate report has been published that has uncovered fresh observations which may provide answers to what caused this tragic accident. And it does matter to those involved that the truth emerges – even thirty years on - and the ramifications are huge.

The new investigation and intermediate report into the sinking of ferry MV Estonia has revealed flaws in its bow visor construction which it says were missed during its certification. According to joint investigators from Estonia, Finland and Sweden, if the necessary examination had been carried out, the Estonian registered ship would not have been approved as seaworthy to serve the Tallin to Stockholm route on which it operated.

In 1997, the official investigation into Europe's worst peacetime maritime disaster since World War II concluded that the ro-ro ferry sank on a stormy Baltic Sea after a bow shield failed, damaging a bow ramp and causing the car deck to flood. However, a Discovery Network documentary that aired in 2020 showed underwater images of holes in Estonia's hull, prompting Sweden, Estonia and Finland to start a new survey of the wreck lying in shallow Finnish territorial waters.

If the inspection had been carried out adhering to the regulations, the flaws of the visor construction could have been discovered and the accident may not have occurred the findings of this new probe into the possible cause suggest.

"More specifically, the holes discovered in the hull were possibly caused by the impact on the vessel on the sea bottom rather than have caused the actual sinking", remarked Rene Arikas, Estonian Safety Investigation Bureau Director.

"We do know that when she sank, she didn't have the bow visor and she didn't have the ramp. But so far we have not found any damages (to the hull before sinking) other than that in the bow area," said Risto Haimila, the Chief Marine Safety Investigator at the Finnish Safety Investigation Authority.

Before the final results of this new probe are announced, the investigators will raise Estonia's bow ramp to further examine the damage, take samples from the hull area, survey the inside of the ship, and conduct interviews with the survivors.

As Reuters reports, there has always been doubt cast about the cause of the sinking which has led to speculation which included a collision with a submarine and an explosion inside the ship. But this new investigation has so far not found any evidence of an explosion in the bow area, or a collision with another vessel or floating object.

The following were the most significant findings from the wreck:

- The wreck of MV Estonia is in a poor condition with severe structural damage.
- No penetrating damage is observed in the hull below the water line, except for damage already known before the Preliminary Assessment.
- The port bridge wing on deck 9 is pressed down towards deck 6 by several metres, implying that the part of the vessel which contains the bridge may be partially loose from the rest of the construction.
- The upper and aft part of the vessel is severely deformed.
- From astern, the upper part of the vessel is twisted to port from deck 6. This twist runs along the majority of the length of the vessel.
- An indentation was observed on the bottom of the vessel which follows the shape of at least some of the bunker tanks.

Download the intermediate report at **https://bit.ly/3HuaROz**. Or scan the QR code.

UAE ADOPTS THE HARMONIZED SYSTEM OF SURVEY AND CERTIFICATION FOR SHIPS

The UAE Federal Maritime Administration (FMA) has adopted the IMO Assembly Resolution A.1156(32) Survey Guidelines Under the Harmonized System of Survey and Certification for Ships (HSSC) 2021, related to the Protocol of 1988 relating to the International Convention for the Safety of Life at Sea, 1974 and of the Protocol of 1988 relating to the International Convention on Load Lines.

All should fully comply with the requirements of Resolution A.1156(32) and its annexes and provide the FMA upon request with a copy of the procedures and documents required for full compliance with the requirements of the resolution.

In 1988, the International Conference on the Harmonized System of Survey and Certification, 1988 (1988 HSSC Conference), adopted the Protocol of 1988 relating to the International Convention for the Safety of Life at Sea, 1974 (1988 SOLAS Protocol), and the Protocol of 1988 relating to the International Convention on Load Lines, 1966 (1988 Load Line Protocol) which introduced, inter alia, the harmonized system of survey and certification under the International Convention for the Safety of Life at Sea, 1974 (1974 SOLAS Convention) and the International Convention on Load Lines, 1966 (1966 Load Line Convention).

NEW LAW WILL IMPROVE DUKW BOAT SAFETY, SAYS NTSB CHAIR

National Transportation Safety Board (NTSB) Chair, Jennifer Homendy, has welcomed maritime safety improvements in the James M. Inhofe National Defense Authorization Act for Fiscal Year 2023, which the President signed into law at the end of last year.

Photo: NTSB showing the Miss Majestic in Hot Springs, Ark., in 1999, where 13 lives were lost.

The legislation advances NTSB recommendations for amphibious vessels known as DUKW boats and requires the U.S. Coast Guard to provide an initial response to new NTSB recommendations within 90 days.

"We applaud lawmakers for their bold action to improve DUKW boat safety, something the NTSB has been concerned about for more than 20 years," said NTSB Chair Jennifer Homendy. "But it shouldn't take an act of Congress to address known safety issues for any vessel, and it certainly shouldn't take decades."

DUKW boats, also known as duck boats, were designed and built in the 1940s for military use during World War II. Some were later converted for commercial service. They are unique vessels with special challenges that must be addressed to ensure passenger safety. They require greater reserve buoyancy, canopy removal and other modifications before waterborne operations and training for crews. The NTSB first identified these safety issues in 1999 with the sinking of the Miss Majestic in Hot Springs, Ark., where 13 lives were lost and recommended corrective actions. They were not acted on and again the NTSB made recommendations following the 2018 sinking of the Stretch Duck 7 in Branson, Mo., where another 17 lives were needlessly lost.

The Act mandates that the U.S. Coast Guard initiate rulemaking within six months requiring:

- Reserve buoyancy through passive means and watertight compartmentalization;
- Identification of limiting environment conditions, such as weather, in which DUKWs may safely operate;
- Proceeding to harbor in case of a wind warning;
- Maintaining and monitoring weather radio;
- Informing passengers not to wear seatbelts in water, performing visible seatbelt checks and maintaining a log recording actions; and
- Annual training for operators and crew.

The legislation includes an interim requirement, within 180 days, to require removal of canopies and window coverings, require passengers to wear life vests, reengineer vessels to minimize hull penetrations and requires bilge pumps and LED lighting.

WINNER OF THE IIMS 2022 BIG ACRONYM QUIZ ANNOUNCED

Thanks to all those who participated in the IIMS 2022 Big Acronym Quiz at the end of last year. Congratulations to Capt Katharine Sweeney from Seattle who scored a remarkable 90% in the recent IIMS quiz - 45 out of 50 questions answered correctly. Katharine is an ISM auditor and also conducts security audits on vessels too. To mark Katherine's achievement, her prize is to receive hard copies of the next four editions of the Report Magazine.

Photo credit: Tommaso Spadolini

TOMMASO SPADOLINI UNVEILS 90M SUPERYACHT CONCEPT

Italian yacht designer Tommaso Spadolini has unveiled the first details of his new 90-metre superyacht concept. The sporty motor yacht features strong exterior lines and has been designed to have close contact with the sea.

The new superyacht concept has been conceived with a powerful shear for the main deck, emphasised by two strong convex lines for the owner's and upper decks. "We have worked closely with the owner and his representatives to create a really head-turning design that responds to his three key requirements without sacrificing one iota of practicality," said Tommaso Spadolini.

RECORD NUMBER OF YACHTS EXPRESS INTEREST IN SWITCHING TO BIOFUEL

Interest in a new type of HVO (hydrotreated vegetable oil) fuel for superyachts has spiked, according to reports from engine manufacturer Caterpillar and the fuel's producer Fioul 83.

The diesel alternative, which is marketed under the name Cristal Power XTL100, claims to offer a 90 percent reduction in CO2 emissions on the basis that it is made from recycled oil that has already made its environmental impact. While the biofuel still emits nitrogen oxides, it does not emit any sulphur and claims to be 100 percent odour-free and compatible with all engine types, without an increase in fuel consumption.

A presentation and demonstration of the new biofuel brought together a number of representatives from across the maritime industry to discuss the benefits and challenges of the new fuel in Antibes on 20th January.

CROATIAN SHIPOWNERS JOIN ECSA AS FULL MEMBER

The European Community Shipowners' Association (ECSA) has welcomed the Croatian Shipowners' Association (CSA) as full members with effect from January 2023.

"We are proud to welcome CSA to the ECSA membership," said ECSA President Philippos Philis. "Having the Croatian shipowners on board expands our expertise and further strengthens ECSA's role as the voice of European shipping in Brussels, at a crucial time when shipping regulation at EU level is advancing rapidly."

CANDELA C-8 NAMED EUROPEAN POWERBOAT OF THE YEAR 2023

Candela, the Stockholm-based electric boat manufacturer, has announced that its revolutionary electric boat, the Candela C-8, has been named the European Powerboat of the Year 2023 at the European Powerboat Awards, also known as the "Oscars of the Boat Industry", at the Boote Düsseldorf show. This award recognizes the C-8's outstanding performance, and innovation in the industry. The Candela C-8 won the electric boat category, thanks to its cutting-edge hydrofoil technology, which allows the boat to fly on water, using only a fraction of the energy conventional boats need.

Photo credit: Tommaso Spadolini

FRENCH AUTHORITIES FURIOUS OVER PLASTIC PELLET SPILL

Environmental authorities in France are livid over a wave of plastic nurdles washing up on the pristine shores of Brittany, where the tiny white pellets have become known as the "white tide". The source vessel is unknown, but local and national officials have asked prosecutors to find and charge the anonymous perpetrator.

The spill off the coast of Brittany is much smaller in scope than the X-Press Pearl disaster, but the pollution is substantial enough to draw the ire of local activists and officials. White beads have been washing up by the thousands in Finistere, Vendee, Loire-Atlantique and Morbihan. Last week, the mayors of the towns of Pornic and Sables-d'Olonne joined the president of Pays de la Loire, Christelle Morancais, in filing a legal complaint against the unknown "X" responsible for the spill.

CARGO HAZARDS DUE TO LEACH RESIDUE

Photo credit: North P&I Club

North Club P&I Club has issued advice about a new schedule featured in the 2022 edition of the International Maritime Solid Bulk Cargoes (IMSBC) Code. The resulting reside of concern comes from a metal recovery process that extracts zinc from a specifically manufactured ore or concentrate.

Cargo properties
Leach residue is usually extremely fine and may contain traces of lead and sulphuric acid from the extraction process. The particles will have strong suction characteristics and retain moisture until exposed to stress from loading and/or vessel motions.

Cargo hazards
According to North P&I Club, the cargo is listed in the IMSBC Code as a 'material hazardous in bulk' (MHB); being both corrosive and toxic. Cargoes that are listed as MHB are those that have hazards not found in the IMDG code (hazardous goods in packaged form) and are only hazardous in bulk form.

Therefore, the cargo schedule is not given a UN number as per IMDG code cargoes as per section 4.1.1.3 of the IMSBC code.

The residue is also very fine, therefore posing a liquefaction hazard. As such the cargo is listed as both GROUP A and B.

Importantly, it should be noted that there is also a potential hazard to humans. The cargo is corrosive to the eyes and is known to potentially cause long term health effects. Control measures generally concern avoiding generating dust, avoiding contact or inhalation, and keeping away from naked flames and heat sources. Measure the concentration in air regularly and undertake cargo operations in the open/under local exhaust/ventilation or with respiratory protection.

The Code advises that the cargo can give off toxic gas when heated strongly (higher than 1,000°C).

REQUIREMENTS FOR TOWING OPERATIONS IN UAE WATERS

To ensure that safe towing operations conducted in UAE waters and ports are following International and National regulations, Ministry of Energy and Infrastructure, the Maritime Administration of the United Arab Emirates, operators must adhere to certain procedures. The Ministry has issued the following guidelines:

1 Towing operations are conducted in reference to the Circular No. 884 of 1998 (Guidelines for Ocean Safe Towing), issued by the Maritime Safety Committee of the International Maritime Organization.

2 Towing operations are conducted in UAE waters and ports after obtaining the Towage Approval Certificate from one of the companies approved by the UAE Maritime Administration. Vessels with towing combinations arriving at UAE Ports from International voyages must submit the Towage Approval Certificate to the port of arrival in UAE.

3 Towing operations commenced from UAE ports after obtaining the approval from the Harbormaster and verification on the weather condition for the intended voyage as indicated in the Towage approval certificate.

4 All vessels engaged in the towing operation must have valid insurance coverage for the intended voyage.

5 Port authorities must verify that all vessels engaged in towing operations have nominated a local UAE agency.

Phot credit: US Navy

PUBLIC HEARING BY US COAST GUARD INTO THE 'SPIRIT OF NORFOLK' FIRE

The US Coast Guard has held a formal hearing to consider evidence related to the 7 June 2022 fire and total constructive loss of the passenger vessel Spirit of Norfolk.

The sightseeing vessel was underway on a two-hour lunch cruise on the Elizabeth River near Naval Station Norfolk with 108 people on board, many of whom were school children on a field trip, when a fire started in the engine room. Coast Guard, local fire departments, and numerous vessels responded to assist evacuating the passengers off the vessel and with firefighting efforts. All passengers and crew safely disembarked with no injuries reported. The Spirit of Norfolk was towed to nearby Norfolk Naval Station where firefighting crews worked to put out the fire.

Rear Adm. Shannon Gilreath, commander of the Fifth Coast Guard District, ordered a formal investigation to determine causal factors that led to the incident, examine the response, and identify any other information that can improve maritime safety in the future. The hearing took place from 26 January in Virginia Beach and examined all aspects of the fire, including pre-accident historical events, regulatory compliance, crewmember duties and qualifications, mechanical systems, emergency response, and Coast Guard oversight of the vessel.

The National Transportation Safety Board (NTSB) is conducting a concurrent investigation into the incident and joins the Coast Guard in this fact-finding phase. The NTSB will analyze the facts to prepare and publish a separate report.

NEOLINE PLACES ORDER FOR ITS FIRST WIND-POWERED RO/RO

French based Neoline is a significant step closer to realising its ambition of becoming the first modern day shipowner to fully embrace energy efficiency by relying on wind power as its primary energy source. It has raised the funding needed to build the first of two planned ships and has placed a contract for the vessel with Turkish shipbuilder RMK Marine.

The 136 m long Neoliner will offer 1,200 lane meters (2.8 meters wide) of RO/RO capacity (equivalent to 321 cars), or 265 TEU, for a maximum weight of 5,300 tons of goods. It will use the same Chantiers de l'Atlantique SolidSail wind propulsion technology as the just announced Orient Express cruise yachts. In the case of the Neoliner, the SolidSails will be mounted on two 76-meter-high folding carbon masts and will have a sail area of 3,000 square meters.

Photo credit: CNW Group/BRP Inc.

SEA-DOO SWITCH PONTOON NAMED "BOAT OF THE YEAR"

The Sea-Doo Switch pontoon has been named "Boat of the Year" by Boating Magazine, the world's leading publication for recreational boating. The Sea-Doo Switch family of pontoon boats represents a shift of paradigm in the fastest growing segment of the recreational boating industry. This award is a testament to BRP's dedication to ingenuity and innovation as it strives to open recreational boating to more people.

"For building a boat that's easy to dock, easy to tailor to varying needs and that makes boating affordable and an attainable lifestyle for a great many families, we award the Sea-Doo Switch as the 2022 Boat of the Year," said Boating Magazine Editor-in-Chief, Kevin Falvey.

ANTI-FOULING PERFORMANCE IS BEING ENHANCED

The biocide, Selektope, is being introduced into marine antifouling coatings to enhance the performance of self-polishing co-polymer (SPC) marine coatings. I-Tech's team of R&D scientists have been working on the technology for the last five years and say they have discovered new ways in which the first-of-its-kind biocide, Selektope can be introduced to marine antifouling coatings in combination with other biocides with little or no effect on formulation chemistry or performance.

The technology works by improving the dispersion of the active substance via adsorption to paint pigment particles. And the scientists say positive static test results have also provided proof of concept that Selektope can be used in silicone-based foul release coatings, a new application area for the technology.

Selektope is an organic, non-metal biocide that prevents hard fouling, repelling barnacle larvae from a coated surface. The controlled release of Selektope in SPC coatings has proved successful using traditional methods with multiple products commercialised to-date, however, I-Tech says its R&D efforts have focussed on further improving the controlled release of the technology and minimising any issues catalysed through the introduction of Selektope into a paint matrix.

"This work is significant for two reasons; enhancing the current use of Selektope in SPC coating types and, opening up new routes for us to explore the use of this novel technology in foul release coatings," said Dr Markus Hoffmann, technical director at I-Tech.

MULTIPURPOSE VESSEL HERBERT CALLS AT THE PORT OF EMDEN

Chipolbrok's newbuild multipurpose vessel Herbert has called at the port of Emden, Germany, to discharge wind turbine blades. According to the Ports Agency and Services, the blades measured 73 m long. The company also discharged various additional machinery components. The vessel is 199.9 m long, 32.36 m wide and is equipped with cranes that can lift up to 300 tonnes.

Image credit: Ems Ports Agency and Services

NEW INTERNATIONAL CODE OF SAFETY FOR SHIPS CARRYING INDUSTRIAL PERSONNEL

The IMO has adopted a new mandatory International Code of Safety for Ships Carrying Industrial Personnel (IP Code), anchored in a new SOLAS Chapter XV. The code enters into force on 1 July 2024 and enables cargo ships and high-speed cargo craft to transport and accommodate industrial personnel working offshore. A growing offshore energy sector, including renewable energy construction projects, has triggered the need for clear requirements to facilitate the safe and efficient transfer of technicians serving offshore installations.

The new IP Code is based on the Code of Safety for Special Purpose Ships (2008 SPS Code), but with adaptations and provisions for the training of industrial personnel, the safe transfer of personnel and the carriage of dangerous goods in combination with industrial personnel. The carriage of toxic products, low-flashpoint products, and acids as cargo will not be allowed on IP ships carrying more than 60 persons on board.

SHIPS BEING REFUSED ENTRY TO PORTS IN NEW ZEALAND AND AUSTRALIA DUE TO BIOFOULING ISSUES

The Governments of both New Zealand and Australia have recently adopted regulations regarding the control of biofouling on ships' hulls and have been conducting inspections. These regulations have resulted in ships being refused entry to ports in both countries, with a significant impact on ship operations and passenger. Both countries require documentation to be provided before arrival to demonstrate that appropriate measures are in place to manage any biofouling which may occur on the hull.

The New Zealand position

For New Zealand, there are three ways to comply with the requirements; by carrying out one of the following procedures and having the appropriate documentation including:

- Undertaking continual hull maintenance using best practices (recommended for short-stay ships).
- Cleaning the hull and niche areas within 30 days before arrival in New Zealand (recommended for long-stay ships).
- Booking an appointment for the ship to be hauled out and cleaned by an MPI-approved treatment supplier within 24 hours of arrival (recommended for vessels coming to New Zealand for refit or repair).
- If your ship is not able to meet the required standard using one of these measures, you may develop a craft risk management plan that details alternate but equivalent measures to manage biofouling.

More details regarding New Zealand's requirements can be found at **https://bit.ly/3irv1PR**.

The Australian position

For Australia, ship operators can demonstrate proactive management of biofouling by implementing one of these three accepted proactive biofouling management options which include:

- Implementation of an effective biofouling management plan.
- Cleaned of all biofouling within 30 days prior to arriving in Australian territory.
- Implementation of an alternative biofouling management method pre-approved by the Department of Agriculture, Water and Environment.

Documentary evidence must be available upon request by a departmental officer. Should the ship request to carry out in-water cleaning in Australian Waters, the approval process is complex and could involve multiple government agencies and port authorities who consider the biosecurity risks.

Therefore, ship operators should be aware that in-water cleaning requests are unlikely to be approved due to the high biosecurity and environmental risks associated with in-water cleaning and treatment activities.

More details regarding the Australian requirements can be found at **https://bit.ly/3GBVPF7**.

ROUND BRITAIN eRIB CHALLENGE 2023 UNVEILED

The Round Britain eRIB challenge is a not-for-profit event which aims to support the marine industry's transition to electric propulsion for leisure and small commercial craft. To do this a 17-year-old skipper from Taunton, Somerset will attempt to drive an electric boat around Britain in Summer 2023. Setting off from Lyme Regis in Dorset, the team will be using a unique combination of shoreside infrastructure and on-water charging.

Young eRIB skipper, Harry Besley, pictured

This environmental challenge originated from the lack of an alternative to fossil fuel propulsion in the small leisure powerboat sector. The electric RIB being built specifically for the Challenge will be used to showcase the capabilities of electric propulsion in UK coastal waters.

A significant part of the Round Britain eRIB project is to encourage the installation of charging infrastructure to support local sailing clubs, marinas, harbour authorities, port operators and private owners in the transition of their vessels to electric, zero emission propulsion. Encouraging and building knowledge about the charging options for eBoats helps build momentum in the direction of the UK Government target which states in the Clean Maritime Plan 2050 that "by 2025 all new vessels being ordered for use in UK waters must be designed with zero emission propulsion capability." At the forefront of this developing sector, the Challenge team will be relying on generous support from the wide range of small harbours and ports that make up our coastline, as well as the British engineering companies who are now becoming part of our history in leading maritime innovation.

Working with British Marine and the RYA, through their joint Green Blue initiative, the Challenge team will enhance public knowledge and understanding, and ensure the momentum generated in the market is harnessed.

This project will:

- Support the Clean Maritime Plan target that all new vessels being ordered for use in UK waters are designed with zero emission propulsion capability by 2025.
- Enable more local sailing clubs, marinas, harbour authorities, port operators and private owners to access eBoat charging facilities.
- Showcase the potential of eBoats in UK Coastal waters.

"I believe that we cause too much damage to the world, and I want to change that. I wanted to do something that people will remember, something that could have an impact. If we are successful, then this project could help change the future for the leisure marine industry forever. But change can only happen if we work together and getting public support for the Challenge through our social media platforms will definitely help us. What happens after that…. well, that's what we hope to find out!", said skipper Harry Besley.

Jaqui Besley, Round Britain eRIB Project Manager, "said, "We cannot under estimate the scale of this Challenge. eBoat technology is only just developing and EV battery management systems are not designed for continual impact. Early adopters are seeing significant issues and regulations have not yet caught up. Along with that, we have massive range constraints and virtually no shore side charging infrastructure and are looking for Partners to help us with on-water charging. This is a massive undertaking, but we are already seeing results: 10 or our strategic STOP locations are planning to install permanent eBoat charging infrastructure."

The Challenge team have been working on this project in their spare time for over a year and are now looking for public and industry support to raise the funds to make this a reality. If you feel you have something to offer or would like to be associated with this challenge, visit the website at **https://www.roundbritain-erib.org/**.

RECREATIONAL CRAFT REGULATIONS LIST OF DESIGNATED STANDARDS UPDATED

The Department of Business Energy and Industrial Strategy published amendments to the list of designated standards (the ISO standards which if followed give an automatic presumption of conformity) in late December 2022.

The notice is split into two annexes. Annex 1 has two parts; part one shows the new standards which are now being designated, and part two gives the full list of all designated standards.

The new standards being designated are as follows:
- EN ISO 10087:2022 Small craft – Craft identification – Coding system (ISO 10087:2022)

Annex 2 of the notice gives the dates that standards will have their designation removed. This means you will no longer be able to use that particular revision of the standard for automatic presumption of conformity. Again this annex is split into two parts with part one listing new entries with a removal date and part two with the full list dates of standards being removed.

Part 1 includes the following new entries:
- EN ISO 10087:2019 Small craft - Craft identification - Coding system (ISO 10087:2019) – to be removed 17th April 2024.

Click to download the full BEIS notice and the two annexes at **https://bit.ly/3WNGAj6**.

CERTIFICATION FOR YACHT TRANSPORT COMPANY

Sevenstar Yacht Transport has received Lloyds Register certification for its transport cradles. The certification gives clients assurance that their yacht or floating cargo is in safe hands and will be securely delivered to any desired destination. The certification is another milestone for Sevenstar's team of engineers and loadmasters. "Every day setting the highest standards for safety, quality, and reliability in the yacht transport industry keeps us moving and motivated as a team and company," said Max Stepanov, Sevenstar manager of operations.

MARITIME & COASTGUARD AGENCY APPOINTS VIRGINIA MCVEA AS CHIEF EXECUTIVE OFFICER

Virginia McVea will become the new Chief Executive Officer of the Maritime & Coastguard Agency (MCA), overseeing the work of the agency as it responds to tens of thousands of incidents at sea every year, inspects thousands of UK-registered ships and protects over 11,000 miles of our coastline.

Her appointment comes at an important time for the MCA, as it continues working to ensure the UK is the world's best-performing coastal state and takes a leading role in both the international and domestic maritime arenas.

In her previous roles, Virginia was the CEO of the Human Rights Commission and most recently the Chief Electoral Officer of Northern Ireland – the largest single electoral administrative area for the UK.

Virginia McVea has been appointed as the MCA's Chief Executive Officer

BOAT OWNERS BEWARE OF STICKY FUEL

Over the past year, River Canal Rescue, says it's witnessed an uncharacteristic peak in fuel-related component breakdowns due to a new problem called 'sticky fuel'. RCR said its marine engineers now respond to two-three cases per week on the inland waterways and managing director, Stephanie Horton, is keen to alert the wider marine community to the issue.

"We first became aware of sticky fuel when we had two identical jobs where fuel injectors were diagnosed as needing an overhaul, yet their replacements stopped working within a week, and the injection pumps were found to have failed even though the diesel was clear and bright," she said.

The engineers found in both cases, the injector pump racks had seized solid and the nozzles were blocked and when replacing the plunger filter head, they found the fuel had a sticky, syrup-like substance. Alongside stuck injection pump racks, injectors and filter head plunger failures, there was also cases of fuel filters blocking with wax inside them.

Following discussions with several leading fuel analysis companies, RCR is now working with a university lab to use IR spectrum analysers and a range of samples/treatments to see if the cause of sticky fuel can be identified.
RCR has been approached by owners of sea-going vessels, many reporting similar issues.

Andy and Lindsay Reeves have owned their boat Jiggers, a Bruce Roberts Mauritius 43ft steel ketch, for 13 years. Moored in Cardiff Bay, the vessel has a Volvo Penta MD22 60hp diesel engine and carries 1000L of diesel in two 500L tanks, built into the hull. They'd never had an issue with their engine before last summer, it was always regularly serviced and whenever the tanks were filled, half a small bottle of diesel treatment was added to each one. Whilst on a trip from Cardiff to Guernsey, they noticed the engine needed some throttle to start and then a few days later it stalled and wouldn't run. The pump was found to have a yellow sticky substance throughout which was very difficult to remove and the fuel had a very odd smell similar to turps or paint brush cleaner.

NEW MINIMUM SAFE MANNING REQUIREMENTS PUBLISHED BY ISLE OF MAN SHIP REGISTRY

Isle of Man Ship Registry
www.iomshipregistry.com

The Isle of Man Ship Registry has issued an updated Manx Shipping Note (MSN 052) for minimum safe manning requirements, published on 9 January 2023.

This MSN sets out the measures adopted by the Ship Registry to ensure the Isle of Man registered vessels are sufficiently and efficiently manned in accordance with the Isle of Man Merchant Shipping (Manning and STCW) Regulations 2014. The Regulations and this MSN have been produced by taking into account IMO Resolution A.1047(27) Principles of Minimum Safe Manning.

The Regulations apply to all Isle of Man registered ships except for:

- fishing vessels;
- wooden ship of primitive build;
- warship, naval auxiliary, or other ship owned or operated by a State and engaged only on governmental non-commercial service;
- ships not propelled by mechanical means; or
- commercial yachts.

Section 1 of the document specifies minimum safe manning document requirements.
Section 2 explains the guidelines for determining the minimum safe manning for the Isle of Man registered ships.
Section 3 explains the responsibility of the ship's Company. The Company must prepare and submit its proposal for the ship's minimum safe manning by completing the minimum safe manning application form which is available on the Ship Registry website.

Download MSN 052 at **https://bit.ly/3JevboL**. Or scan the QR code.

CHARTWELL MARINE WINS £320K INNOVATE UK SMART GRANT TO EXPLORE METHANOL FUELLED VESSEL DESIGN

The grant will enable UK based Chartwell Marine and consortium partners — Boat Electric & Electronics and Engineered Marine Systems — to develop and test the feasibility of a market-first methanol-fuelled vessel design, with applications in the offshore wind, commercial workboat and leisure sectors.

Methanol fuel presents a significant opportunity to decarbonise in a maritime industry which is confronted with the debate over sustainable fuel alternatives, as it can be produced from biomass and can carry a near-zero carbon footprint. Whereas ammonia has sparked concerns about its toxicity to wildlife and pure hydrogen presents continued feasibility challenges, methanol can be stored safely and effectively in standard atmospheric conditions, and spills have little adverse effect on the local aquatic environment.

Andy Page, Director at Chartwell Marine, said: "We're grateful to Innovate UK for the opportunity to delve deeper into the feasibility of methanol-based propulsion. As a company, we've delivered over 30% of hybrid vessels in the UK offshore wind market, all complete with the latest state of the art electric-diesel hybrid technology.

"That gives us a great starting point to take methanol forward in a meaningful way and cut through some of the challenges we've seen in the development of alternative fuels, which may be a long time from full viability. There are still hurdles to overcome with methanol, of course: a lack of refuelling infrastructure onshore, weight issues, and fully efficient conversion to energy, to name some."

SEADOGZ SKIPPER CLEARED OF MANSLAUGHTER

The skipper of a RIB has been acquitted of manslaughter after a collision with a buoy on Southampton Water, UK which killed a teenage girl. Fifteen-year-old Emily Lewis was fatally injured when the rigid inflatable boat hit the navigation device at speeds of more than 36 knots in August 2020. A number of other passengers were also seriously injured.

Skipper Michael Lawrence, aged 55, was found not guilty of manslaughter by gross negligence but guilty of failing to maintain a proper lookout and failing to proceed at a safe speed.

The owner of Seadogz, Michael Howley, the company which operated the 'thrill ride', was convicted of not operating the boat safely.

During the trial at Winchester Crown Court, the jury heard how the Stormforce 950 Rib had crossed the wake of a ferry five times before heading straight for the 15 ft buoy for 14 seconds. Emily suffered severe internal injuries after being crushed against the metal handle in front of her.

Christine Agnew KC for the prosecution said that Lawrence initially blamed a face mask for blocking his vision but had later changed his account. The court also heard that a medical cause such as a blood clot in his eye was unlikely to have caused vision loss as it was unlikely to have affected both eyes at once.

HISTORIC LONDON LIFEBOAT STATION FLOATED AWAY FOR LAST TIME

The RNLI's Tower lifeboat station in the heart of London is the busiest one in the UK. Due to old age it has been floated away from its home on Victoria Embankment, to be replaced by a new station in April. The old station was towed across London, passing under the capital's iconic Tower Bridge, watched by intrigued onlookers. In the short term, the crew will continue their lifesaving duties operating out of nearby HMS President.

Maritime regulations: What's new for 2023

IIMS takes a look at and presents highlights of some of the latest maritime regulations that came into force around the world in January 2023.

Requirement for all ships to calculate their attained Energy Efficiency Existing Ship Index

From 1 January 2023 it will be mandatory for all ships to calculate their attained Energy Efficiency Existing Ship Index (EEXI) to measure their energy efficiency and to initiate the collection of data for the reporting of their annual operational carbon intensity indicator (CII) and CII rating.

A ship's attained EEXI indicates its energy efficiency compared to a baseline. Ships attained EEXI will then be compared to a required Energy Efficiency Existing Ship Index based on an applicable reduction factor expressed as a percentage relative to the Energy Efficiency Design Index (EEDI) baseline. It must be calculated for ships of 400 gt and above, in accordance with the different values set for ship types and size categories. The calculated attained EEXI value for each individual ship must be below the required EEXI, to ensure the ship meets a minimum energy efficiency standard.

The requirements for EEXI and CII certification which came into force last month means the first annual reporting will be completed in 2023, with initial ratings given in 2024.

Ban on use of Anti Fouling Systems containing cybutryne

Amendments to the IMO Convention for the Control of Harmful Anti Fouling Systems on Ships (AFS Convention) – MEPC.331(76) – Ban on use of Anti Fouling Systems (AFS) containing cybutryne. These amendments mean that AFS containing cybutryne shall not be applied or reapplied to any ship on or after 1 January 2023.

Ships bearing an AFS that contains cybutryne in the external coating layer of their hulls on 1 January 2023 shall either remove the anti-fouling system; or apply a coating that forms a barrier to this substance leaching from the underlying non-compliant AFS; no later than either the next scheduled renewal of the anti-fouling system after 1 January 2023, but no later than 60 months following the last application to the ship of an anti-fouling system containing cybutryne.

AMSA introduces Coxswain 3 certificate

Organisations operating vessels as part of their business (not those for sale) are reminded that the new Australian Maritime Safety Authority (AMSA) Marine Order 505 Certificates of Competency was introduced from 1 January 2023 with the new Coxswain Grade 3 certificate replacing the current Exemption 38 arrangements.

This is of relevance to organisations operating workboats, marina tenders and similar vessels used in the boating industry, where the vessel is less than 12m in length.

The Coxswain 3 provides basic seamanship knowledge and skills, permitting the certificate holder to operate small domestic commercial vessels in smooth waters or close to shore. Coxswain 3 certificate holders are required to acquire job specific training and skills in accordance with their organisation's Safety Management Systems (SMS), in addition to meeting the eligibility criteria for the certificate.

AMSA: New air pollution regulations

New regulations relating to air pollution from vessels apply from 1 January 2023. These changes are the result of a review of Marine Order 97 (MO97) that included public consultation in March and again between August and October of 2022.

MO97 deals with the prevention of air pollution from vessels and gives effect to the MARPOL Regulations for the Prevention of Air Pollution from ships (Annex VI). The reissue of MO97 implements a new short-term measure adopted by the International Maritime Organization (IMO) to reduce the carbon intensity of international shipping by 40% by 2030, compared to 2008 levels.

Maritime regulations: What's new for 2023

Amendments to the 2011 Enhanced Survey Programme (ESP) code – MSC.483(103)

The international code on the enhanced programme of inspections during surveys of bulk carriers and oil tankers, 2011 (2011 ESP Code) establishes a survey standard for the regular and safe survey of the cargo and ballast areas of oil tankers and bulk carriers.

These amendments require that from 1 January 2023 onwards, thickness measurements will only need to be taken of 'suspect areas' at the first renewal survey of double-hull oil tankers. This will align the thickness measurement requirements for oil tankers with those for bulk carriers.

Disposal of unwanted distress flares in the UK: New regulations

MIN 687 highlights how from 31 December 2022 HM Coastguard has stopped offering a voluntary, public-facing flare disposal service to private individuals who have personal flares to dispose of. From that date, private individuals will need to use a third-party disposal service to dispose of their personal flares. This MIN offers guidance to private individuals on how to dispose of their flares, and private businesses that may wish to offer a flare disposal service.

The Green Blue's environmental facilities map from British Marine and the Royal Yachting Association provides contact details of disposal service providers. You can contact the providers directly to discuss your disposal needs.

If there's not a disposal service near you, you may be able to dispose of your marine distress flares at:

- the place where you bought them
- local marinas
- life raft services
- local authorities
- waste disposal businesses, some may already offer a disposal service

Other service providers offer disposal events across the country, usually at busy harbours or marinas. To read MIN 687 and supporting documentation, go to **https://bit.ly/3ZqdkAx**

Two IACS Unified Requirements come into force on 1st July 2023

Amendments have been made to Lloyd's Register's Rules to include the requirements of two newly published Unified Requirements from the International Association of Classification Societies (IACS) regarding marine forgings and castings. The following IACS Unified Requirements come into force on July 1st, 2023:

1. UR W7 Rev.4 – Hull and machinery steel forgings.
2. UR W8 Rev.3 – Hull and machinery steel castings.

To give manufacturers advance warning of these changes, Lloyd's Register (LR) has included these revised requirements in the 1 January 2023 version of the Rules. However, compliance by manufacturers is not required until the IACS implementation date of 1 July 2023.

The impact on LR's Rules (mainly contained within Lloyd's Register's Rules for the Manufacture, Testing and Certification of Materials) are summarised as follows:

- Revisions to testing sample locations for forgings.
- Introducing requirements for forged rings.
- Requirements for Charpy impact testing for forgings.
- Introduction of alloy steel castings.
- Revisions to testing sample locations for castings.
- Requirements for Charpy impact testing for castings.
- Introduction of higher strength grades.
- Revised requirements for repair of defective castings.

More information about the rules is available at **https://bit.ly/3CuWB5m**

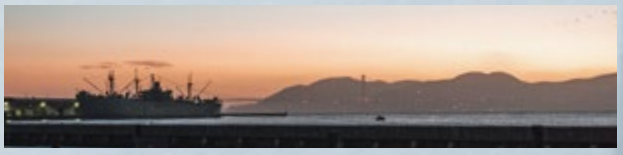
Amendments (06-21) to the International Maritime Solid Bulk Cargoes (IMSBC) code

Updates to the International Maritime Solid Bulk Cargoes (IMSBC) Code include a change of the definition of group A cargoes, re-classification of ammonium nitrate-based fertilizer (non-hazardous), and new cargo schedules for clam

Maritime regulations: What's new for 2023

shell and leach residue containing lead and granular triple superphosphate.

The amendments will enter into force on 1 December 2023, with voluntary early implementation underway from 1 January 2023.



Mandatory at-berth regulation now in place in California

New compliance requirements for the At Berth Regulation in California went into effect on 1 January 2023. The goal of the Ocean-Going Vessels at Berth Regulation is to reduce diesel particulate matter (PM) and oxides of nitrogen (NOx) from ocean-going vessels auxiliary engines while they are docked at California ports.

The original Ocean Going Vessel at Berth Regulation was approved in December 2007 with compliance requirements that began in 2014. The 2007 at Berth Regulation affects the following three vessel categories: container ships, passenger ships, and refrigerated-cargo ships at six Californian ports:

Los Angeles, Long Beach, Oakland, San Diego, San Francisco and Hueneme

Compliance requirements for vessels include visit requirements and emission or power reduction requirements both which were phased in over time to the current 80% reduction requirement.

California Air Resources Board's (CARB) State Implementation Plan, AB 617, California Climate Change Scoping Plan, Mobile Source Strategy, and California Sustainable Freight Action Plan (Executive Order B-32-15) include commitments to evaluate the existing 2007 At Berth Regulation for opportunities to further reduce emissions from vessels.

The new regulatory efforts will help achieve much needed public health protection for Californians living nearby port communities, reduce exposure to toxic air emissions in disadvantaged communities and meet 2023 and 2031 emission reduction goals for NOx.

Download the CARB FAQs at **https://bit.ly/3jFkzEl**

New rules to protect passengers on UK older passenger vessels

New rules which will bring the safety of older passenger ships in line with modern standards fit for the 21st century are now in force for the UK. The Maritime and Coastguard Agency has worked on The Ship Safety – Merchant Shipping (Safety Standards for Passenger Ships on Domestic Voyages) (Miscellaneous Amendments) Regulations ("Grandfather Rights") to implement the new rules.

Among a number of new safety regulations such as carrying lifesaving equipment, fire detection and powered pumps, ships will have to comply with damage stability rules – also known as survivability – which will make sure that in the event of an accident, vessels can stay afloat long enough for all passengers to be evacuated.

These regulations are being implemented to prevent the repeat of accidents such as the Marchioness disaster in 1989, where fifty-one people died. The resulting inquiries and recommendations have underpinned the development of maritime safety legislation to improve the safety of all passengers throughout the country, and the changes announced today continue this work.

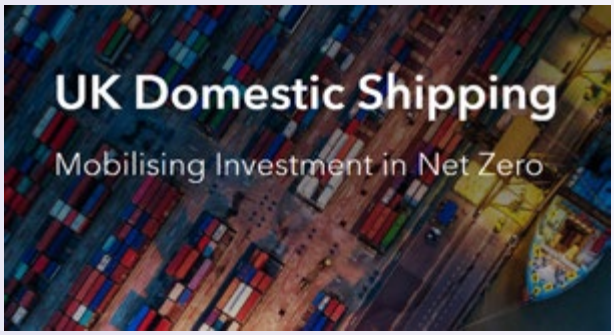
Maritime Minister Baroness Vere said: "These new safety rules will help prevent avoidable tragedies and allow passengers to sail with confidence on all types of vessel, with up-to-date safety standards on older vessels and lifesaving equipment on board fit for the twenty-first century.

Katy Ware, Director of UK Maritime Services said: "Our absolute priority is to keep people safe on the water – there is no compromise on safety. Every passenger travelling on every boat deserves to know the same consistent standards of safety are applied."

"Older vessel standards must be brought, as far as possible, up to an equivalent level of safety as new ones, to provide an acceptable safety standard for the fare-paying public."

"These changes aren't designed to stop people travelling on historic ships, but to urgently bring their safety into the 21st century to ensure they are as safe as modern vessels."

The UK Maritime Minister Baroness Vere



NEW REPORT: IDENTIFYING PATHWAYS TO UNLOCKING £75BN FINANCING NEEDED FOR UK SHIPPING'S ENERGY TRANSITION

A report produced by Marine Capital Ltd, with the support of UMAS and Lloyd's Register (LR), estimates that approximately £75bn of investment over the coming three decades will be required for the UK's domestic maritime sector to transition to net zero. Attracting new sources of capital will be key to the industry's energy transition. The report, "UK Domestic Shipping: Mobilising Investment in Net Zero", identifies funding mechanisms that can be applied immediately to unlock untapped investment capital to finance this transition, without waiting for the introduction of carbon pricing or the selection of a 'winning' zero emission fuel solution.

The report presents the most comprehensive study to-date of the UK domestic maritime sector, and its findings and recommendations are intended to contribute significantly to the next iteration of the UK government's Clean Maritime Plan.

The complexity of the UK's domestic maritime sector, with its diverse range of stakeholders, vessels and ports presents significant challenges to achieving net zero. The Study identifies the vessels which comprise the UK domestic and short-sea shipping fleets and provides a profile of these fleets, including a breakdown of emissions by different vessel types. This analysis shows that the largest source of emissions come from a relatively small subsector of vessels, providing the potential for targeted measures. Both investment and clear, coordinated policy support will be required to overcome the various barriers that currently hinder the sector's decarbonisation transition. These barriers include uncertainty regarding future demand for and supply of clean fuels, lack of clarity over the evolution of the policy and regulatory environment and limited access to funding by many stakeholders. Identifying areas of priority will be key to the sector's successful navigation of the net zero pathway over the coming two decades.

Download the report at **http://bit.ly/3ubneHQ**.
Or scan the QR code.

WHITEPAPER AMMONIUM NITRATE FIRE RISK ON BOARD SHIPS PUBLISHED

The risks posed by poor conditions of storage of this common compound, which is used extensively in the Fertilisers and Explosives industries, have been well documented but awareness of the dangers of fire during transportation by sea is less well known. The objective of this guide, entitled 'Ammonium Nitrate Fire Risk on Board Ships' is to outline best practice with respect to the management of risk on vessels chartered to ship the compound through ports around the world.

Ammonium Nitrate (NH_4NO_3), a white to grey odourless chemical has a melting point of 169 degrees C and decomposes at 210 degrees C. While it does not burn by itself, significantly it will accelerate burning of combustible material, producing toxic oxides of nitrogen and ammonia, which will support combustion, even in the absence of oxygen.

The whitepaper outlines in detail ammonium nitrate's peculiar reactions to heat and subsequent conflagration, as well as the nature of its decomposition. These characteristics mean that the specifications of vessels' equipment, including deck cranes, hatch covers, hold linings, fuel tanks and pumps, also forklifts and other handling devices, must be precise. The whitepaper offers comprehensive guidance on these particulars.

Download the whitepaper at **https://bit.ly/3Isq81V.** Or scan the QR code.

NEW REPORT: FRAMEWORK FOR ASSESSING DECARBONIZATION TECHNOLOGIES AND ALTERNATIVE CARRIERS

The Maritime Technologies Forum (MTF) has published a comprehensive report which compares the feasibility and readiness of alternative marine fuels. The report from MTF assesses the level of current readiness of fossil LNG, bio-methanol and green ammonia compared to fossil MGO. The assessment applied MTF's Framework for Assessing Decarbonization Technologies and Alternative Energy Carriers to fossil MGO, fossil LNG, bio-methanol and green ammonia.
It also covers eight categories of evaluation, including sustainability and environmental, safety, security, economic feasibility, regulatory, people, technology status and engineering.

The report reveals that when bio-methanol and green ammonia are compared to fossil MGO and LNG they perform better in the sustainability and environmental category but score lower in other key categories, primarily due to the lack of a comparable fuel value chain. As regulations and research for bio-methanol and green ammonia expand, it is expected they will become increasingly competitive fuel solutions.

Commenting on the report, Knut Arild Hareide, Director General of Shipping and Navigation at the Norwegian Maritime Authority said, "The anticipated and much needed scaling of handling more hazardous fuels such as liquefied methane, methanol, ammonia but also hydrogen, in liquid or gaseous state, requires competence building and certified training to ensure the safe decarbonisation of shipping."

Download the report at **https://bit.ly/3GB7uVE**. Or scan the QR code.

NEW REPORT: SUFFICIENCY, SUSTAINABILITY, AND CIRCULARITY OF CRITICAL MATERIALS FOR CLEAN HYDROGEN

A report published by the Hydrogen Council examines three critical areas. By using new data on the material intensities of key technologies, the report estimates the amount of critical minerals needed to scale clean hydrogen. According to the report, the overall material footprint of the sector is unlikely to cause major stress to most material markets involved, indeed in some markets, such as platinum, it may actually relieve stress that could occur with the decline in demand from current uses.

However, the broader context of a potentially materially intensive low-carbon transition needs to be borne in mind, implying that materials crucial for different aspects of the hydrogen sector may be under significant strain from demand elsewhere This means that reducing the material stress from clean hydrogen will be beneficial to both the deployment of the technology, while also reducing any negative impacts relating to GHG emissions and water from the sector.

Both governments and the private sector have crucial roles to play in this regard, from establishing the right policy frameworks, to implementing technology transfer, to innovating and investing in efficiency and new technologies.

Beyond these challenges understanding the material implications of the widespread deployment of clean hydrogen is important for helping to first understand, and then help to mitigate, the environmental impacts from sourcing the materials needed for clean hydrogen production and consumption.

Download the report at **https://bit.ly/3Zcyu56**. Or scan the QR code.

NEW REPORT: SURVEY REVEALS THAT THE USE OF DIGITAL TOOLS ONBOARD IS POSITIVELY PERCEIVED

As part of this project, the two partners, The European Community Shipowners' Association (ECSA) and the European Transport Workers' Federation (ETF) wanted to investigate the increased use of digitalisation on board and the possible benefits and /or improvements to shipboard safety and welfare. As a result of the survey, there are a number of recommendations made which are summarised at the end of this article.

The research starting point was a desk-based exercise to map out and analyse existing research findings. To get detailed insights as regards life on board, and the impact of increased digitalisation, the research targeted those with first-hand experience through online surveys.

The surveys were circulated to a wide audience to gain a broad range of insights, targeting individual seafarers, as well as companies and interest representatives and named "stakeholders" in the research paper. The aim was to hear about digitalisation experiences, positive or negative, and to ask for suggestions for improvement.

The results of the research found that an increased use of digital tools on board ships is generally perceived as a positive development, but that attention needs to be given to a number of elements to ensure the industry reaps all the benefits of these tools. On a positive note, digital tools are seen by seafarers as having a positive impact on efficiency at work by reducing administrative burden and time spent on tasks, as well as allowing them to engage in more complex and high-level duties.

Turning to elements that need improving, stakeholders are less positive about the adequacy of training provided to seafarers, highlighting that updated training is needed to re-skill and up-skill crew with digital skills. Looking to the future, more than half of the seafarers believe that digitalisation will lead to a reduction in ship crew size, while a smaller share of stakeholders believes this will be the case.

In the analysis looking at the results of the survey per category of seafarers a number of trends appeared. It can be noted that, perhaps unsurprisingly, the younger the seafarers, and the lower their rank, the more positive they are about digital tools. The younger generation of seafarers are less concerned about new risks created by the digitalisation of work tools, and put more trust in these tools.

Building on these results, the following recommendations are made:

- Ensure that all tools are suited for on board use, by involving seafarers in the decision-making process, ideally at the stage of tool development and calibration;
- Give special attention to the user-friendliness of tools, and prefer tools with built-in familiarisation training modules or user manuals;
- Ensure that tools are properly tested and refined before full rollout;
- Avoid double tasking/reporting (paperwork + digital procedure) by decreasing, wherever possible, traditional paperwork;
- Ensure continuous updated training to re-skill/up-skill crew;
- Adapt seafarer training in maritime schools to the digital reality, while maintaining traditional seafarer training (to avoid loss of essential skills and practical seamanship);
- Be cautious of over-reliance/trust in digital tools (ashore and on board) and stress importance of human cross-check and oversight;
- Be mindful of differences in level of familiarity with digital tools on board (depending on level of experience/training) and adapt training accordingly to avoid some seafarers being left behind;
- Ensure that new risks created by increased use of digital tools (e.g. cybersecurity risks) are appropriately taken into consideration, and reassure/inform seafarers of measures taken to minimise risks (e.g. training, manual override protocols);
- Carefully consider the burden of responsibility when digital tools result in a shift of tasks from ship to shore. - Responsibility should follow the task;
- Be mindful of isolation of crew members – ensure that opportunities remain on board for seafarers to socialize together where they wish to do so;
- Ensure that advances in digitalisation also provide benefits for seafarers, e.g. in the form of improved possibilities to communicate with family and friends;
- Remote inspections are only to be used when physical inspections are not possible.

RISK AND RESILIENCE GUIDELINES FOR PORTS, HARBORS AND TERMINALS PUBLISHED

The International Association of Ports & Harbors (IAPH) has published its new risk and resilience guidelines for ports, as well as details of a new risk inventory portal aimed at sharing best practices on risk mitigation and management for ports.

According to ISO 31000 (2018), risk is the effect of uncertainty on achieving the objectives, often quantified as the Likelihood of the occurrence of an event multiplied by its Impact (L x I). While risk is generally perceived as a negative thing, we should keep in mind that it can just as well be a positive outcome, linked to a certain likelihood (i.e. an opportunity).

A second point to be aware of, is that likelihood can be treacherous and therefore our understanding of the risks that we face is biased – and too often on the positive side. When we look at frequent events, we can perfectly determine the probability at which they occur and we can take the necessary measures of prevention, mitigation and response. However, for larger impact incidents – the so called "High Impact – Low Probability" events – our estimation skills become blurred. We tend to ignore them because either their impact is beyond the imaginable, or because we don't believe they will ever happen.

Finally, we must also be aware of hidden risks due to the accumulation of smaller separate threats which happen to come together at the wrong place and time, setting off a cascade of secondary events. This can happen on a local scale (e.g. within the port) but also on a larger scale (e.g. over the supply chain). An example in port could be a nautical accident that creates terminal congestion, which leads to road blockages of trucks hampering the access of emergency services.

The guidelines have been designed as a pragmatic, practical tool that can be applied by a port irrespective of size, technical characteristics or governance model.

Download the guidelines at **https://bit.ly/3HadUeR**. Or scan the QR code.

ANOTHER POSITIVE YEAR FOR MARINE INSURERS IS REVEALED IN THE IUMI ANNUAL STATS REPORT

The International Union of Marine Insurance (IUMI) has published its 2022 global marine insurance market analysis known as the IUMI Stats Report. The report presents various statistical data from multiple sources, including IUMI's data, to provide insight into the marine insurance market within the context of global trade and shipping. For the third year, IUMI Stats contains analysis from its major claims database, which now comprises 11,000 claims records amounting to USD 17.3 billion of major losses.

Commenting on this year's report, IUMI's Secretary General, Lars Lange, said:

"We are reporting this data at a time when several shocks have hit a world economy already weakened by the pandemic. Indicators in many economies now point to an extended period of subdued growth. Marine underwriters are navigating some highly complex issues."

Download the report at **https://bit.ly/3FakbVM**. Or scan the QR code.

CARGO LIGHTS IGNITED CARGO ONBOARD BULKER: CASE STUDY

In a recently published casebook featuring four case studies, The Swedish Club has shared information about an incident where floodlights caused a cargo fire on a bulk carrier.

Two days into the voyage the crew noticed smoke coming from cargo hold 2. Hot spots were discovered in hold 2 on the transverse hatch coaming, both forward and aft on the portside, and an additional hot spot was also discovered on hold 3 on the transverse hatch coaming, on the portside aft.All hot spots were located adjacent to recesses in the coamings for the cargo holds' floodlights. The crew isolated the electrical power to the floodlights. Because of the increased temperature of the hot spots in hold 2, the Master released CO2 into the hold.

The CO2 did not extinguish the fire but reduced its severity for a while. When the vessel arrived at the discharge port the cargo hatches were opened, and flames broke out from hold 2. At the same time a plume of smoke escaped from hold 3. The top layer of cargo in hold 2 had been burned.

Lessons learned

- The subsequent investigation revealed that the cargo floodlights were not connected according to the approved 'as built' circuit diagrams delivered with the vessel. It was not clear on board which lights were controlled by which keyswitch.
- The fire was caused because a number of cargo lights were operating while cargo covered them, so the lights ignited the cargo. There was a lack of information on board about how the light circuits were connected and how the light system should be operated. There was also a lack of records concerning use of the lights.
- Many bulk carrier/general cargo holds have fixed cargo lights. Halogen-type lights can easily ignite combustible cargoes such as grain, animal feed, wood chips, pulp and paper if they are too close to the light.
- Cargo lights in holds need to be properly isolated before cargo is loaded. This is best done by removing fuses or other physical links in the electrical circuits so that the lights cannot be switched on by mistake. In container ships the lights need to be properly placed so that they do not overheat cargo or other combustibles and thus cause damage or fire. Lights in car carriers and ferries are usually fluorescent, which are unlikely to cause ignition. Nonetheless it makes sense to leave lights switched off when they are not needed, particularly in cargo areas where combustibles are present.

WARNING: CRANE COMPONENTS MUST COMPLY WITH MANUFACTURER RECOMMENDATIONS

The Bureau of Safety and Environmental Enforcement (BSEE) has published details of a potentially serious near-miss recently which occurred on a Gulf of Mexico energy facility. While using the platform crane to suspend a wireline lubricator, the pin holding the hook on the crane stinger backed out, resulting in the hook and lubricator falling.

The incident investigation found that the cotter pin at the end of the hook pin had sheared, which allowed the washer to fall and the pin to back out. Following the backing out of the pin, it caused the ear on the connection to distort, resulting in the hook failing.

The BSEE investigation found there was an inadequate pin configuration design. The pin installed on the hook assembly had a smooth composition. The operator determined that a threaded bolt with nuts and keepers was the proper pin design for ensuring the stinger remains secure throughout lifting operations. Following this event, the operator inspected their other facilities and found the same improper arrangement on additional cranes.

Lessons learned

- Be sure to inspect all cranes on the facility and verify that the hook assembly has a threaded pin with nuts and keepers.
- Retro-fit any stingers equipped with an improper stinger hook pin configuration.
- Verify all crane components are in alignment with current manufacturer recommendations.
- Add assessment of the pin condition into the pre-use inspection checklist, which should be completed before conducting lifting operations.

REPORT bites

Groupe Beneteau has placed an order with Vision Marine Technologies for 25 revolutionary E-Motion 180E outboard and powertrain systems as part of its pledge to offer eco-friendly propulsion solutions by 2030.

Japanese shipping major Mitsui O.S.K. Lines has revealed a new name and hull color design for its car carriers, which are primarily fuelled by environment-friendly liquefied natural gas.

India is exploring a plan to subsidize its shipbuilding industry in its latest push for industrialization as part of an India first campaign.

Amazon founder Jeff Bezos has given his superyacht a Māori name, Koru, which translates to 'new beginnings'.

An RNLI station in North Shields has launched its first all-female crew, hailing it as a "momentous occasion".

The Inland Waterways Association's Canalway Cavalcade will celebrate its 40th anniversary at Little Venice, UK, during the Early May Bank Holiday weekend from 29 April to 1 May 2023.

Williams Jet Tenders has announced that Oscar Hemmings has joined the design and engineering department as Junior Designer, Special Builds and SOLAS.

Oyster Yachts is strengthening its partnership with Yanmar Marine International by installing its sail drive solution onboard its Oyster 495.

A US-based firm has earned salvaging rights to a vessel that sunk off the Washington State Coast 147 years ago that may have gold worth about $10 million onboard.

After attaining government approval in late 2022, the United Kingdom's first Freeports in Plymouth, Solent, and Teeside are now fully up and running.

Blue Innovations Group, founded by John Vo, the former head of manufacturing at Tesla, has developed an electric boat with solar charging capabilities, the R30.

China Shipowners' Association has become a full member of the International Chamber of Shipping from 1 January 2023.

Safety Briefings

FIRE DUE TO MISDECLARATION OF CONTAINER: CASE STUDY

The recently published Casebook by The Swedish Club highlights an incident when the Master of a ship noticed smoke coming from the forward part of the vessel. At the same time the fire detection system for cargo hold 2 sounded on the bridge. The Master described the smoke as being white at first and then greyish. The Chief Officer, however, described the smoke as being "dark grey, almost black".

Probable cause

The container where the fire started was not declared as dangerous cargo but was actually loaded with calcium hypochlorite and had been misdeclared by the shipper.

The charterer had loaded the container as per the rules of the IMDG code. As per the manifest, the container was allowed to be loaded in the cargo hold, but as the cargo was calcium hypochlorite it should not have been loaded below deck or in the position it was stowed in.

Lessons learned

Cargoes that fall into this category include calcium hypochlorite and other oxidising solids. They are often used for swimming pool sterilisation and fabric treatment (bleaching or washing).

These materials do not oxidise but they can be relatively unstable chemicals that decompose slowly over time, evolving oxygen. This self-decomposition can evolve heat. A self-heating process can therefore happen in which the material towards the middle of a body of cargo becomes hotter, so the rate of decomposition and heating increases.

This can lead to 'thermal runaway' with very rapid self=-decomposition and evolution of heat and gases, sometimes including further oxygen. The effects of this in a hold can be similar to an explosion. The heat and oxygen produced can lead to fire spreading.

Potential causes of self-decomposition incidents include:

- Exposure to heat e.g. solar radiation (before or after loading), cargo lights and heated fuel tanks.
- Cargo formulation.
- Contamination of cargo at manufacture.
- Spillage and thus reaction between cargo and combustibles e.g. timber.
- Excess quantity of cargo in containers giving insufficient dissipation of heat Inadequate separation of packages in containers, also giving insufficient dissipation of heat.

Photo: Tibbie Adams via TSB

POOR MAINTENANCE AND LACK OF REGULATORY SURVEILLANCE CONTRIBUTED TO FISHING VESSEL SINKING

The Transportation Safety Board of Canada (TSB) has published its investigation report into the August 2020 sinking of the fishing vessel Arctic Fox II near Bamfield, British Columbia. The incident resulted in the death of two crewmembers.

The TSB said the master and crew were unfamiliar with the instructions for deploying the liferaft and, in their efforts to deploy the raft, its painter line was disconnected from the vessel and went overboard. Shortly afterwards, the master and one of the crew members entered the water with their immersion suit only partially zipped and with ankle straps unsecured. Consequently, they were exposed to the elements and eventually drowned.

The familiarisation of the life-saving equipment that the crew received was insufficient for them to successfully abandon the vessel, and the crew's response was guided only by their limited experience. The one surviving crew member who managed to reach the liferaft was later rescued by the US Coast Guard.

The investigation found that insufficient vessel maintenance and the absence of regulatory surveillance contributed to the vessel taking on water and eventually sinking. This occurrence highlights the need for Transport Canada to provide more surveillance and monitoring to effectively ensure that vessel owners and authorised representatives take ownership of their safety responsibilities and comply with regulatory requirements.

FLEXIBLE FUEL HOSE FAILURE CAUSES FIRE ONBOARD BULKER

The Transportation Safety Board of Canada (TSB) has released its report into the engine room fire onboard the bulk carrier Tecumseh while transiting the Detroit River off Windsor, Ontario.

Flexible fuel hose assembly on the inboard side of the starboard main engine (Photo credit: TSB)

Probable cause

The investigation determined that the fire on board the Tecumseh originated on the port main engine after a flexible fuel hose assembly supplying fuel to the main engine failed. The analysis examined engine room maintenance, the effectiveness of the vessel's structural fire protection and emergency equipment, and the decision to re-enter the engine room after the fire had been initially suppressed by the carbon dioxide (CO2) fixed fire suppression system.

Causes and contributing factors:

- A fuel hose assembly of unknown origin and integrity failed on the port main engine, which allowed fuel oil to spray on to local sources of ignition, leading to the fire.
- Multiple unsealed deck cable penetrations between the engine room and the engine control room (ECR) deck allowed the fire to propagate to the ECR main switchboard, leading to the complete destruction of the ECR.
- Because the maintenance opening for the emergency fire pump compartment was not secured, smoke entered the emergency fire pump compartment and prevented the crew from being able to access the fire pump to troubleshoot it. Consequently, for approximately 2 hours, the fire pump was unavailable to the crew for boundary cooling.
- Approximately 3 hours after the CO2 was released, crew re-entered the engine room from the steering gear flat with a charged fire hose. Re-entry into the engine room allowed fresh air to enter the engine room, which most likely re-ignited the fire.
- Without local shore-based firefighting resources to assist, the vessel was forced to await the arrival of additional firefighting resources, which meant that the fire burned for many hours without on-board firefighting capability.

Download the full report at **https://bit.ly/3HREGcP**. Or scan the QR code.

REPORT bites

The National Subsea Centre, a centre of excellence for subsea research and technology development established to provide advanced research to accelerate the transition to net zero, has officially opened in Aberdeen.

The new MRCE Handbook mobile app from North P&I is designed to make collecting evidence on incidents faster, easier and more accurate while enhancing reporting consistency in future claims.

The Port of Prince Rupert has proposed a ban on open-loop polluting scrubbers in its harbour in an effort to protect the Pacific coastline.

The final stage of the redevelopment of Newhaven Marina in East Sussex has been given the go ahead by planners.

The European Boating Association has marked 40 years of representing recreational boaters' interests in Europe.

Jeffrey (Lord) Mountevans has been appointed Chairman of the Baltic Exchange Council.He succeeded Denis Petropoulos, who has held the position since June 2019 in January 2023.

Emirates Team New Zealand with pilot Glenn Ashby have broken the land speed sailing record clocking 222.4km/h on board their speed craft, Horonuku.

ABS has launched Custom Rule Book, a powerful new tool which allows users to create tailored ABS rule sets in moments, saving significant time.

Groupe Beneteau is rolling out its B-Sustainable program which is centred around three pillars - ethical growth, engaged care of employees and preserving the ocean.

Plymouth City Council is to receive £842,490 to develop a framework for testing autonomous and prototype maritime vessels for research and development.

Chilean authorities are investigating the violent theft of several copper-filled shipping containers from the national firm Codelco said to be worth millions.

The Port of Leith has become the first large mainland commercial port in Scotland to provide a shore power connection.

Safety Briefings

MAIB REPORT: FAILURE OF A SUSPENDED BUOY ON WORKBOAT ANNIE E WITH ONE PERSON INJURED

At approximately 1315 on 3 April 2021, a deckhand on board the workboat Annie E was injured when he was struck by a grid buoy that had been lifted out of the water by the workboat's forward crane at a fish farm off the Isle of Muck.

Annie E's skipper had noticed that the grid buoy was out of position and needed to be lifted in order to recover and re-lay its mooring anchor. The workboat's forward crane was used to lift the buoy and its anchor connection out of the water. The buoy was suspended 9m above the water when its metal components experienced a mechanical failure, resulting in the buoy falling and striking the deckhand.

First aid was administered to the injured deckhand, who was evacuated by a coastguard helicopter to hospital, where he underwent surgery. He has since received further surgery and treatment.

Safety Issues

- the deckhand was injured when he was struck by a falling grid buoy that had been lifted by Annie E's forward crane
- the deckhand was standing near to the suspended buoy, contrary to the workboat owner's risk assessments, method statements, lifting plan and industry guidelines
- the risk assessments and method statements did not fully mitigate the risks associated with a suspended load
- the grid buoy was not certified as lifting equipment and the lifting technique used did not comply with the manufacturer's recommended procedure, which the vessel's owner and crew were unaware of
- the grid buoy's metal components were worn and the top washer was missing, both of which resulted in its failure
- there was no record of the buoy having been inspected before installation or routinely checked in accordance with manufacturer's guidelines while in service

Recommendations

In view of the actions taken by the organisations involved in this accident, no safety recommendations have been made.

Download the report at **https://bit.ly/3k3rSWy**. Or scan the QR code.

LESSONS LEARNED FROM WET DAMAGE STEEL PRODUCT CLAIMS

John Southam, Loss Prevention Executive, and David Richards, Director (Claims), both from North P&I Club, offer lessons learned and discuss avoidable claims related to the carriage of finished and semi-finished steel products which continue to remain an issue.

The issues highlighted by North P&I include the importance of recording the preload condition and defending yourself against allegations of unseaworthiness with strong evidence.

In some recent cases it became apparent that the preload condition of the steel cargo was poor, whether it was physical damage through impact or corrosion damage from wetting. And when such damage to the cargo is noted at discharge, a high value claim can result.

Precautionary survey

Precautionary surveys on steel cargoes are in two parts. The first part covers the monitoring and recording of the apparent order and condition of the cargo being loaded (or being nominated for loading).

If there are issues with the cargo condition, then the two usual options are to either clause the mate's receipts and bills of lading as appropriate, or to replace the damaged cargo with sound cargo.

The second function of the steel preload survey is the hatch cover test, where the hatch covers and other cargo hold openings are thoroughly checked for weathertightness. Contemporaneous evidence of properly conducted weathertightness testing is vital in proving seaworthiness and defend against allegations of poor vessel maintenance. While hose tests are acceptable, it should be noted that ultra-sonic testing (UST) is more accurate as it considers hatch cover compression and therefore its sealing ability when in a dynamic condition.

As North Club P&I says, there are instances where part of the cargo of steel is loaded onto the vessel in good condition, but then wet cargo is loaded into the same hold. This usually occurs when it rains during loading, and the remaining steel for the same hold has been wetted whilst sat on the quay. When the wetted cargo is later loaded on top of the dry cargo, that too becomes damaged. What's more, there have been cases where steel cargo has been worked in rain conditions, despite the Master's initial protests. Charterers then may offer to issue a 'rain letter' in exchange for owners agreeing to continue loading.

NEW PORT SAFETY GUIDELINES ISSUED BY NEW ZEALAND

New Zealand port safety has taken an important step forward when employers, unions, the Port Industry Association and government regulators, working together as the Port Health and Safety Leadership Group, published detailed new guidelines for setting up a fatigue risk management system.

'Building a Fatigue Risk Management System: Good practice guidelines for the ports industry' focuses on understanding what fatigue is, the science behind it and how to implement a fatigue risk management system. It includes 16 appendices, which are examples and templates that organisations can adapt and use.

The Chair of the Leadership Group, Maritime NZ Chief Executive, Kirstie Hewlett, said the formation of the Port Health and Safety Leadership Group, and its collective leadership across the sector, is critical to improving safety on Ports, and the Leadership Group is proud to release the fatigue guidelines, which will be the first of many outputs from the Leadership Group.

Download the guidelines at **https://bit.ly/3CIsVII**. Or scan the QR code.

REPORT bites

France's APER, a non-profit organisation created in 2009 by the French Nautical Industries Federation and the Composite Recycling company, have signed an agreement to formalise their glass-fibre recycling partnership.

MarineShift360 and the International Monohull Open Class Association have agreed a formal partnership focused on understanding the environmental impacts of high-performance offshore racing.

According to state media outlet Xinhua, Ningbo Port saw its container throughput reach 31.26 million TEU between January and November 2022.

The construction of the next-generation diesel-electric propulsed cargo vessel has kicked off in Turkey.

The government of Sudan has signed a $6 billion agreement with a consortium from the UAE to build a new port on the Red Sea.

A consortium of international partners has launched a new project that aims to establish a hydrogen export route from Scotland to Rotterdam via liquid organic hydrogen carrier.

German shipping titan Hapag-Lloyd is building a new transshipment terminal with an annual handling capacity of 3.3 million TEU in Damietta, Egypt.

French shipowner Louis Dreyfus Armateurs has developed an innovative vessel design capable of storing and supplying hydrogen using green ammonia.

The Inland Waterways Association Lichfield Branch has donated £2,000 in memory of Malcolm Braine, founding member of the Staffordshire & Worcestershire Canal Society.

The world's oceans were recorded as being the hottest ever in 2022, revealing the extensive impact that human-caused emissions are having on the planet.

Huisman has secured a contract for a 3,000-tonne leg encircling crane from COSCO Shipping Offshore, which will be installed aboard a Cadeler jack-up vessel.

In a significant step towards the building of hydrogen carriers, ABS has approved Provaris' H2Neo compressed H2 carrier design.

Safety Briefings

GREAT CARE SHOULD BE TAKEN WHEN CONTAINERS ARE LOADED ON VESSELS

In a recent communiqué from the American Club, it focuses on container losses in general. This is a phenomenon that is much too common the Club says and needs addressing.

Containers are routinely being lost at sea from container ships, from barges, and from non-cellular vessels carrying containers. There are several causes including incorrect container weight declarations by shippers, improper weight distributions in the stow, cargo misdeclarations, inadequate packing of cargo inside the containers, inadequate stowage plans, and inadequate cargo securing.

Great care should be taken whenever containers are loaded and secured on vessels not designed to carry containers. Particular attention should be paid to the condition of deck fittings and whether there is a sufficient number of securing points. The deck fittings may be unsuitable if they have been poorly maintained. When deck fittings become heavily corroded, they can lose much of their strength. Additionally, the twist locks used to secure the containers to the deck fittings may not hold properly due to corrosion or wastage of the deck fitting.

The vessel may not have sufficient quantities of lashing gear. Lashing gear should be inspected frequently to ensure it is in good condition. Some vessels have tried to use alternative lashing gear that is not designed for the task or not verified to be sufficiently strong enough to ensure the containers remain securely stowed. When in use, lashing gear must also be checked regularly to ensure it remains tight and has not become loose due to cargo shifting and shipboard vibration.

Containers lost overboard are rarely recovered successfully. The contents are almost always a total loss. And some containers lost overboard remain afloat for days. Since they are unlit and tend to float low in the water, they are a serious hazard to navigation for both large commercial vessels, private vessels, the fishing fleet and small craft. Some containers with toxic cargos have released toxins and killed marine life too.

MATERIAL FATIGUE OF PRESSURE GAUGE PIPE CAUSES FERRY FIRE IS REPORT FINDING

The German Bureau of Maritime Casualty Investigation (BSU) has published its report on the German flagged ferry BERLIN, which suffered a fire en route to Rostock on 13 August 2020.

At about 0245, when the ferry was in the approach fairway about 2.6 nm off the sea channel, alarms sounded in the engine control room (ECR) and in the workshop. The IMAC Alarm, "gear oil sump level low" sounded first. The ship's mechanic 1 (SM 1) acknowledged the alarm in the workshop and proceeded to the source of the alarm at main engines (ME) 1 and 2 (the two main engines that drive the controllable pitch propeller together with ME 3, via a common reduction gearbox). There he detected a leakage from a double nipple on top of the gearbox (from the pressure gauge connection).

The ship's mechanic 2 (SM 2) meanwhile reached the scene via Deck 1. He saw flames and smoke in the area of ME 2 turbocharger. At 14:46, the smoke detector in the main engine room went off. However, the object protection system did not trigger automatically, as this only happens when two detectors detect an alarm.

Due to material fatigue, the double nipple of a pressure gauge on the pipe of a gear oil pipe broke. This resulted in gear oil spraying far into the engine room and onto hot surfaces, where it ignited. At the same time, this caused the oil pressure in the system to drop.

Probable cause
The cause was determined to be material fatigue of a pressure gauge pipe that could not have been foreseen. It had broken, releasing a jet of gear oil onto insufficiently insulated engine parts, where it predictably ignited.
1 Extinguishing measures: The Scandlines crews have above-average training levels in practical firefighting and also tactics. This is achieved through regular safety drills on board and large-scale exercises with ship firefighting units of the professional fire department, as well as through regular participation in so-called 'Live Fire Trainings'. These 'Live Fire Trainings' were developed years ago for cruise vessels and ferries and go far beyond the required training for STCW. All kinds of scenarios are trained under realistic conditions, such as engine room fires, cabin fires, or fires in vehicle decks.

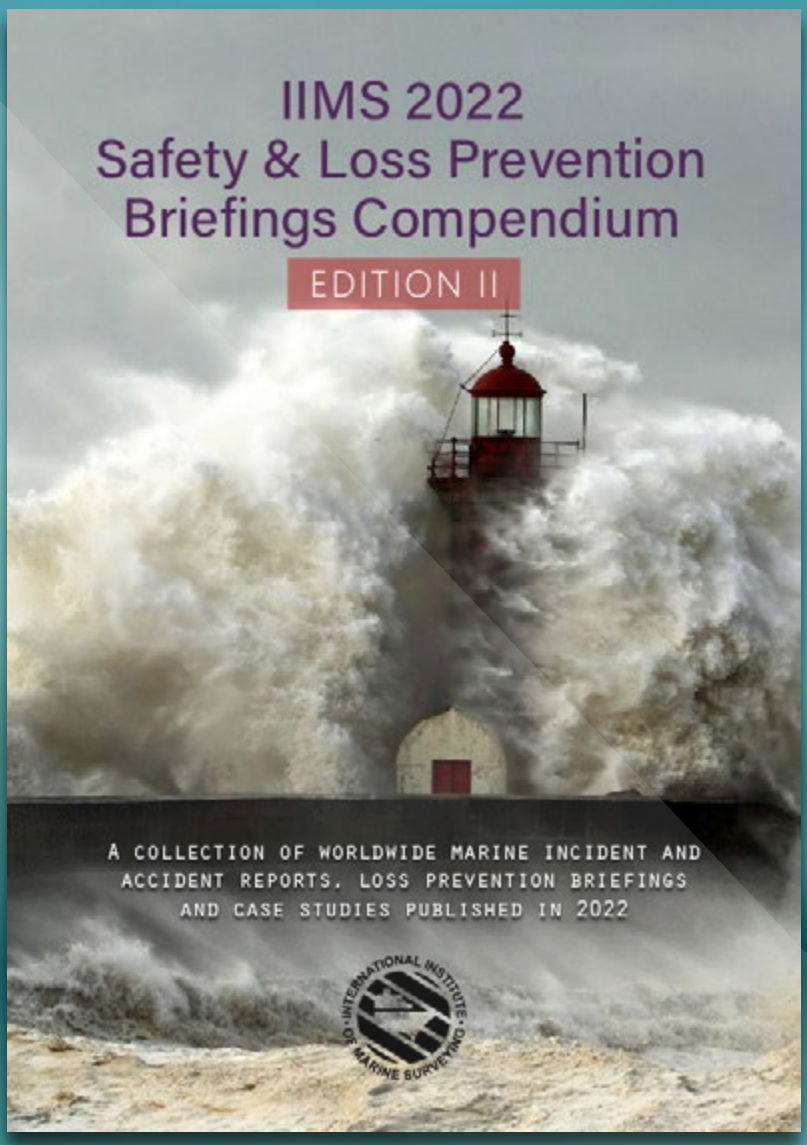
In addition to high-quality STCW training, Advanced Fire Fighting (AFF) refresher courses in defensive fire protection should also be introduced for crew members at ratings level, if they are members of fire protection squads, not only for licensed officers.

2 Legal framework: In the course of the investigation, it became apparent that uniform standards must be developed that specify periodic and repair-dependent inspections of the "hot surface situation" in terms of fire prevention for engines and machinery.

Download the BERLIN BSU report at **https://bit.ly/3XkKtfl**. Or scan the QR code.

DOWNLOAD THE 2022 COMPENDIUM AT

http://bit.ly/3GpsbEr



SCAN THE QR CODE

RETURN LINE FUEL LEAK ON MAIN ENGINE CAUSES FERRY FIRE IS REPORT FINDING

The Marine Casualty Investigation Board (MCIB), the Irish government agency for investigating maritime accidents and incidents, has released its report on the ferry fire that broke out onboard the "Frazer Tintern" midway between Ballyhack, Co. Wexford and Passage East, Co. Waterford.

On the morning of 5 August 2021 a deck crewmember of the ferry "Frazer Tintern" reported to the Master that he smelled diesel fumes coming from the No.1/No.4 engine compartment. Upon further visual investigation, a diesel fuel leak was discovered where a fuel return line had become disconnected on the No.1 engine.

The engine was shut down and a phone call made to the company's marine engineer to report the situation. As the engineer was unavailable at the time to attend the problem, the decision was taken to call out a local marine mechanic who had previously carried out repairs on the vessel.

The leak was repaired by the mechanic by refitting the return line and securing it with a hose clip and verified by the Master who ran up the engine to check the repair. The Master had worked on the vessel since its arrival in Ireland and was familiar with operating the machinery. The area around the No.1 engine compartment was cleaned by the crew with detergent and deemed free of diesel residue, as was the deck plating adjacent to the engine compartment. The engine compartment was monitored hourly by the crew and there were no further reportable events for the remainder of that morning shift.

On the evening of 5 August a strong smell of diesel fumes was noted by the Master and simultaneously by one of the deck crewmembers who called this over the radio to the wheelhouse. The same crewmember informed the Master that he was going to investigate the source of the diesel fumes by approaching the starboard machinery space access.

When the crewmember arrived at the mesh gate on the starboard side leading to the compartment of No.1/No.4 engines, he discovered smoke and flames pouring from the compartment and immediately informed the Master of the source and location of the fire. The Master immediately shut down No.1 engine and switched off the engine room fans. The fire flaps and fan shutdown for the starboard machinery space were inaccessible due to the location of the fire.

The return fuel lines on the main engines on the vessel were seen to be fixed using three distinct methods. The original fixing by the manufacturer was by use of spring clips, but other pipes were attached using cable ties or hose (jubilee) clips. The repair to the fuel line on the morning of the incident was made by fitting a hose clip. This may have contributed to return fuel line failure.

The fire suppression system for the machinery space was not operated as the Master did not want to lose all propulsion at the time and deemed it safer to complete the short run and land the passengers at Passage East, Co. Waterford.

The fire was most likely caused by a return line fuel leak on No.1 main engine providing fuel to the area. The volume and pressure of the fuel was greatly increased by the fuel return line being blocked or shut off. The ambient high temperature and swirling air flow in the vicinity assisted in the atomisation of the fuel.

The operators have stated that prior to the incident they carried out fire drills. There are no records of these being carried out or what was involved in the drills. Post incident, drills are carried out on a weekly basis with at least one of each drill (Man Overboard/Fire in Accommodation, Car Deck or Engine Room/Abandon Ship) carried out per month.

Download the report at **https://bit.ly/3X4Q2i4**. Or scan the QR code.

REPORT bites

Daewoo Shipbuilding & Marine Engineering and the leading domestic steel company POSCO are forming a partnership to develop materials to meet the requirements for shipping materials such as liquified carbon dioxide or cryogenic liquified hydrogen.

The Port of Felixstowe has introduced autonomous terminal tractor units into mixed traffic container terminal operations. The port is believed to be the first in Europe to introduce such equipment.

Homeless individuals and refugees could be housed on cruise vessels under new ventures to tackle an ongoing housing crisis in Devon, UK.

Montrose Port set to become the first Scottish port to provide shore power.

Bureau Veritas is joining an effort to develop and introduce possibly the first commercial application of a molten salt nuclear reactor.

P&O Ferries has revealed it has reduced its carbon footprint by 9 per cent in 2022 through maximizing the efficiency of sailings and with the help of new a partnership.

DP World announced that its Southampton container terminal delivered a 55% drop in net carbon emissions in 2022, owing to a switch in primary fuel.

Organisers of the Paris Boat Show have said they will be consulting on the show's model over the coming weeks and its sustainability credentials.

Japanese shipping major Mitsui O.S.K. Lines plans to launch the construction of Wind Hunter, a hydrogen-producing vessel outfitted with multiple rigid sails, in 2024.

OCIMF is overhauling its Ship Inspection Report Programme (SIRE) to future-proof the regime and enable it to evolve with changing risks and requirements.

The Setúbal council in Portugal has presented a preliminary study for a marina which could accommodate 600 vessels, including superyachts up to 50 metres.

The world's first shipment of certified blue ammonia reaches Ulsan port.

Safety Briefings

ONBOARD TRAINING FOR OPERATING HATCH COVERS IS ESSENTIAL

Hong Kong authorities have issued an investigation report following a fatal accident that happened on board a bulk carrier, when it was en route to Port Hedland, Australia to load a cargo of salt in bulk.

During the voyage, the crew of the vessel was engaged with the main deck cleaning work and the cargo hold lime-coating work, while the C/O was co-ordinating the lime-coating operation on the main deck. When the C/O placed his body underneath the partially opened folding type hatch cover to check the condition of the cargo hold and take photos, the hydraulic oil hose of the hatch cover operating system ruptured, resulting in the sudden closure of the hydraulic operated hatch cover. The C/O was crushed to death by the hatch cover on the spot.

Probable cause

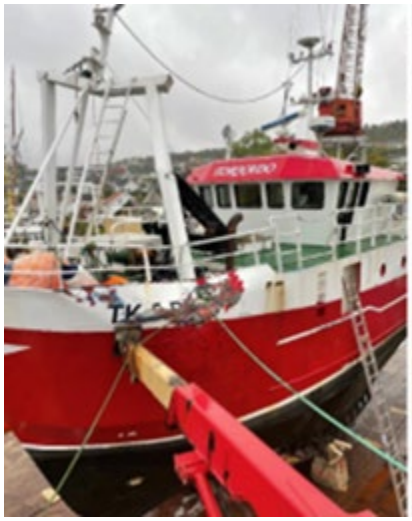
The investigation revealed that the main contributory factors to the accident were:

- A lack of safety awareness by the C/O on operating the hatch cover, and he did not hold a valid permit to work aloft as required; the crew failed to carry out maintenance of the hydraulic operating system in compliance with the requirements of the shipboard manual, namely "Operating and Maintenance Manual for the Hydraulic Operated Folding Hatch Cover" (the Manual);
- The shipboard Safety Management System (SMS) failed to identify the hydraulic system as an item that required maintenance in order to comply with the requirements of the Manual;
- The crew failed to follow the requirements of "Code of Safe Working Practices for Merchant Seafarers" (the Code) and the Manual when operating the hatch cover.

Lessons learned

In order to avoid a recurrence of similar accidents during operation of hacth covers in the future, the ship management company, all masters, officers, and crew members should note the following items:

- To enhance safety awareness and training onboard in operating the hatch cover including effective risk assessment, and the requirement for a valid permit to work aloft;
- To strictly follow the requirements of the manual to carry out maintenance of the hydraulic operating system of the hatch cover;
- To strictly follow the requirements of the Code and the shipboard hydraulic operated folding hatch cover operating manual to operate the hatch cover;
- To consider revising the shipboard SMS to ensure the hydraulic operating system of the hatch cover is included in the shipboard maintenance manual. Besides, to conduct an internal audit on the vessel to ensure that the crew strictly follow the requirements of the shipboard maintenance manual when carrying out the aforementioned system maintenance onboard.



TOO MUCH RELIANCE ON NAVIGATIONAL AIDS LEADS TO COLLISION IS REPORT FINDING

The Norwegian Safety Investigation Authority (NSIA) has published its report about the collision between the 118-metre-long cargo ship 'MS Edmy' and the fishing vessel 'MS Tornado' in Langesundsbukta Bay. As a result of the collision, significant material damage was sustained by the fishing vessel.

The collision caused the fishing vessel to lean to the side, and her course was turned almost 180 degrees. Once clear of the cargo ship, the fishing vessel still had propulsion, and the crew were able to turn her in the right direction. The crew were physically unharmed and proceeded to check the status of the vessel. She had sustained considerable damage to the port bow bulwark. The forward cargo hold was also checked, but no damage was observed. The skipper therefore continued the hauling process, as they had only had time to haul about 100 metres of wire and had 600 metres left.

Analysis

The sequence of events that appears in the first part of this report describes a situation where active navigation was not carried out over a period of time. NSIA has chosen to focus on some of the contributing factors to the accident. This is to highlight factors that NSIA believes provide the most universal safety learnings.

The navigator of the cargo ship checked the radar for potential dangers, without identifying the fishing vessel. The NSIA believes this was because the fishing vessel was only shown on the radar as an echo, with no AIS information on the radar or ECDIS displays. Use of navigational aids such as ECDIS and AIS allows navigators to rely more on the technology and thereby engage less actively in traditional outlook-based navigation. The NSIA believes that the expectation that most vessels transmit AIS information can lead to a false sense of security, as there is a possibility that not all dangers are identified.

The bridge navigational watch alarm system is a tool that can help navigators to maintain attention over time. The system was deactivated on the cargo ship during the day, and the NSIA believes that the system would have contributed to safer navigation had it been active, because then the navigator had to acknowledge the alarm at the navigation instruments at the front of the wheelhouse.

Measures implemented

The following has been implemented on board all vessels:

- Watchkeeping procedure was updated by adding the requirement on the minimum setup of navigation bridge and lookout for various sailing scenarios.
- Established minimum recommended CPA/TCPA values were established and posted next to radars / ARPAs.
- Bridge change-over check list was reviewed and updated with additional check points, such as status of BNWAS, ARPA's CPA settings, listening watch on appropriate VHF channel and Ch16.
- Departure check list was reviewed and updated with additional check points, such as status of BNWAS, ARPA's CPA settings, listening watch on appropriate VHF channel and Ch16.
- The Master's standing orders were updated and re-issued reflecting above items as well as statement prohibiting paper work and use of IT equipment when there is no back up lookout.

All the above was communicated to all vessels with request to review watchkeeping routines onboard and propose further improvements where necessary.

Download the report at **https://bit.ly/3GAde0z**. Or scan the QR code.

POOR WIRING RESULTS IN SHIP'S DETENTION

Photo credit: The American Club

The American Club has shared a case where a ship was detained due to an ISM deficiency, arising from poor wiring.

As there was no electrician onboard, the vessel's third engineer was sent to investigate why the vessel's forward anchor light was out. He found the wiring in extremely poor condition. The insulation was missing in some areas and heavily cracked in others. The wire itself was shorted out against the side of the deck penetration. He made repairs using some wire he had in his tool belt and a lot of electrical tape. He then reported that the problem was fixed.

Two days later, with the vessel still at anchor, a Port State Control inspector observed the poor wiring and detained the vessel for an ISM deficiency. In the course of investigating the cause of the detention, the Chief Engineer and Master were upset that the third engineer's repair had been so poor. However, they were more upset that the third engineer had not recognized or reported the need for more permanent repairs consistent with the vessel's safety management system.

The physical damage to the vessel was minimal. However, the vessel was detained until the wiring was correctly repaired and an external ISM audit was conducted. The wiring was properly repaired for less than $250.

A poor repair could have caused the forward anchor light to fail again. That would have increased the risk of a collision and increased the potential confusion for other vessels manoeuvring into and out of the anchorage. Additionally, the poor electrical repair created an electrical shock hazard.

EXTRA CARE REQUIRED WHEN INSPECTING WIRE ROPES FOR EVIDENCE OF WEAR DUE TO FRICTION

Photo credit: BSEE

The Bureau of Safety and Environmental Enforcement (BSEE) has published details of an incident involving an auxiliary line's abrading that caused a rope guard to fail and presents the resulting lessons that were learned.

The BSEE investigation found that chronic scraping and rubbing by an auxiliary line created enough damage to the main line idler sheave carrier side plate, pin boos, rope guard, and auxiliary line that it caused the guard of the main load line idler sheave carrier to fail.

The rope guard fell approximately 100 feet, landing near personnel working below. This type of damage occurs when the auxiliary line is used at high speed, thus causing the auxiliary line to jump onto the main line idler sheave.

BSEE confirms that this particular incident involved an American Aero OM 450 crane. Other cranes with a similar configuration could see the same issue and personnel involved with the inspection and maintenance of such equipment are asked to be vigilant.

Key lessons learned

- Inspect idler sheaves and wire ropes for wear indicative of friction and abrading when performing pre-use inspections described in API RP 2D.
- Replace single main load line idler sheave carriers with a double sheave idler.

WATER FLOOD IN CARGO HOLD CASE STUDY

According to the Swedish Club, water was flooding from the cargo hold after the crew of a containership were washing down the main deck and cargo hatches. Here are the learnings.

It was morning and outside there was a light breeze and some drizzle. The crew of the container vessel was preparing to wash down the main deck and cargo hatches before arrival in port the same afternoon. They had the rare opportunity to do this as there were no containers on deck, only in the cargo hold.

Fire hoses were connected, and the decision was made to use two fire pumps, and to close the valves on the fire line for the anchors. These valves are normally left open, but this action would increase the water pressure. The crew left for their lunch break leaving the fire pumps switched on and the valves closed.

The engineer on duty in the Engine Control Room noticed that the bilge alarms for cargo hold 1 and 2 had been activated. He acknowledged the alarms but did not carry out any further investigation as he assumed the alarms were activated because of the drizzly weather conditions outside. After lunch the bosun noticed that there was water in cargo holds 1 and 2. At this time there was about 0.5 metres of water in both holds. The Master told the bosun to immediately investigate the origin of the leak. At the same time the Master started to discharge the water overboard. When the bosun entered the cargo hold he could see water flood over the edge of the void space. He also noticed that water was leaking from the fire lines both port and starboard side. The fire pumps were immediately stopped.

The Master informed the Chief Engineer of the flooding. He advised that the alarms warning of a high level of bilge water had been activated several times, but that the duty engineer had not investigated them. None of the void spaces were fitted with sensors which would indicate the presence of any water. The void spaces adjacent to cargo hold 1 and 2 had openings connecting them to the cargo holds. Unlike the other void spaces on the vessel, these void spaces were not watertight. A couple of days later the crew opened up all void spaces and also found water in the void spaces adjacent to holds 3 and 4.

Inside the void spaces they also found that the rubber gaskets positioned between the sections of the main fire line were damaged.

It was evident that the closed valves had increased the water pressure so much that it had damaged the rubber gaskets and caused the water to flood the cargo holds. The crew replaced these with new gaskets made of hard plastic instead of rubber.

Lessons learned
Ask yourself the following questions:

- What were the immediate causes of this accident?
- Is there a risk that this kind of accident could happen on our vessel?
- How could this accident have been prevented?
- What sections of our SMS were breached if any?
- Is our SMS sufficient to prevent this accident?
- If procedures were breached, why do you think this was the case?
- How often are void spaces inspected?
- How often are cargo hold inspections carried out?
- What are the procedures when a bilge alarm is activated?
- How often are lines and pipes in tanks, void spaces and other spaces that are not usually entered inspected?
- Are inspections like this included in the PMS?
- Do we have any sensors in void spaces or tanks that will show if any water is present?
- Was it acceptable to pump the water overboard?
- How much water can enter our cargo holds until there is a risk to stability?
- Do we have risk assessment procedures onboard that address these risks?
- Would a work permit have identified these risks?

Not a Single Ship Surveyor Apprentice in the UK

By **Peter Roberts**, Editor,
Shoreside Maritime Training Magazine

There are no training providers in the UK providing the Marine Surveyor (Degree) (Level 6) Apprenticeship.

Marine surveying is essential to the maritime industry as it ensures vessels comply with safety standards and regulations. However, there is growing concern about the lack of qualified surveyors as there is not a single training provider in the UK offering the Marine Surveyor Apprenticeship.

This apprenticeship teaches individuals the necessary skills and knowledge to provide independent verification, inspection, or examination of a vessel's structure, machinery, equipment, and systems, ensuring they meet the required standards.

The fact that no UK training providers offer this apprenticeship is a significant cause for concern for the industry and the potential apprentices who could benefit from it. In this article, we will explore the issue of the lack of Marine Surveyor Apprenticeships in the UK, its implications for the industry, and possible solutions to the problem.

This is a significant gap in the industry as individuals who want to pursue a career in this field may not have access to the necessary training.

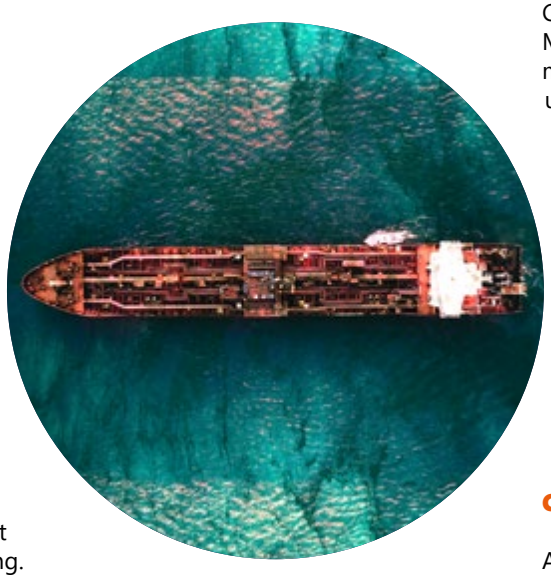
Furthermore, the shortage of qualified surveyors may lead to safety risks and potential long-term implications for the maritime industry. The question is why there are no training providers in the UK offering this apprenticeship and what can be done to address this gap in the industry.

BACKGROUND

Shoreside Maritime Training Magazine is an independent trade publication in Maritime Training, giving impartial advice to seafarers at various stages of their careers.

As part of a project to provide training advice on apprenticeships in the maritime sector sparked by National Apprenticeship Week 2023, (see **http://bit.ly/3ImQNyf**) Shoreside have begun to create a comprehensive prospectus for apprenticeships in the maritime industry.

Looking to give an overview of the provider for each type of apprenticeship, the team at Shoreside we shocked to find out that despite its publication in 2019, not a single training provider is offering the Marine Surveyor (Degree) (Level 6) Apprenticeship.



IMPLICATIONS

The lack of Marine Surveyor Apprenticeships in the UK has significant implications for the maritime industry. From safety risks to the potential shortage of qualified surveyors, it's clear that action needs to be taken to address this gap.

Shoreside reached out to a number of leading organisations within the Surveying sector for comment, including Mike Schwarz, CEO of the International Institute of Marine Surveying, who personally contributed to the agenda-setting forward the apprenticeship standard in Marine Surveying. Many others declined to comment.

COMPLIANCE ISSUES

One of the primary concerns is the shortage of qualified surveyors, which may lead to safety risks and potential long-term implications for the industry. As the number of ships and vessels operating in UK waters continues to grow, there is a greater need for qualified surveyors to ensure their safety and compliance with regulations.

Concerned for the safety of seafarers, Mike Schwarz, stated, "For years, marine surveying has remained an unregulated space, and anyone can practice, unlike that of a house surveyor, for example. This remains a major challenge for the industry." when approached by Shoreside for comment.

Mike Schwarz continued, "There is no appetite for regulators to regulate the marine surveying business. Mentoring is another issue too."

CAREER BLOCKADE

Another concern is that the absence of Marine Surveyor Apprenticeships may deter potential candidates from pursuing a career in this field. Without access to the necessary training, individuals interested in marine surveying may look for opportunities elsewhere or choose to pursue a different career path altogether. This could lead to a shortage of qualified surveyors in the future, with potentially severe consequences for the maritime industry.

In a comment to Shoreside, Mike Schwarz, stated, "I think we always knew that the potential number of employers who would embrace this apprentice scheme would be small. Most surveying practices are one-

man bands – sole traders – or work in tiny businesses. It was always hoped that someone like the MCA with a much bigger talent pool might potentially want to adopt such a scheme."

LACK OF SPECIALISTS

The lack of training providers also means the industry is missing out on an opportunity to develop and train its workforce. Marine surveying is a growing field that requires specialised skills and knowledge, and investing in apprenticeships could help to ensure a steady supply of qualified surveyors in the future. Without this investment, the industry may struggle to find the necessary expertise to support its growth and development.

Concerned about the lack of growth in specialisation, Mike Schwarz, stated, "The idea of the apprenticeship scheme was to give people a knowledge base that they cannot easily obtain, unlike in time gone by when working in a boatyard or with a boatbuilder was a good route into the surveying business."

SOLUTIONS

The lack of Marine Surveyor Apprenticeships in the UK is a three-way chicken-and-egg situation. Without training providers, there can be no apprentices. Without demand from employers, there can be no positions to fill. Without marketed opportunities, there can be no candidates.

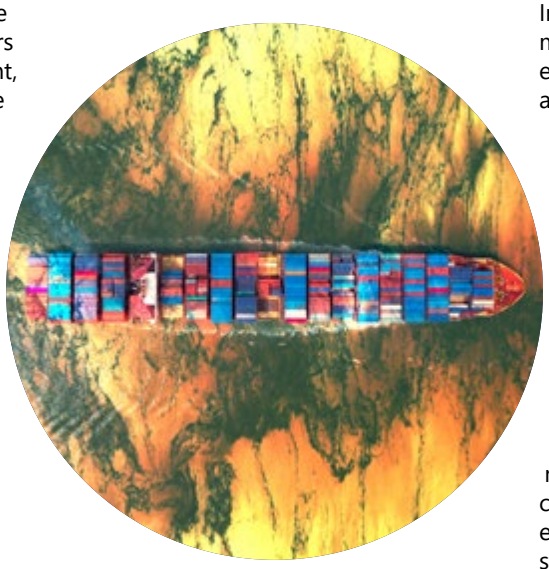
To address this gap in the industry, a comprehensive approach is necessary, one that involves a range of stakeholders, from training providers to employers to potential apprentices. The following list includes some possible solutions to this issue, but it's important to remember that each approach is interconnected, and a long-term strategy will require cooperation and collaboration from everyone involved.

This slightly adapted article can be read in its original form online at:
https://shoresidetraining.co.uk/news/not-a-single-ship-surveyor-apprentice-in-the-uk/
Website:
https://shoresidetraining.co.uk/

Here are some steps we propose towards the solution.

- Encourage existing training providers to offer the Marine Surveyor Apprenticeship by highlighting the demand for qualified surveyors and the potential benefits to their business.

- Work with industry bodies to further develop the framework for the apprenticeship, including the necessary qualifications, standards, and training requirements.



- Seek funding from the government or other sources to support the development of the apprenticeship and provide financial incentives for training providers to offer it.

- Partner with international training providers or industry bodies to adapt successful examples of marine surveyor training from other countries or industries to the UK context.

- Raise awareness of the importance of marine surveying and the opportunities it offers as a career, both to potential apprentices and to businesses looking to invest in their workforce.

- Establish a network of industry professionals and apprentices to share best practices and support the development of the apprenticeship.

- Work with the Maritime and Coast-guard Agency (MCA) to increase opportunities within the space.

WHAT CAN PROSPECTIVE CANDIDATES DO?

There are still a number of options and opportunities for prospective Surveyors, including distance learning courses in Marine Surveying from organisations such as IIMS, (see **http://bit.ly/3CU3hHY**) as well as a range of short courses available in the industry, usually applied for directly via the employer site.

Suppose you are looking to take action to encourage training providers and employers to provide the course. In that case, the best course of action may be to reach out to your desired employer and make yourself known as a prospective applicant, showing them that there is demand in this space.

CONCLUSION

The lack of Marine Surveyor Apprenticeships in the UK is a significant gap in the maritime industry that has implications for the safety of vessels and the industry's future. This apprenticeship provides individuals with the necessary skills and knowledge to conduct surveys independently, ensuring vessels comply with safety standards and regulations. The absence of training providers means that potential candidates may not have access to the necessary training, leading to a shortage of qualified surveyors in the future.

The solutions listed above provide a range of possible strategies for addressing this issue, from encouraging existing training providers to offering apprenticeships to seeking funding and partnering with international training providers. However, it's clear that a comprehensive approach is necessary, one that involves cooperation and collaboration from training providers, employers, and potential apprentices.

The maritime industry is growing, and the demand for qualified surveyors will likely increase in the coming years. Investing in apprenticeships is an investment in the industry's future, and it's essential to take action now to ensure that we have the necessary expertise to support its growth and development. By working together, we can bridge the gap in the industry and provide the training and opportunities necessary to meet the demand for qualified marine surveyors.

Announcing a unique event - the Ian Nicolson Lecture Live: Your invitation to attend

One of the more interesting nonagenarians you are likely to encounter is Ian Nicolson C.Eng. FRINA HonMIIMS, a small craft marine surveyor based in Scotland, who is not your average ninety-plus-year-old. For one thing, he has been marine surveying for over 70 years – in itself a remarkable feat.

IIMS is delighted to be hosting this unique event live - the Ian Nicolson Lecture "Lessons learned from 78 years of marine surveying" on Thursday 13th April between 10.30 and 12.30 (London, UK time). The lecture is open to anyone who wishes to attend and if the date and time are not for you, you may request a copy of the video for later viewing on catch up. There is a modest cost for attending of just £35.

Ian has a unique presentation style and format and will use his own beautifully hand-drawn diagrams as the basis for his lecture. He is known to be a stickler for detail and will demonstrate the importance of that in his own inimitable fashion, pulling no punches. This is one lecture not to be missed and no matter what your marine surveying experience is, you are bound to learn something from one of the doyens of the industry!

About the lecturer, Ian Nicolson
Ian Nicolson was apprenticed to the traditional yacht designer, Frederick Parker. He was one of the team involved in the first post-war rebuild of the large Fife schooner ALTAIR. He did his journeymanship with John I Thornycroft Ltd, the ship and yacht builder.

Ian was a doughty pioneer in the field of ocean cruising. He emigrated by sail in 1952 to Vancouver where he worked under Canada's finest designer of traditional wooden fast motorboats and power cruisers, Thorton Grenfell. His return passage to Britain was made by hitchhiking across Canada and building himself a small wooden yacht cruiser near Halifax. He sailed her 'home' single-handedly across the Atlantic in 1954.

After working for Alan Buchanan on wooden yacht designs, Ian was the naval architect for 'Yachts and Yachting' magazine and then became a full partner in A Mylne & Co, the design firm set up in 1896 by Alfred Mylne, the First. When Alfred Mylne the Second died in 1979, Ian Nicolson took over as senior partner.

He is a much-published author having written a string of books on design, construction, operation and handling of small marine craft. He was a recipient of the Geoff Pack Memorial Medal for his contributions to yachting literature.

To reserve your place go to **https://bit.ly/3GDVNwf**.

A R Brink & Associates celebrates 40 years

Back in 1983 when Capt Allen Brink HonFIIMS CMMar, FNI, FRIN, and FCMS set up A R Brink & Associates in Durban, South Africa, little could he have known what a success his survey business would become, not just in southern Africa, but globally too.

Later this year, A R Brink & Associates officially celebrates its fortieth birthday. On behalf of its members and the head office team, IIMS would like to congratulate Allen for achieving this milestone.

A Chartered Master Mariner, Allen is a member of the IIMS Management Board and a Director of IIMS Ltd. He was present at the events which led to the formation of the Institute back in 1991 and has remained a leading light in the organisation since that day.

IIMS Hybrid AGM and Conference set to proceed on 6/7 June

Low cost, high value education either in-person or as an online delegate.

Kindly supported by Matrix Insurance Ltd

Open for reservations now. Go to **https://bit.ly/3ju8PFc** for more details.

Following the initial announcement about plans to hold an IIMS hybrid Conference and dinner at Southampton on June 6/7, the decision has been made to proceed with the event. IIMS is looking forward to welcoming both in-person and online delegates at the event.

There seems to be a growing appetite to get back to face-to-face events across the world. The Institute's main aim is to get back to face-to-face conferencing and networking wherever possible, but with a hybrid option. With that in mind IIMS has made the 2023 Conference affordable and accessible for those wishing to attend. Rising costs in London have helped to make the decision to choose Southampton as the venue an easy one.

The meeting venue

The one-day Conference will be held at the Axis Conference Centre, (pictured), which is owned by the University of Southampton. There is plentiful free car parking too for those who wish to drive. It is a state-of-the-art, bespoke venue set up purely for the needs of conference organisers and has excellent IT facilities to enable quality broadcasting for online delegates.

The hotel accommodation

Just a couple of minutes' walk away from the Axis Conference Centre is elegant Chilworth Manor Hotel (pictured) set amongst 12 acres of beautifully landscaped grounds. This Edwardian manor house hotel is a wonderful retreat in idyllic surroundings yet is within easy reach of Southampton city centre.

The IIMS team has been working hard to put together a diverse presentation programme with expert speakers who will share their knowledge with delegates. The varied range of topics will appeal to marine surveyors from all branches of the profession.

IIMS is also planning a day of educational activities in and around the nearby Southampton port area at no costs to delegates on 6 June ahead of the Conference dinner that evening. More details to follow soon.

In-person delegates

For those joining the event face-to-face, the cost for the day is £130 (inc VAT) per person which includes a buffet lunch and refreshments throughout the event.

Online delegates

For those joining the event as an online delegate or wishing to purchase the video content for later viewing, the cost is just £95.

Tuesday 6 June 2023

7.30 Conference Dinner at Chilworth Manor.

The cost of dinner is £72 (inc VAT) per person.

Bed and breakfast at the hotel (if required) are at own cost.

Wednesday 7 June 2023

Annual General Meeting

08.30	AGM open	*There is no cost for attending the AGM only.*
10.30	AGM close	
10.30 – 10.50	Conference registration and refreshments	
10.50 – 11.00	President's opening address by Peter Broad	
11.00 – 11.15	Ten achievements that IIMS should be proud of by Mike Schwarz	
11.15 – 12.05	Plenary session 1: What you need to know about lithium-ion batteries and thermal runaway by Ian Bartle	
12.05 – 13.00	Plenary session 2: Key corrosion considerations for marine surveyors by Dr Mike Lewus	
13.00 – 13.45	Lunch	

Wednesday 7 June 2023

Room 1
Presentations and discussions for Yacht & Small Craft Marine Surveyors hosted by Mike Schwarz

13.45 – 14.25	Q&A session by Sir Robin Knox-Johnston
14.25 – 15.10	Electrical surveying from an electrical engineer's perspective by Paul Madeley
15.10 – 15.25	Afternoon refreshments
15.25 – 16.10	Claims update by Karen Brain, Matrix Insurance Ltd
16.10 – 16.40	Join your fellow surveyors in Room 2

Close

Room 2
Presentations for Commercial Ship Marine Surveyors hosted by Hilary Excell

13.45 – 14.25	Developing Technologies and Practices Within Commercial Marine Surveying by Mike Wall
14.25 – 15.10	Update on the progress towards autonomous shipping by Alexandros Ntovas
15.10 – 15.25	Afternoon refreshments
15.25 – 16.10	Presentation to be confirmed
16.10 – 16.40	Open forum discussion hosted by Mike Schwarz and Peter Broad

Close

Reservations for the Conference are now open. More details about the confirmed speakers so far and instructions about how to reserve your place can be found **https://bit.ly/3ju8PFc**.

Report on the South West UK small craft surveyors gathering

IIMS member, Nick Healey, took it upon his own back to organise an event for small craft surveyors at Mylor in Cornwall in early February. IIMS was able to assist Nick with marketing and promoting the event. The meeting was held down at Castway's restaurant Mylor Yacht Harbour. There were twelve attendees including brokers from Ancasta and Red Ensign.

Aerial view of Mylor Yacht Harbour, Cornwall

Mylor Yacht Harbour hosted the event under the title ***Rigging and Electrics***. Dan Teubert headed up the talk firstly giving an insight into their services and how they tackle a rig survey. He provided attendees with a sample report that they produce and pass onto their clients.

After what Nick describes as munching his way through a huge burger washed down with a beer, Dan went through an extensive slide show opening up a relaxed discussion on common defects found during their appraisals. Nick said he was sure everyone would have learnt something and probably most importantly it gives a little reminder of the detail needed in order to provide a worthwhile survey report.

As Nick said, "Surveying can be a lonely world sometimes. Time spent networking and building a relationship between other surveyors/brokers and contractors has been invaluable during my career. Sometimes a quick call to a contractor or a fellow surveyor to discuss a topic or something you are currently looking at can make your day run a lot smoother. Asking for help when knowledge or experience may be at a deficient should be actively encouraged."

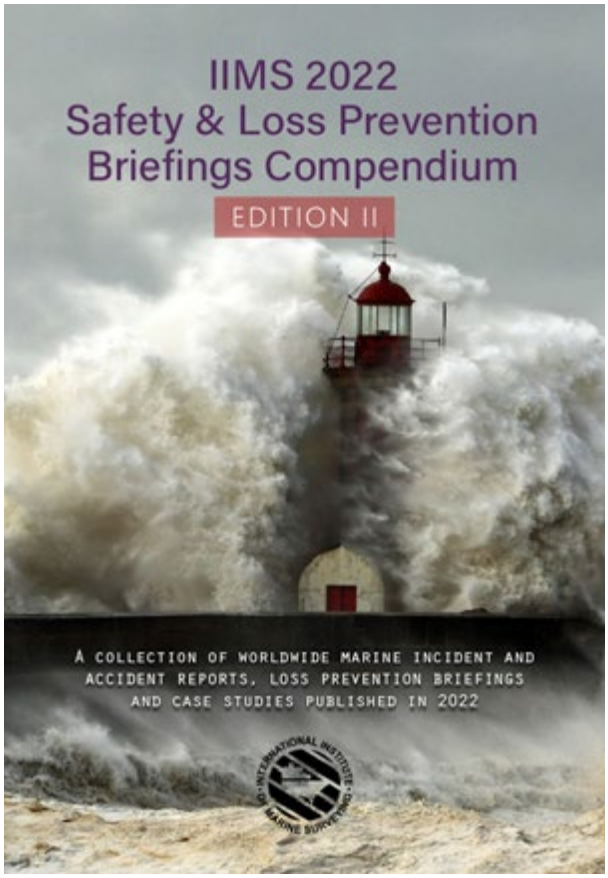
The annual CPD year deadline for 2022 is fast approaching

This is a gentle reminder to all IIMS members that the final deadline for claiming Continuing Professional Development (CPD) points for last year is 31 March 2023. You may make your final claims through the CPD App, accessible via the Institute's website.

Although IIMS does not make CPD mandatory, professionals from all walks of life are encouraged to maintain CPD and IIMS urges its members to think seriously about recording those activities that have helped them to learn new skills or brush up on old ones.

And for those who have obtained the necessary requirements (15 points) over the year, they will be rewarded by having the CPD logo displayed on their website and app profile pages. This is your opportunity to show the maritime world that you take CPD seriously.

The full list of activities that are accepted for CPD and the points awarded for each can be viewed at https://bit.ly/34tVp4j.



IIMS 2022 Safety & Loss Prevention Briefings Compendium published

Following the surprise runaway success of the first edition of the Safety & Loss Prevention Briefings Compendium, published in January 2022 by the International Institute of Marine Surveying (IIMS), and subsequently downloaded many thousands of times, Edition II was launched covering the period January to October 2022. It is still available to download and read in pdf or eReader formats.

Edition II builds on the success of the launch publication and extends to 160 pages. The simple aim is to highlight the dangers of working in the maritime industry, the ensuing accidents and some of the prevention measures available to mitigate disasters at sea. The publication blends a mix of incident and accident reports with essential loss prevention advice generated over the year. One significant new feature is a calendar, featuring some of the many accidents that have occurred during 2022, catalogued month by month.

Make sure if you have not done so already that you claim your free copy in pdf format. Click to download it at **https://bit.ly/3GpsbEr**. Or scan the QR code.

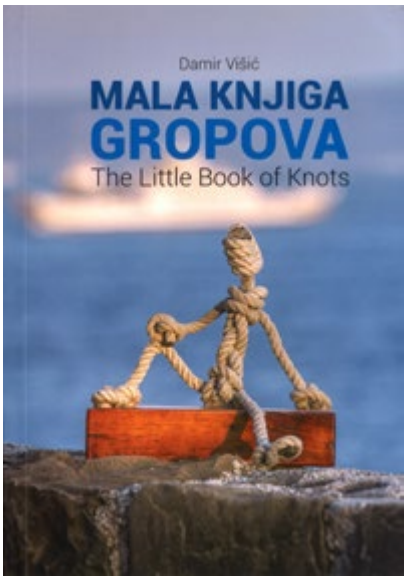
The Little Book of Knots

IIMS member based in Croatia, Damir Višić, has self-published a book entitled "***The Little Book of Knots***". The book extends to 108 pages and is in paperback format with a hardwearing front and back cover.

Damir has published the book in dual language format in both Croatian and English. So, the descriptions for the thirty-plus knots are displayed in both languages. There are helpful diagrams to show how each knot is put together with tying instructions as well as brief explanations about what each one is suitable for.

As Damir says in the introduction, "Tying knots was always one of the basic seaman's skills in times when everything onboard was controlled with ropes. Knots described in this book are those used, or suitable for usage on sailing yachts as well as on motorboats."

The Little Book of Knots is priced at 15.93 euros and is available directly from Damir, the publisher. Just email him for further details at **damir.visic@st.t-com.hr**.



Two dates for your diary:

Canada AGM

The 2023 AGM of the IIMS Canada Branch will take place on Saturday 1 April 2023 as an online only event. The AGM will be followed by several presentations for branch members. Watch for further details.

Palma

John Walker has organised the Western Mediterranean Small Craft Working Group for many years. And now the event is back again at its usual location in Palma on 26/27 April and John looks forward to welcoming local surveyors to the event in-person. Watch for more details.

Yacht & Small Craft Spring training hybrid seminar

IIMS has organised an essential one-day seminar for marine surveyors of small craft to be held on 30th March 2023 at PETA, a purpose-built meeting venue near Portsmouth, UK.

Delegates are invited to attend in-person, or online via Zoom. There is also an option to purchase the videos for later viewing.

The speaker line up with details of their presentations is as follows:

09.30 Update on IIMS activities and initiatives by Mike Schwarz, IIMS Chief Executive Officer.

10.00 Battling biofouling the technological mix by Darren Jones, Sonihull.
Darren will cover the regulatory and technological journey of recent years and where it is heading over the next decade. He will highlight the rapid change in approach and the mix of technologies that are going to be required to reduce the impact of biofouling.

11.00 Key considerations when surveying large yachts by Phil Duffy.

11.45 Minimum steel thickness for narrowboats by Peter Brookes.
Peter's presentation will include a look at design thicknesses, insurance requirements and an exploration of acceptable diminution.

12.45 Lunch break. A two-course lunch is offered for those attending in-person.

13.30 Recent changes to RCD, standards and UK regulations post-Brexit by Alasdair Reay, HPI Verification Services.

14.20 Karen Brain, Matrix Insurance Ltd – (topic to be confirmed).

15.30 Close

For more details and to reserve your place go to **https://bit.ly/3JgIrci**.

RECENT NEW IIMS MEMBERS

Full members

Francesco Amoruso	*MIIMS*	Italy
Quintin Antony Robin Lloyd	*MIIMS*	Hong Kong
James Newcombe	*MIIMS*	New Zealand
Luis Chavez	*MIIMS*	Panama
Ernesto Ylaya	*MIIMS*	USA

Associate members

Jason Caple	*AssocIIMS*	Canada

Affiliate members

Joshua Kuriakose	*AffilIIMS*	Canada
Matthew Willis	*AffilIIMS*	UK
Geoffrey Wright	*AffilIIMS*	Canada
Marius James Venter	*AffilIIMS*	South Africa

Technician members

Muhammad Saiful	*TechIIMS*	Indonesia

Graduate members

Radovan Skarica	*GradIIMS*	Croatia
Graham Lane	*GradIIMS*	UK
Oliver Roe	*GradIIMS*	UK

IIMS congratulates
Jon Spiller, Radovan Skarica, Graham Lane and Oliver Roe
for completing their studies in the
IIMS Professional Qualification in Yacht and Small Craft Marine Surveying

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From the Murky Bilge

Some say... that a team upon exiting were wearing each other's hats.
Some say... that "Maurice" came out slightly agitated - his name was Bob when he went in...

Some say... if you put your head down to the lowest point and listen very carefully, your ear will come up wet, and oily.
Some say... Once inside - you cannot turn left.

We only know it as the... "MURKY BILGE"!

Our thanks to KIM SLOV-NIELSEN MIIMS for this edition's contribution. From the photograph you will see the object of interest, which some of you may recognise as a "shackle". The more astute among you will perhaps even have sufficient experience to be able to suggest that it's most certainly not new.

Some say that this was FROM THE TITANIC'S BELL ROPE – but it wasn't.

The story goes that this particular shackle was found in the bilge of one of those delightful "round-the-bay" tourist party boats, with the music blaring over the megaphone at tremendous decibel levels and a free rum punch when you get onboard – you've seen them and know the type. The twin speakers were either side of the little wheel house, all approximately the same physical dimensions.

A few of you may even think that type of a trip round the bay sounds great fun, in which case this article's not for you!

Anyway, for those of you who would rather not go round the bay on the noisy "round the bay boat", the story continues. The captain of said vessel, after years in the job and by now quite severely hearing impaired, was doing his captaincy thing. He was dressed the part with 'Captain' on his hat, faded beer sponsored T shirt and big black sunglasses. He was driving the boat to and fro, occasionally turning the music up ever louder.

It is always quite impressive how far the deep bass notes travel across water. They could still be heard about halfway round the bay when at the point where normally they would drop the stern anchor to allow some swimming for the guests, the lone crewmember approached the little wheelhouse.

"Can't hear you!" shouted the captain cupping his hands behind his damaged ears. The crewmember's face turned blue and the veins stood out on his neck as he hesitated for a moment, hoping for a pause in the cacophony. Then, in a brief lull between Cliff Richard singing "Summer holiday" and "The conga", the crewmember made the captain understand there was a problem with the anchor. The problem was not immediately apparent as many of the passengers had moved as far as possible aft in an effort to put as much distance between themselves and the loud speakers. Indeed, some of the more susceptible had collapsed motionless to the deck at the stern with their heads buried in their arms. This disguised the problem which was in fact the anchor was gone. The rope was still there but someone had removed the shackle and thrown it into the bilge, one supposes to sabotage the trip, making it shorter, getting back on land and resting ears all round.

So, my questions to you are:

1. What was the name of the party boat?
2. What was the song immediately after "The conga".
3. We would like to believe that this party boat's shackle had reached the point of "maximum rust", while still managing somehow to hold its form - unless of course you know better!

Please send your answers, suggestions and/or observations by email to **murkybilge@gmail.com**.

The **opportunities** and **threats** presented by **report writing software**

By Geoff Waddington, HonFIIMS and IIMS Immediate Past President, Mike Schwarz, IIMS Chief Executive Officer with contributions from Craig Norton, President, InspectX

Photo by Bram Naus on Unsplash

IIMS and its Professional Assessment Committee remain concerned at the quality of reports that it sees, both in general terms, but in particular when assessing a candidate's suitability for an upgrade.

The emergence of new surveyors into the industry, coupled with their desire (along with more experienced practitioners) to utilise the latest report writing software is creating a concerning trend. In writing this article we want to remind surveyors no matter what method they use to prepare their surveys of the importance of accuracy and giving sufficient meaningful and detailed, factual information to the client. That is and always will be the role of a marine surveyor. To further illustrate this point, the authors have used some verbatim comments taken from legal teams who have been asked to comment and give opinions on surveyors' report in courts and for insurance companies when assessing claims and considering potential litigation. For obvious reasons, the sources of these comments are not revealed.

Let's first remind ourselves of the definition of a report. *"A report is a written document, produced for a clear purpose and to a particular audience. Specific information, facts and evidence are presented, analysed and applied. The information is presented in a clearly structured format making use of sections and headings so that the information is easy to locate and follow. When you are asked to write a report, you will have been given an instruction. The instruction should outline the purpose, audience and problem, or issue that your report must address."*

In achieving an acceptable and successful outcome, it does not matter if you hand write your reports or use report writing software, but the end result must match the requirements set out in the above description – sadly this is not always the case.

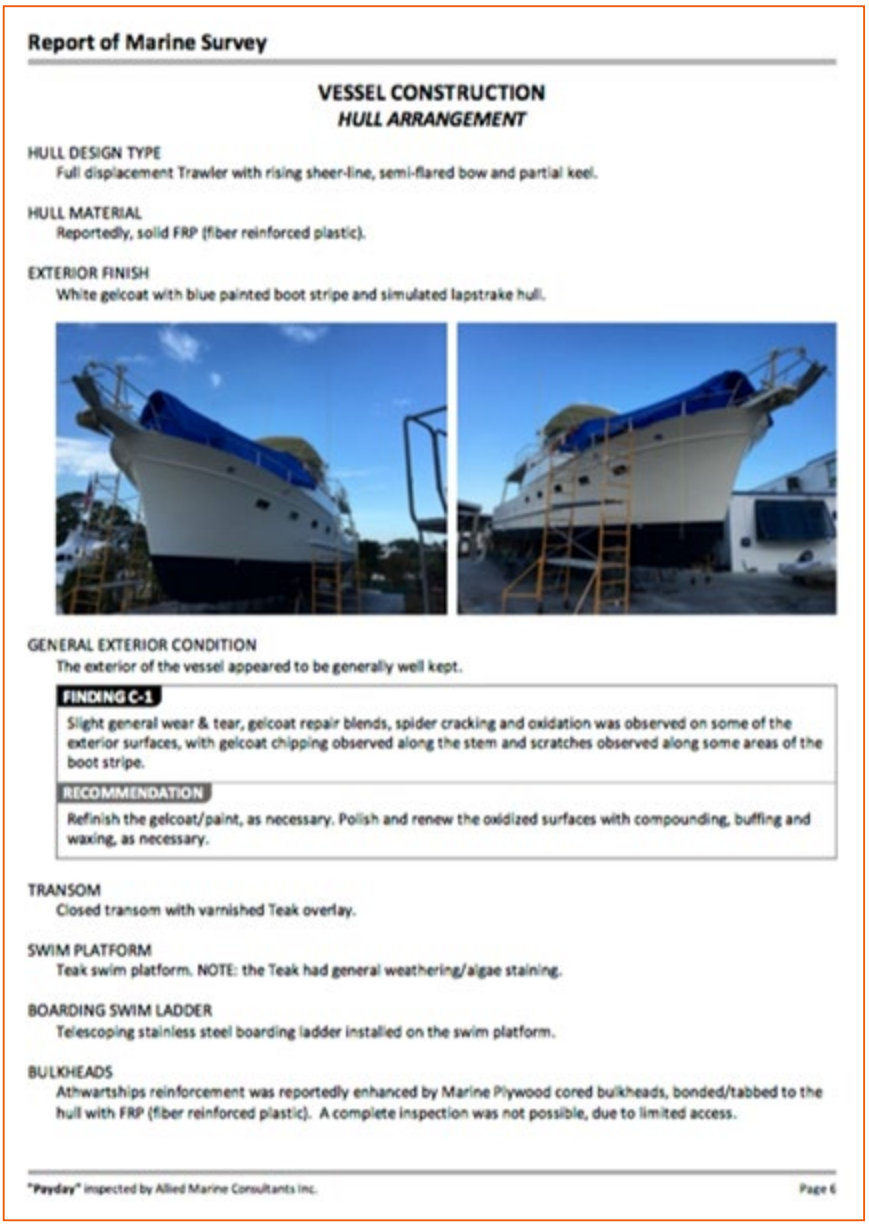
Craig Norton, InspectX, gives an overview of his surveying practices when using his InspectX report writing software and says, *"As for my typical survey process, I begin by opening a project in the program, which is similar to starting a new Word document. This is started in my office usually the week or weekend prior to the scheduled survey. Even when surveying a vessel type I am already familiar with, I still begin with basic research to verify the construction materials and build process, so that I can have as much insight as possible while onboard at the time of survey."*

He added, *"I am quite selective about what build information is included as I do not agree with copying/pasting a general layout description from the manufacturer as those are typically filled with objective statements (such as 'ample storage' or 'luxurious sofa') that I have no need of in my reports. I am also very selective about from where the information I choose to include in the report is sourced. Information direct from the builder is preferred, and any information from the sales listing is considered the least dependable and only included if no other references can be found."*
"Speaking of the listing, I will also pour over the listing line-by-line and preload relevant information into my tablet in the appropriate locations in readiness. This serves two purposes, firstly so that I can verify these listed items are in fact onboard as stated, but also so that it may help to speed up my entry on that heading after verification onboard."

Mike Schwarz continues the story, *"Let me be quite clear. The Institute has no issue with the concept of report writing software. It is a modern solution and over time will become the norm and one we support wholeheartedly."*

As Mike says, *"Some of the reports we have seen generated using report writing software have been top class, but others have left a lot to be desired – that means, poor quality reporting with minimal information given and the use of words that are inherently vague. If scrutinised in a court of law, they simply would not stand up, leaving the surveyor vulnerable. Therefore, I am left with the assumption that it is not the software that is at fault, rather the person inputting the data from the survey they have conducted. Indeed, it may well be a lack of understanding of the capabilities of the report writing software itself. Simply moving to and utilising a software package does not guarantee the generation of an excellent report."*

"Back in the day when creating databases, we always used to say rubbish in, rubbish out. In other words, the output is only as good as the input. The software is just the tool and mechanism to help you reach the required outcome."



Report of Marine Survey

VESSEL CONSTRUCTION
HULL ARRANGEMENT

HULL DESIGN TYPE
Full displacement Trawler with rising sheer-line, semi-flared bow and partial keel.

HULL MATERIAL
Reportedly, solid FRP (fiber reinforced plastic).

EXTERIOR FINISH
White gelcoat with blue painted boot stripe and simulated lapstrake hull.

GENERAL EXTERIOR CONDITION
The exterior of the vessel appeared to be generally well kept.

FINDING C-1
Slight general wear & tear, gelcoat repair blends, spider cracking and oxidation was observed on some of the exterior surfaces, with gelcoat chipping observed along the stem and scratches observed along some areas of the boot stripe.

RECOMMENDATION
Refinish the gelcoat/paint, as necessary. Polish and renew the oxidized surfaces with compounding, buffing and waxing, as necessary.

TRANSOM
Closed transom with varnished Teak overlay.

SWIM PLATFORM
Teak swim platform. NOTE: the Teak had general weathering/algae staining.

BOARDING SWIM LADDER
Telescoping stainless steel boarding ladder installed on the swim platform.

BULKHEADS
Athwartships reinforcement was reportedly enhanced by Marine Plywood cored bulkheads, bonded/tabbed to the hull with FRP (fiber reinforced plastic). A complete inspection was not possible, due to limited access.

A sample page using the InspectX software. The layout and formatting for the final draft can be adjusted within the settings pages to customize the report to the surveyor's preference.

Continuing, Mike said, "*The quarterly online report writing seminar for small craft surveyors that IIMS runs, for example, is quick to highlight certain words that are best avoided in a report because they are vague and cannot be substantiated which is inviting the client to interpret and deduce what they mean, especially if no further clarification is given by the surveyor. Words such as apparently, appeared to, ample and approximately – and that's just the As for starters – have no place in a report. Factual word clarity is essential.*"

For many surveyors, the thought of going onboard a vessel to survey with tablet in hand sounds very appealing and is the modern way, but the fundamental rules for the survey remain just as they have done for decades. In this respect, Craig Norton has some pertinent advice when he says, "*With that basic report prep, I step onboard every vessel very well prepared. I carry a tablet with me at all times and data entry into the tablet is pretty similar to handwritten notes, just typed directly on the tablet rather than taken with a notepad. Some common equipment and often used conditional phrases are easy to select in the program, while others require some modification for clarity just like they would if I were taking handwritten notes. Importantly, the software does not guide my survey process, but rather follows me on the survey and allows me to make direct entries as I go. Of course, I am always in need of certain reminders and the coloured buttons inside the InspectX software program serve as a great reminder of what equipment, or checks I still need to complete before I finish for the day.*"

Geoff Waddington picks up the baton and says, "*Having assessed many computer software generated reports over the past years it has become apparent that the popularity of these programs is on the increase. I do not intend to stand in the way of progress, and I am sure that these programs have their place within the marine surveying profession; however, as an Institute we would be failing our members if we did not consider the implications and potential pitfalls of using report writing software and alert people to our concerns so that they can be addressed.*"

Craig Norton adds, "*It is worth noting that while I complete most of my report entirely in the field, this is really only achieved after an extreme familiarity with the program and customization of the options I have at my fingertips. I encourage ALL my program users to complete a number of reports in the office before even attempting to carry a tablet into the field. There is enough to focus on the survey and the vessel alone, that a tablet/computer should only be introduced when navigating and typing on it can be done as second nature. Again, no shortcuts.*"

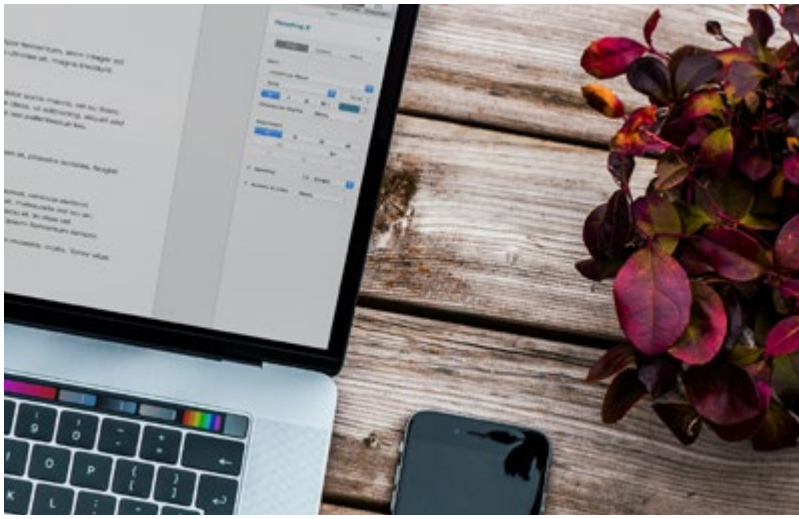
Geoff Waddington comments further, "*There may be an argument for simplified reports with regards to insurance, valuation and even damage surveys, but the use of report writing software for pre-purchase surveys needs more serious and deeper consideration.*"

"*There are a growing number of claims I see being made against surveyors with regards negligence and even claims for incompetence due to alleged oversights, or just plain lack of technical detail during the raising of survey reports. It is a fact that exclusions and limitations of survey can protect you from some, but not all, claims included in this sort of legal action.*"

The following is an extract from a letter of claim which reaffirms the aim of the surveyor's report and what it must achieve: "*A reasonably competent surveyor will identify any potential defects, within the limitations of the survey, and impart sufficient knowledge to the prospective purchaser in regard to the potential costs and the logistical problems which would be required if the vessel was purchased*".

Geoff Waddington continues, "*That sums it up perfectly. When making a claim your wise and boat knowledgeable client, who may have been friendly and understanding at the time of survey, will suddenly become completely and extremely un-knowledgeable, un-friendly and devoid of any understanding as far as the implications of undertaking the purchase of the vessel concerned and will claim that he/she was totally reliant on your advice.*"

A claim may be generated by advice from an experienced and knowledgeable friend, often with 2020 hindsight, most likely from a qualified engineer or repairer who is making sure that he achieves the most lucrative repair contract, or it could be the surveyor who inspects the vessel on behalf of the next purchaser. When ensuring that they are placing themselves in the best position any of these could then place blame upon the owner's surveyor having failed to discover or



advise on issues which then result in a claim perhaps even several years after the surveyor's original inspection and survey. The following is another extract to this effect: *"This is something that a diligent surveyor should have advised about, so that the prospective purchaser could take a view as to whether this potential repair was something they would be willing to accept"*.

Just to emphasise the point further, here are some verbatim comments and opinions from lawyers and legal teams:

- This is another problem, upon which a reasonably competent surveyor should have reported.
- A reasonably competent surveyor would have advised that a considerable amount of rectification work would be required to remedy this problem.
- By not identifying and explaining this problem, the surveyor denied our client the opportunity to consider the work required, together with the costs which should have been identified.
- There was no reason why a reasonably competent surveyor should have missed this.
- A diligent surveyor should have considered this.
- A competent surveyor should have advised that it was not possible to determine the full extent of the problem.
- Another point which should have been considered is the likely poor condition of structure even where it could not be seen.
- A diligent and competent surveyor should have questioned how this could be repaired.
- No consideration or advice was given as to the practical aspects of any repair process.
- It was a significant omission for the surveyor not to comment on this.
- A competent surveyor would have considered the available information and properly assessed the visible condition of a vessel of this age.

A difficult situation is the content of any pre-survey communications between surveyor and client, which should be limited to contractual issues and avoid pre-empting the survey or giving the surveyor's opinion on the likely condition of the vessel. However, if you are engaged to conduct the survey to reflect the client's wishes to, for example, sail round the world single handed in the vessel concerned, the surveyor could be accused of a lack of duty of care if he/she fails to advise the client on the suitability of the vessel for such purpose, which could generate the following challenge: *"Putting to sea without this knowledge would be an unacceptable risk of which our client should have been advised"*.

Even when the vessel is finally inspected and the surveyor has doubts with regards its suitability for a given purpose, he/she needs to be careful to give the most informed advice. If not, this could generate the following legal argument: *"Negligently and in breach of contract, the surveyor made a number of omissions and gave negligent advice"*.

It is not good practice to discuss the findings of a survey at the time of inspection and should be avoided always; equally another outcome the surveyor does not want to have to defend is: *"The short comments provided by the surveyor in his email were insufficient and did not reflect the true extent of the problem. There was insufficient discussion, within the email or the survey report, in regard to this issue"*.

The following extract is an excellent example of the legal opinion with respect to a pre-purchase survey: *"One of the primary purposes of any pre-purchase condition survey is for the surveyor to provide the prospective purchaser with sufficient information to enable a reasonably accurate assessment of the likely financial implications of taking ownership of that vessel. This will include establishing and advising upon the condition of the vessel and the likely extent and cost of any repairs that are needed to put the vessel into a condition which was assumed when the offer to purchase was made"*.

We would argue that placing a figure regarding the costs for the rectification of defects found during survey is above and beyond what is required by a surveyor. It could potentially place the surveyor in a difficult position and in danger of a claim should his/her estimate fall well short of the eventual actual costs of any such repairs, meaning they could become liable for the difference. However, the next statement may be more correct: *"A survey report which identifies defects but does not discuss the scope of rectification work of such defects falls short of what would be expected of a reasonably competent surveyor"*.

Even when costs are not assessed by the surveyor, he/she could still fall foul: *"A competent surveyor would/should have ensured that our client was fully aware of any work/ defects that would have significant financial implications"*.

With all this in mind, the surveyor finally sets forth and conducts the survey and produces his/her report. No matter what format the report has been prepared using, the surveyor must ensure that the report is proof read by another person, or by using proofreading software aids such as Grammarly, or even read back to you using a program such as Natural Readers **https://www.naturalreaders.com/** for accuracy, literacy and to ensure it makes sense. Spell checkers are also a valuable tool but by no means fool proof; and finally, you could produce a water marked DRAFT report unsigned and un-dated. This could be submitted to get the client's reaction and give them the opportunity to raise any questions and corrections prior to the submission of the final completed report.

This action should minimise the generation of this type of comment: *"The report was to a poor standard and failed to comment on significant aspects of the vessel's structure and contained numerous generic comments some of which appeared to have been carried over from a previous survey report regarding a different vessel. The report also made various statements that were factually incorrect and more importantly confused rather than assisted the purchaser"*.

Below is an example of a simplified report writing software template which gives the surveyor the option to insert his/her own information. From what IIMS has seen in some instances, a single word is used to describe an aspect of the vessel and that's it. There is a complete lack of content and information and no further comment offered.

OUTER BOTTOM

CONDITION	*GOOD*	*ADEQUATE*	*POOR*	*DEFECTIVE*	*NOT SEEN*	*UNKNOWN*
DESCRIPTION						
URGENT RECOMMENDATION *RECOMMENDATION* *SUGGESTION* *NOTE* *OBSERVATION*						

So, coming back to the potential pitfalls, if the surveyor uses a software template such as this and ticks the box that says adequate for the outer bottom with no further description given, this is insufficient reporting. Being a vague word, if 'adequate' is chosen it is recommended to back it up with some further descriptive text to inform the client of what state the outer bottom was actually in.

Report writing software can be an invaluable aid in assisting the surveyor to deliver a quality product, but it is not, and should never be seen as a quick fix that replaces the detailed work required by the surveyor to deliver a meaningful report to his/her client. Remember, the output is only as good as the information and detail that is put in at the front end by the user.

To conclude with a final example, IIMS has recently seen a software generated report that simply says *"paint work – poor"* with no further information or detail provided. What exactly is the potential purchaser of the vessel supposed to make of that statement? Further descriptive text is necessary, for example, *"The paintwork was poor with multiple surface cracks, scratches and abrasions visible and had a diminished gloss finish"*.

About InspectX

InspectX is a software platform designed for marine surveyors the world over that helps them to save time, improve their reports and increase their business productivity. By incorporating an intuitive method of touch navigation to enter information, experienced users can complete a professional report while in the field during a survey.

Website: https://inspectxpro.com/

Contact Craig Norton:
Email: info@inspectxpro.com

Firefighting at Sea

Towards a Safe Ship Concept

*By **John Gow**, Technical Director Marine, Jensen Hughes*

The most important of all international maritime safety conventions is the International Convention for the Safety of Life at Sea (SOLAS). The first version was adopted at a conference in London in 1914. The catalyst for this conference was the sinking of the Titanic on her first voyage in April 1912, which cost the lives of more than 1,500 passengers. This was the beginning of the journey that put in place a regulatory framework to protect those who work and travel by sea.

Whilst the sinking of the Titanic was not fire-related, the convention introduced new international requirements dealing with, among other things, the provision of fire-resistant bulkheads, fire prevention devices and firefighting appliances on passenger ships. The convention came into force in July 1915, some three years after the loss of the Titanic.

In 1948, the convention expanded to include the maintenance of essential services in emergencies, structural fire protection - including the introduction of alternative methods of subdivision by means of structural fire protection - and the enclosure of main stairways. It was at this time that an International Safety Equipment Certificate was introduced for cargo ships over 500 gross tons.

It wasn't until the introduction of the 1960 SOLAS Convention that many safety measures applying only to passenger ships were extended to cargo ships, including those dealing with emergency power, lighting and fire protection. Regulations dealing with construction and fire protection were also revised. Following the 1960 SOLAS conference, an agreement was reached to implement a unified international code dealing with the carriage of dangerous goods. The Maritime Dangerous Goods Code came into force five years later.

The SOLAS convention continues to develop. Chapter IX: Management for the Safe Operation of Ships, a new chapter to the convention, was added in May 1994, and the International Code for Fire Safety Systems (FSS) was adopted in December 2000.

It is clear that progress is often slow and change usually follows a disaster. It would be fair to say that a more risk-based approach has been adopted on land. A building's performance and the principles of fire compartmentation, protection and response are considered at the design stage, with fire modelling used to evaluate and inform design approaches.

This brings me back to the title of this article, "Firefighting at Sea – Towards a Safe Ship Concept." What does this mean? Whilst this is a concept that should apply to all vessels, the focus of this article is cargo ships. Cargo carrying capacity is increasing, as is the size of the vessel. Combined with smaller crew sizes, there is no doubt that the potential for more shipping

disasters exists. Therefore, the intent of this article is to consider some of the key elements of a Safe Ship Concept. This includes:

- Regulatory framework
- Ship design
- Fire protection
- Safe carriage of cargo
- Crew competence

Regulatory Framework

Relevant regulation is set out in Chapter II-2 of the International Convention, SOLAS (Part A, Regulation 2), which sets out the (1) fire safety objectives and (2) applicable functional requirements. It is clear from this regulation that the principles of prevention, detection, compartmentation and life safety are all included. And so the question arises, is it the regulatory framework that is lacking or does the problem lie elsewhere? The regulatory framework must continue to evolve and be ready for the risks of tomorrow.

Ship Design

Fire safety objectives shall be achieved by ensuring compliance with prescriptive requirements. Given the concern now being expressed by insurers and others regarding the alarming number of containership fires, it would appear that these fire safety objectives are not being met. Therefore, the problem, at least in part, may lie with ship design.

In any emergency situation, especially a fire or explosion, the ship must continue to function. The heart (engine room) and the mind (command bridge) of the vessel must be protected to ensure continuous safe operation for as long as is foreseeably possible. Whilst the engine room is fairly well-protected with automatic fire detection and protection measures, the challenge is maintaining essential air supplies to sustain propulsion and power to vital equipment. Dangerous goods, declared or not, should not be stored in proximity to these two areas as they pose the greatest risk to the ship's safety. The guidance, on risk based stowage, produced by CINS in 2019, provides good advice on this topic .

A ship's hold can be compared to a high-bay warehouse with the added disadvantage of cargo stuffed in separate compartments (containers). As such, the early stages of a fire may not be detected due to the lack of buoyant fire gases. Once established, the fire can spread forward and aft with little in the way of structural containment to retard the flow of heat, flame and smoke.

Moreover, as ships grow in size, so does the stowage space. More rows and higher tiers equal more combustibles. Movement on deck takes longer, increasing deployment time and the physical effort required to attack a growing fire. Any delay in controlling the developing fire will expose an increased fuel load below and above deck.

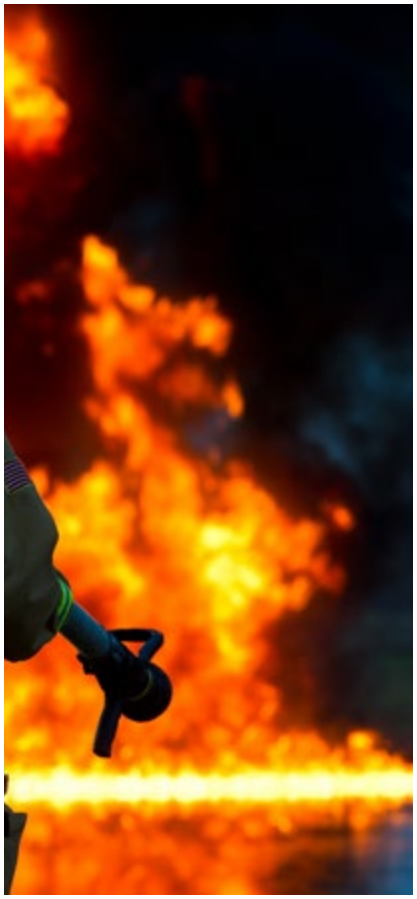
Fire Protection

Passive Fire Protection. Passive fire protection measures are integral structural components designed to contain the spread of fire, heat and smoke, providing more time for a fire response and safe evacuation of occupants. At sea, the crew will not evacuate the ship, except in the most serious of circumstances. They are also the only fire brigade available to attend to the fire. Consequently, passive measures must be designed in a way that slows the spread of fire, heat and smoke, allowing for a timely deployment of firefighting resources.

Passive fire protection can include, among other things, structural bulkheads or automatic curtains that drop when alarms sound or heat is detected (examples of which can be seen in any modern shopping centre). Assessing the risk at the design stage should inform what passive measures are appropriate. Solutions must be practical and effective as well as proportionate in cost.

Active Fire Protection. Active fire protection measures require an action to detect, alert, stop or contain a fire. This action can be either automatic or manual. A common misconception is that active measures, such as sprinklers, are designed to extinguish a fire. Whilst sprinklers can often extinguish a small fire, they are actually a mechanism to slow fire spread and give time for an emergency response to be deployed.

Although most spaces have some degree of fire detection or protection, the major gap in this



provision is on deck. The absence of active fire protection increases the risk of a fire growing beyond its incipient stages before either smoke or flame is discovered. Larger fires ultimately require greater resource requirements to bring the fire under control. The earlier a fire is detected the better.

The accommodation block and the command bridge are particularly vulnerable to external fire attack. A measure often adopted for buildings is the installation of external water drenchers to create a water curtain, which flows down the outside of the structure. Windows and doors may need additional protection to direct water over the opening.

The absence of any detection or protection on deck all too often results in a fire developing beyond incipient stages before it is discovered. Installing sensors, such as infra-red cameras, and remote-operated water monitors - in combination with water curtain or drenchers on lashing bridges - could provide separation between stacks, retard spread and provide remote means for attacking the fire whilst crew resources are put in place.

Fire detection in ships holds relies on technology designed in 1918 for open cargo holds. However, cargo is now carried in many containers, which are stacked in a hold similar in size and volume to a large warehouse. Fire in its incipient stages may produce smoke that has to vent from a container into a space where the ambient temperature is still relatively low and the smoke plume less buoyant.

The smoke must be drawn into the smoke detection system before travelling a considerable distance to the actual smoke detector which is often located within the CO2 room. The issue here is the considerable lag time between fire initiation and detection, during which fire growth continues.

The principal method of attacking a fire within a ships hold is the release of specified quantities of CO2. Holds are not hermetically sealed, and CO2 requires prompt release and frequent top up, according to manufacturer's instructions. CO2 has limited cooling effect and boundary cooling needs to be employed.

Whilst CO2 is an effective extinguishing medium, alternative means should be explored, such as high-pressure water mist which has high latent heat capacity and can displace oxygen. Research may be needed to ascertain the capability of this method of fire control and the possible advantages compared to sprinklers, drenchers, or flooding.

Safe Carriage of Cargo

The biggest risk to crew and ship safety is the carriage of mis-declared cargo. Some shippers have already implemented measures that may, in time, make the carriage of cargo safer. However, these initiatives must be industry wide.

As the culprits who put safety at risk melt into the night, the industry should look at the benefits of trusted trader schemes with those not participating, subject to greater scrutiny. Additionally, since technology already offers the ability to track individual containers, it may be time to explore methods for integrating temperature monitoring into tracking or other devices to assist the early detection of fire.

Crew Competence

Seafarers are facing ever increasing challenges, too many to discuss in this article. The prospect of new propulsion methods and the risks associated with lithium-ion batteries, electrical vehicles, and undeclared dangerous goods bring new challenges to their working lives. It is clear that the training syllabus needs to change to prepare them for future risk.

Conclusion

Although much is being done to tackle the problem of fires on board cargo ships, there is still much to do. The industry now appears to be of one voice demanding change. Whilst I have offered some insight and possibly some solutions, others will have a contribution to make. However, I have no doubt that a safe ship concept encompassing a holistic approach is central to any long-term solution building upon the standards needed to meet challenges in the shipping world of today and tomorrow.

ABOUT THE AUTHOR

John Gow started his working life in the military before joining Strathclyde Fire and Rescue Service where he served as an operational firefighter and incident commander. During his 31 year career he delivered training to seafarers on the Standards of Training, Certification and Watchkeeping (STCW) basic and advanced fire fighting courses and taught operational firefighters on the wearing of breathing apparatus, search procedures and incident command and firefighting. He spent his last 13 years of service as a specialist fire investigator before moving to the private sector with IFIC Forensics, now Jensen Hughes. As Technical Director for Marine at Jensen Hughes, he was invited to participate as a member of the expert group on container ship fires convened by the International Union of Marine Insurance (IUMI).

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Minimum Steel Thicknesses for Narrowboats

A discussion paper

by Tom Keeling MIMarEST and Peter Brookes CEng, MIET, AffIIIMS

Tom Keeling and Peter Brookes are inland waterways-based marine surveyors. Both have run independent consultancy businesses in this sector for many years, specialising in the survey of steel hull boats.

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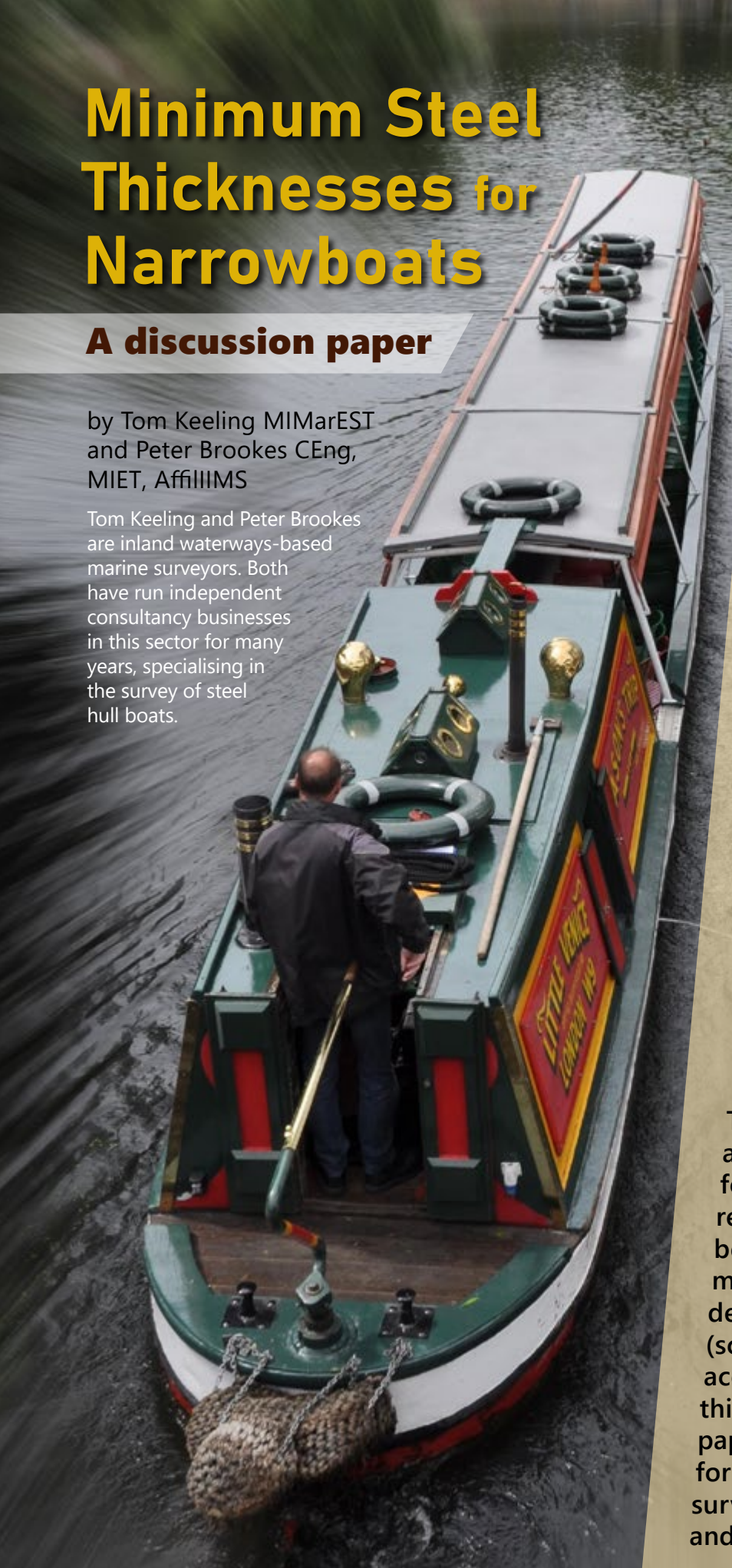


Marine surveyors and boat owners are regularly heard to say there is a minimum 4.0mm of hull thickness required at time of survey of a steel narrowboat. Some brokers even publish videos of such information, with some surveyors enforcing it (Whilton Marina, 2012 and 2016). Boaters are subject to it and repair often follows. In a recent article, Geoff Waddington (2021) explains there is confusion in the industry about wastage limits, and consequently acceptable residual hull plate thicknesses, and opinions among surveyors 'vary wildly', with some quoting 3mm acceptable minimum plate thickness, others using percentage loss.

This short paper explores what a standardised acceptable limit for diminution, and therefore residual plate thickness, could be. It describes a variety of methods of calculating the design plate thicknesses (scantlings) and the minimum acceptable residual plate thickness. In doing so, this paper aims to serve as a guide for inland waterways marine surveyors, boat owners, repairers, and insurers alike.

Design thicknesses

The origin of minimum design thickness was researched. Prior to the 1990s, which saw the advent of the well-known 10/6/4 specification (where 10mm is the base plate, 6mm the hull side plate, and 4mm the superstructure), narrowboats were built of varied steel thicknesses. It is not uncommon to find all-steel narrowboats from the 1960s onwards of 6/5/3 (or imperial equivalents), 6/6/4, 8/5/3 8/6/4 etc. Some 80s boats started to have thicker plating such as ½" base plates (e.g., Les Allen). Springer of course successfully built many boats of all-over 3mm. The convention now is 10/6/4, with some builders using 15mm for base plates (e.g., Amber, Hudson).

This increase in design thickness is significant, and the absence of evidence of boats built to the lighter (thinner) specification breaking up through lack of strength suggests narrowboat hulls with this increased design thickness are over-engineered. A thicker base plate might be favoured because these often-unpainted plates have a greater tolerance to corrosion loss. A reduction in ballast requirements is also often mentioned as a reason for thicker base plates. As the industry grew into the 2000s, 10/6/4 became the minimum standard and 6mm bottomed narrowboats built post 1995 are seldom seen.

There does not seem to be a design reason for thick base plates based on structural necessity. The Canal Boatbuilders Association (CBA) (1999) published the below chart of design steel thicknesses for conventionally shaped narrowboats and so-called widebeam narrowboats.

Taking a 50' all-steel narrowboat as an example, the CBA chart shows design thicknesses of approximately 3.6mm for hull side plating and 4.1mm for base plating. For a 30' long narrowboat 3mm is adequate from CBA calculations; Springer Engineering using this to good effect in the 1980s.

Taking a 50' all-steel narrowboat as an example, the CBA chart shows design thicknesses as follows: -

Length x breadth in metres gives figure to look up on graph to ascertain required section modulus of framing, to be multiplied by 1.3.

Bottom shell plating and side shell plating obtained from graph by looking up length in metres.

L x B = 15.24m x 2.08m =	*31.7m²*
Section modulus (from graph) =	*24.5cm³. Multiply by 1.3 = 31.85*
Bottom shell plating (from graph) =	***4.7mm**. Round up to 5.0mm*
Sideshell and deck plating (from graph) =	***4.15mm**. Round up to 5.0mm*
Transverse Frames	*60mm x 60mm x 6mm angle bar @ 750mm centres*
Longitudinals	*60mm x 40mm x 5mm angle bar @ 2 per panel*

Figure 1 - CBA scantlings specification, 50' narrowboat, 1999

75. **GRAPH OF SHELL PLATING, TRANSVERSE AND LONGITUDINAL FRAME SECTION MODULUS AGAINST BOAT LENGTH AND FORM FACTORS.**

WB = wide beam; NB = narrow beam;
PW = panel width; Z = section modulus in cm³;

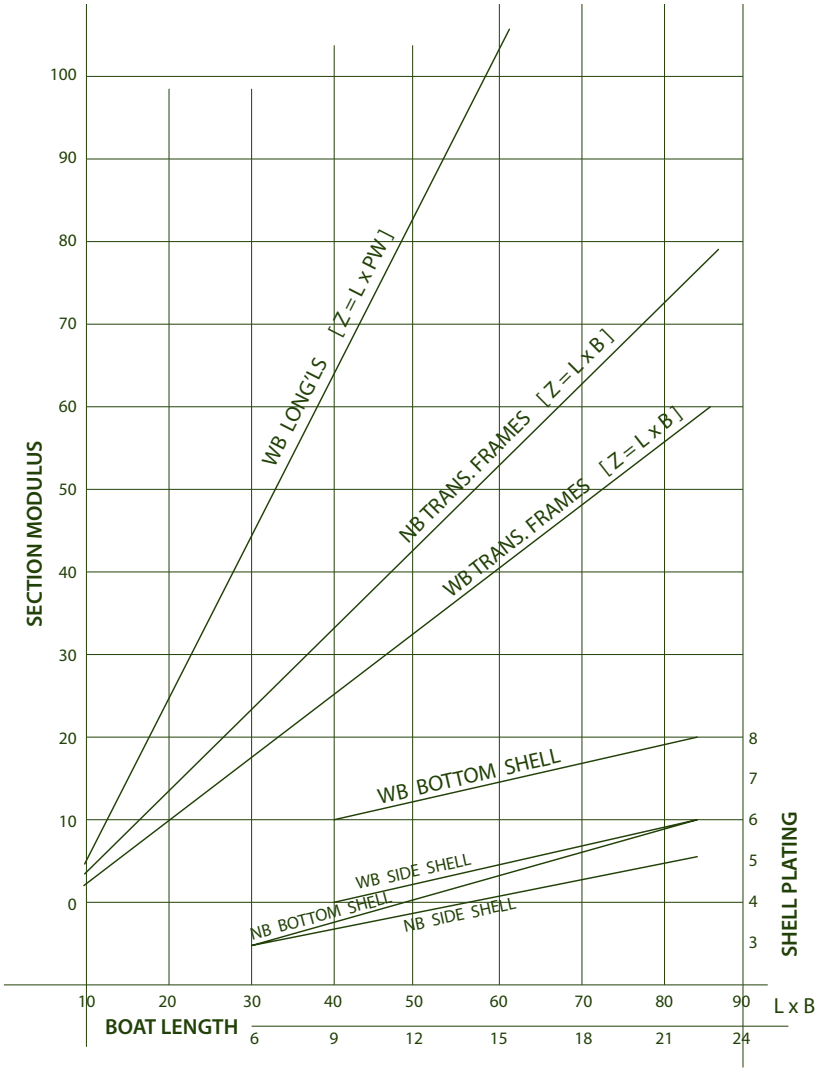


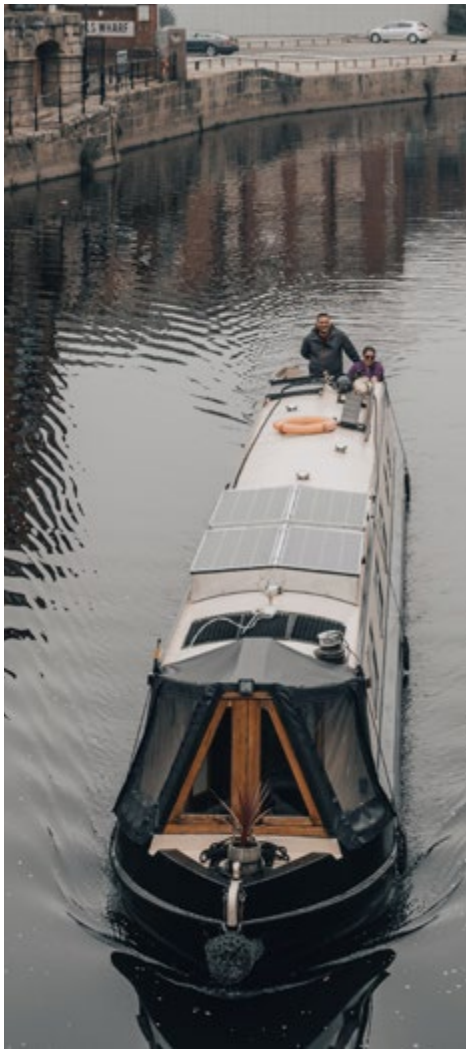
Figure 2 - CBA scantlings specification, 1999

The CBA round up and the 50' narrowboat ends up being 5mm base and 5mm hull sides. For 30', 3mm is adequate; Springer Engineering using this to good effect in the 1980s. In fact, the CBA state at clause 67, that 3.0mm is the effective minimum thickness for bottom shell, side shell and deck plating; this appears to be irrespective of length or beam.

The thicknesses the CBA graph recommends has of course been tested over the last 50 years and fortunately we do not see narrowboat structures failing due to a lack of design thickness. There are plenty of plating failures as a result of lack of maintenance and erosion, but it follows that a well-maintained 3mm Springer is an adequately designed vessel (and should therefore also be insurable).

The CBA does not reference its data, but it is not arbitrary and somewhere down the line calculations were made to enable them as a trade association to recommend scantlings of a certain size to their members.

Dave Gerr (2000) in his book *The Elements of Boat Strength* provides various formulae aimed at enabling builders, designers, and owners to calculate required scantlings. Taking the 50' narrowboat example, once the scantling number is calculated as Gerr instructs, the alongside formulae provide design thickness.



Dimensions in m	
Length (L)	15.24 (50')
Beam (B)	2.08 (6' 10")
Hull depth (D)	1.3 (51")
ST = (L x B x D)	41.20896
Divisor	28.32
Scantling No (sn) (ST/28.32)	1.45511864
Multiplier	3.05
Sn	1.45511864
power of 0.25	1.09830915
SHELL PLATE THICKNESS in mm (3.05 x 1.09830915)	**3.35**
(Added thickness if required)	0
BASE PLATE THICKNESS in mm	**3.35**
SUPERSTRUCTURE	
Multiplier	2.79
Sn	1.45511864
power of 0.23	1.09010074
SUPERSTRUCTURE THICKNESS (2.79 x 1.09010074) in mm	**3.04**

Figure 3 –
Dave Gerr's scantling formulae

He further specifies that the figures generated are over-specified, directing the designer to use the next available thinner plate. In the case of our 50' narrowboat, the designer would take the 3.35mm figure for the base and chooses 3.0mm plating.

The CBA and Gerr both arrive at thinner plating than the current 10/6/4 convention directs. Both state that 3mm is the minimum effective thickness for the smallest vessels. However, whereas Gerr is focussed on efficiency of design, the CBA are factoring in the inland waterways' environment. Furthermore, Gerr's calculation for the 50' boat, with typical transverse framing as common on narrowboats, relies on frame centres of 275mm, CBA 750mm. It is worth noting that the heavily built narrowboats of the 1990s were often built 10/6/4 and 600mm frame centres, but that recently 1200mm centres have been observed.

Considering contemporary industry-specific guidance, British Marine (2022) in their Inland *Boatbuilding Code of Practice* detail a scantling assessment to be completed as follows:

The hull and superstructure for each craft, or model of craft, should be demonstrated to be strong enough for the purpose intended. This can be by showing that the scantlings (i.e., combination of framing and hull plating) used either meet a recognised standard or have a proven service history.

To show that the scantlings meet a standard, this may be undertaken in one of three ways:

a) Manual calculation. The manual calculations are available within the ISO standards referenced.

b) Use of a computer program. Either to the ISO standards or alternatively accepted standards such as Lloyds Special Service Craft

c) Service history on Category D boats – then Post Construction Assessment on:

- *Historic boats*
- *Existing designs*

Using c) must be supported by documented evidence of in-use vessels.

Figure 4 – Extract from British Marine Boatbuilding CoP

Historically narrowboat builders have used customs and practice or followed guidance from trade groups like CBA, using the proven service history route. The ISO standard referred to in the British Marine extract is ISO 12215:2017. Using this, the design thicknesses required for a 50' narrowboat were as follows:

ISO 12215:2017 – 50' narrowboat calculations

For calculating the side plate thickness of a 50' long steel narrowboat

$t = b.f_k.$ *square root* $((P.k_2)/ 1000.s_d))$

$t =$ *600 x 1 x square root ((0.0356 x 0.493)/(1000 x 0.6))*

$t =$ ***3.245mm***

where :-

t = *required plate thickness in mm*

b = *short dimension of the panel*

f_k = *correction factor for curvature (1 in this case) from ISO 12215-5 Table 7*

P *is the design pressure of the panel in kN/m²*

k_2 *is the aspect ratio coefficient from ISO 12215-5 Table 6*

s_d *is the design stress*

For the bottom plate of a 50' long narrowboat with no longitudinal centre stringer

$t = b.f_k.$ *square root* $((P.k_2)/ 1000.s_d))$

$t =$ *600 x 1 x square root ((0.0712 x 0.5)/(1000 x 0.6))*

$t =$ ***4.62mm***

Note:- With a longitudinal stringer along the centreline of the bottom plate this calculation gives ***4.52mm*** *for the bottom plate.*

Figure 5 – ISO 12215:2017 scantling calculations

The above calculations are based upon the internal transverse and vertical framing placed at 600mm intervals.

NB: When considering dutch barges the calculations become more complicated, and even with the light framing that is generally utilised for a welded steel plate hull we can arrive at a scantling requirement of 3mm thick steel plate. Riveted wrought iron plated dutch barges may well result in a different scantling figure due to the different yield strength of the wrought iron, but it is unlikely to be significantly different.

Summary of 50' narrowboat plating requirements, transverse framing

Table 1 – Summary of thicknesses

Source	Hull sides (mm)	Base Plate (mm)	Frame centres (mm)
Dave Gerr	3.35	3.35	275
CBA	4.15	4.7	750
ISO 12215	3.3	4.62	600

A limitation that should be noted, and has been well documented, is that for a surveyor looking at a narrowboat, the framing is usually not accessible.

It should be further noted that hot rolled steel plate can have a significant +/- tolerance from the nominal thickness as supplied by the rolling mill. For instance, 6mm steel plate produced to EN 10029 can have one of four tolerance classes, with tolerance class D permitting the thickness to range from nominal 6mm +/- 0.75mm, so it is possible, though unusual, that a hull constructed from nominal 6mm steel may give an ultrasonic thickness reading of 5.25mm. In this case, it should not be presumed that there is 0.75mm of wastage to the hull

as the plating thickness may be as originally constructed. Likewise, some plates may have a taper to them. Due to the overdesign plate thickness of narrowboats, it would not be unusual for narrowboat builders to purchase steel plate from the rolling mill that is not "prime" and thus achieve some cost saving.

An extract from EN 10029 is included at Appendix A.

Insurance requirements

Given the general success of all the varied narrowboat structures, it is curious how some insurers and brokers have arrived at the 'minimum 4mm' rule. In the last couple of years, some narrowboat owners have been sent renewal documents, subject to survey, where the minimum hull thickness found must be 4mm. Insurers have differing requirements and this lack of harmonisation further complicates the matter.

In private emails, major UK inland waterways insurers were asked for their minimum thicknesses:

Table 2 – Insurer's minimum thickness comments

Insurer	Comment
A	No minimum thicknesses as such but would expect minimum of 4mm for base plates
B	Minimum of 4mm to all hull plating. 3mm Springers required to be overplated to gain insurance
C	No minimum thicknesses, would expect to see minimum 3mm, but relies on expertise and judgement of surveyor. 3mm Springers acceptable, but the report findings are subject to greater scrutiny
D	Stipulates minimum 4mm in renewal documents (but doesn't clarify why)

Insurers A and C seem on balance to reflect historic understandings, insurer B has taken exception to Springers despite the proven scantlings and presents a problem for 5mm sided vessels with pitting, and D has a simple catch-all strict approach.

The lack of harmonisation seems to penalise boat owners, as it is not obvious to them what their insurer wants. Furthermore, knowing how this compares to what their boat actually measures – bear in mind it might be 10 years old, CE marked, 5mm with 1.1mm pitting and in breach of insurance requirements – is difficult to ascertain and almost an apparently arbitrary and unknown condition of cover. With the trend in the sector towards a domestic dwelling setting over a leisure one (CRT in 2021 report the proportion of liveaboard boaters has risen from 15% in 2011 to 27% in 2020), industry professionals need to be mindful that they are dealing with people's homes, security, and possibly everything they own in the world.

Considering acceptable diminution

In recent cases, inland waterways marine surveyors have been challenged legally for not mandating repairs where wastage has been found above 20% of original plating thickness, and the origins and sense of this were considered.

Taking the all-steel 50' narrowboat with 6mm sides and 10mm base, 20% wastage allowance would mean any thickness loss or pitting in excess of 1.2mm on the sides and 2mm on the base would have to be repaired immediately. During research for this paper, reports were heard where a surveyor has "failed" a narrowboat base plating due to 30% diminution due to pitting. The plating was 15mm, with 5mm pitting.

Taking this approach across the board - and given that most narrowboats subject to rudimentary blacking maintenance have active pitting - would mean most narrowboats would require welding repairs at every docking. Furthermore, given access to base plating is generally poor at docking facilities, it is virtually impossible to clean, inspect and repair all pitting accurately.

The lack of maintenance is one plausible reason that boatbuilders have over-specified plating thicknesses; as a corrosion buffer or allowance. If it can be proven that a 50' narrowboat needs a design thickness of 3mm, then the 20% wastage allowance seems completely arbitrary without considering it in context.

The 20% wastage allowance figure is quoted in a variety of places concerning commercial shipping.

MSIS 27.2 / R08.22 – MCA Instructions for the Guidance of Surveyors on Construction, Watertight and Weathertight Integrity Chapter 2 has a table at 2.7.5. For vessels of length less than 100m built to one of the MCA recognised classification society rules, the following corrosion limits should be complied with:

Plating – Bottom and Top-sides – Within L/2 midships 15%

Plating – Bottom and Topsides – Elsewhere 30%

At 2.7.7 MSIS 27.2 it states:

In general, hull plate areas below 3mm in thickness should be renewed

Classification Societies concerned with the design and maintenance of commercial shipping also reference wastage of 20% and 25% (DNV, 2020). Lloyd's Register (2022) in their *Rules and Regulations for the Classification of Inland Waterways Ships*, which applies to ships operating in Zone 3 (where the maximum significant wave height based on long-term significant wave height statistics, excluding the highest five per cent of the observed waves, does not exceed 0.5m), refers to allowable limits of corrosion, defining substantial corrosion as

wastage of individual plates and stiffeners in excess of 75 per cent of allowable margins, but within acceptable limits.

Furthermore, they state:

Additionally, when a survey results in the identification of structural defects or corrosion, either of which, in the opinion of the Surveyor, will impair the ship's fitness for continued service,

remedial measures are to be implemented before the ship continues in service

This last statement reflects the position that the inland waterways marine surveyor finds themselves in daily, except that deteriorating vessel condition and paucity of repair services often make remedial measures difficult to achieve.

Further to that, these Class Society rules quoted are designed to be applied to ships, which are subject to a different environment to narrowboats, and furthermore the rules are designed to be applied to ships from design right through their life. It therefore seems unfair to apply them retrospectively to narrowboats.

There might be some validity in applying the 25% wastage rule, but only if this is proportionate and just. Clearly, with our 50', 10mm bottomed narrowboat, mandating repair when a single pit on the base plate reaches 2.1mm seems hasty, given that 7.9mm remains, and the design thickness requirement has been shown to be between 3mm and 4.7mm. It might, therefore, make more sense to agree that 25% wastage can only be a trigger point for mandatory repair when based upon the minimum design requirements.

This suggestion might not be well received by marine surveyors, insurers, and purchasers. In essence, the suggestion is that the 50' narrowboat with the 10mm base plate could see a reduction in plate thickness to 3mm (the design requirement) minus 25% (the wastage permissible). On this basis, the in-service base plating would be acceptable if reduced to 2.25mm. This seems uncomfortably thin, not just because the industry is used to much thicker plating, but because the corrosion allowance is gone, and there is scant resistance to impact through grounding.

The MCA (2022) provide guidance for fishing vessels that might provide helpful comparative data. Their document *Instructions to Surveyors – Construction, Watertight and Weathertight Integrity MSIS27 Rev 08.22* states:

In general, the maximum allowance for wastage is of 25% of original design thickness (consequently, original scantlings should be available).

And further:

Isolated areas of pitting, with a depth not exceeding 50% of the plate thickness, may be repaired by welding, subject to the use of qualified welders, and approved procedures and materials, e.g., classification society approved. In general, hull plate areas below 3mm in thickness should be renewed.

Here, we have a guide to permissible wastage, a repair method, and a minimum overall acceptable thickness. This seems to match what inland waterways marine surveyors have been saying is acceptable for years and is at odds with the minimum 4mm 'requirement' that has become common in recent years.

The key thing that is missing for the inland waterways marine surveyor is original scantling calculations. As most builders use customs and practice of 10/6/4, scantling drawings or calculations will likely have never been completed. Boatbuilders are content that the long-established success of the narrowboat structure is adequate proof the design is sound. This is true – narrowboats are intrinsically strong – but it does not help the marine surveyor in determining acceptable wastage.

Dave Gerr's calculations result in a design thickness less than those in ISO 12215:2017, with CBA guidelines close to ISO 12215:2017. ISO 12215 is a complicated document, the interpretation of which is beyond many without specialist training and knowledge; in short, narrowboat boatbuilders do not use it. Other methods are far more effective; Dave Gerr's formulae can be added to a spreadsheet where numerous computations are made simple, or for rule of thumb, CBA's chart is adequate. These can be used and are easy to interpret.

A note on impact / collision

Conversations with inland waterways marine surveyors about their accepted minimum thicknesses reflected the variance discussed. All were nervous of the lack of industry guidance available, and all would happily work to an agreed figure. Some, when asked, said 4mm minimum without hesitation to mitigate collision or impact. When asked to expand and citing the 5mm sided boat with 1.1mm pitting, the feeling changed; seemingly a degree of pitting to most is not an issue, beyond insurance requirements or not. Clearly this is an uncomfortable situation the marine surveyor finds themselves in.

Deciding on a minimum thickness that can defend against impact on the spot is entirely arbitrary and subjective. What is the object that will be struck? At what speed? At what angle? None of the design documents mention this, yet surveyors do. 4mm is not enough to defend the vessel against impact on a 200-year-old navigation system; 6mm bow plating has been seen holed, so specifying 4mm on this basis would have been pointless. Damage from impact is of course one of the things insurance is for. Whatever the thickness of the plating, there may be unexpected consequences in a collision that could result in perforation or penetration of the plating.

Of course, much of the wastage and diminution surveyors of narrowboats find, and owners repair, could be easily avoided. If boatbuilders grit-blasted and epoxy coated all underwater plating as a matter of course from new, vessels would be protected against pitting corrosion and have a much longer life. Widespread blanket over plating would be eliminated. Returning to Dave Gerr again, in Chapter 14 of his book he deals extensively with corrosion and prevention; it's within the section called *Design Considerations*. He advocates grit-blasting and epoxy coating inside and out of steel hulls, as well as discussing the various advantages of materials including CorTen steel. It is astounding then, that the contemporary British Marine narrowboat design code of practice makes absolutely no consideration to hull protection whatsoever. It does not even get a mention. The owner, vessel and surveyor are battling corrosion from the start.

SUMMARY

The 4mm minimum plate thickness is a starting point but lack of harmonisation and clear guidelines is penalising owners, and leaving marine surveyors exposed unfairly to defending liability claims.

The authors have shown that there are a variety of ways of calculating what the design minimum should be and if necessary, a marine surveyor could use them on site to aid assessment. The MCA provide a minimum thickness of 3mm, which matches the CBA and Dave Gerr's minimum design thickness for steel vessels. The MCA also give us a wastage maximum of 25% from the scantling design, but it has been established that narrowboats are over-specified, and the thicker base plating includes a generous buffer for corrosion.

It therefore seems that where no specific guidance exists from a vessel designer, architect or boat-builder, the following can be considered as acceptable outcomes:

1. Insurers, surveyors, and repairers can agree that 3mm is the minimum required hull thickness for steel narrowboats. However, this must be considered against other factors, and this is where the discretion and expertise of the surveyor is paramount. The area must be subject to satisfactory hammer sounding. The cause of any internal thinning e.g., pooled water lying in rebates or bilges must be identified and eliminated. Continued abrasion / erosion of the area when returned to service should be considered. Any other contra-indicators should be taken into account.

   Setting 3mm plate thickness as a minimum does not preclude the need to carry out repairs to hulls sooner, and residual plate thicknesses of 3mm should be considered as a minimum, not a target.

2. Where hull plating has reduced to 3mm, the vessel is deemed to be at its absolute minimum and preventative intervention is required. The plating should be grit-blasted, inspected, repaired where necessary and a proprietary hard-wearing paint system applied such as 2 pack epoxy. The point here is that this is known to halt pitting and correctly done should prevent corrosion worsening and help prevent future large-scale repairs from becoming necessary. This will in most cases require a further timely docking at an appropriate location, but taken as a whole, the result will be better for the owner.

3. Where hull plating of steel narrowboats has reduced to less than 3mm, immediate repair is required because the design minimum thickness has been subceeded, and as such (subject to point 1 being agreed) insurers may discontinue cover.

4. With respect to the 3mm original hull plates of some Springers, minus 25% ought to be a maximum accepted wastage where the minimum residual plate thickness is 2.25mm or better. However, to enable a better margin for future wastage or corrosion a surveyor should indicate that remedial works should be carried out when the measured residual plate thickness approaches 2.5mm.

5. In the case of pitting, this can be repaired using industry guidance provided by the MCA and Class Societies, e.g., clean and dry the area, start the weld outside the pitting and reverse the welding direction for each layer

6. In the case of erosion wear or where pitting is too widespread, various repair methods are common across the inland waterways and the surveyor is presently at liberty to select which one to follow. This last point is certainly worthy of a separate discussion paper.

FURTHER WORK

1. An industry-wide agreement should be reached that clarifies hull insurance requirements for steel narrowboats. To achieve this some degree of harmonisation is required and a consultation with underwriters should be completed.

2. The repair methods for steel narrowboats should be researched and an agreed process drafted into a reference document available to surveyors, insurers, repairers, and owners alike.

3. Tackling the issue at source; prevention of corrosion through hull coatings is well documented across the sector but is conspicuous by its absence in CBA and British Marine guidance. Trade bodies should be encouraged to convey to their members the value and importance for the life of the vessel in a thorough coating system for all underwater plating, including base plating. Boatbuilders should be encouraged to grit-blast and epoxy coat from the start.

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APPENDIX A

TOLERANCES TO EN 10029 FOR HOT ROLLED PLATE 3MM AND ABOVE

General

This standard covers non-alloy and alloy steels including stainless steels with:

1. Nominal thickness ≥ 3mm ≤ 250mm
2. Nominal width ≥ 600mm
3. Specified minimum yield strength ≤ 700 N/mm^2

Tolerances on plate less than 600 mm wide shall be agreed at time of enquiry/order.

Thickness tolerance

At the enquiry/order stage it is necessary to define which of 4 classes A-D is required.

Nominal thickness	Tolerances on nominal thickness [1]							
	Class A		Class B		Class C		Class D	
	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
≥ 3 < 5	-0.4	+0.8	-0.3	+0.9	-0	+1.2	-0.6	+0.6
≥ 5 < 8	-0.4	+1.1	-0.3	+1.2	-0	+1.5	-0.75	+0.75
≥ 8 < 15	-0.5	+1.2	-0.3	+1.4	-0	+1.7	-0.85	+0.85
≥ 15 < 25	-0.6	+1.3	-0.3	+1.6	-0	+1.9	-0.95	+0.95
≥ 25 < 40	-0.8	+1.4	-0.3	+1.9	-0	+2.2	-1.1	+1.1
≥ 40 < 80	-1.0	+1.8	-0.3	+2.5	-0	+2.8	-1.4	+1.4
≥ 80 < 150	-1.0	+2.2	-0.3	+2.9	-0	+3.2	-1.6	+1.6
≥ 150 < 250	-1.2	+2.4	-0.3	+3.3	-0	+3.6	-1.8	+1.8

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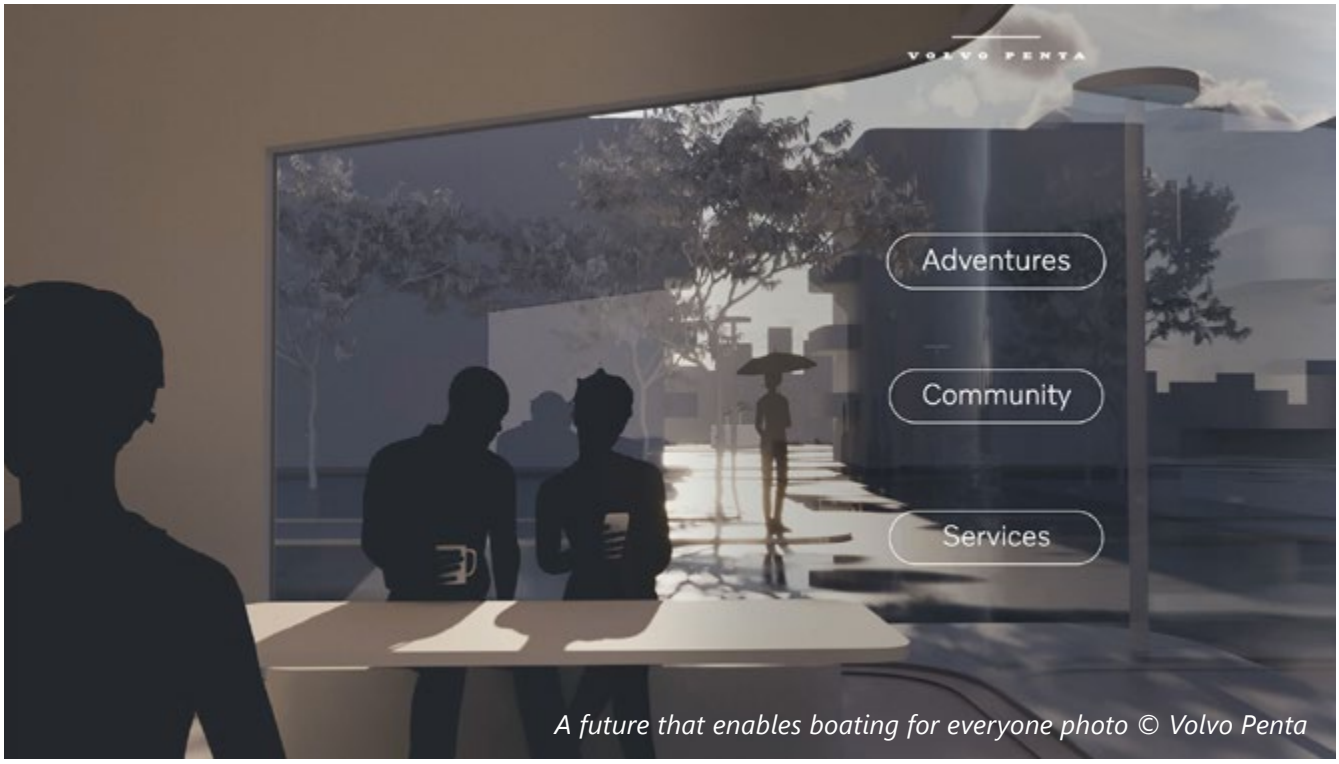


A future that enables boating for everyone photo © Volvo Penta

Under the headline 'Boating for everyone', Volvo Penta used this year's Consumer Electronics Show 2023 (CES) at the Las Vegas Convention Center to imagine a brave new world for exploring and experiencing life on the water built around accessibility for all.

Through an immersive and visionary exhibit, visitors were given an exclusive look at how the company imagines the boating experience of tomorrow. Volvo Penta aimed to kickstart a dialogue with CES attendees and online boating audiences on how to evolve boating together.

Volvo Penta joined the Consumer Electronics Show (CES) live for the first time in 2023 and premiered a future-focused universe, where it presented ground-breaking thinking around a potential new leisure boating experience. This future boating experience will be more open and accessible than ever, designed to heighten people's emotional connection with the water and simultaneously advance sustainability.

Innovation is embedded in the DNA of Volvo Penta and the company has harnessed this with fast-moving technological advances to create a potential vision for the future that goes way beyond anything previously seen in the marine segment. As such, the company elected to present it for the first time at the world's most prestigious technology show, CES, which is the ideal platform to share its holistic re-imagining of how tomorrow's leisure boating experience can be completely transformed.

The concept is the result of imaginative brainpower from a team at Volvo Penta comprising strategists, business development leaders, digital and service experts, as well as technology designers and engineers, all working in collaboration with colleagues from across the wider Volvo Group.

Johan Inden, president of Volvo Penta's global marine business, said CES 2023 was the perfect environment to showcase the company's look to the future.

"Being on the water develops incredible emotional connections in people. It's difficult to convey the true experience and enjoyment you get from exploring, seeking out new adventures or spending time there with friends and loved ones. With this new concept, we wanted to take this further and make it available to a wider population: Boating for everyone.

"To re-imagine boating and elevate it, we must remove all conventional boundaries and completely reframe what it is. We want to challenge current thinking and be challenged ourselves. Our concept is designed to spark a dialogue. How can we make boating more accessible — to anyone who wants to enjoy it? How can we build a boating universe with unlimited ways to explore and enjoy our waters, while at the same time protecting them? These are exciting questions and we're at the start of our journey to lead the discussion together with our customers and partners."

A future that enables Boating for everyone

The evolution of ease

To open the world of boating to a much wider audience, it must become easier. From selecting the boating experience to greater on-board assistance, there are substantial opportunities to change and simplify the ways things are done, built around an easier customer experience with wider appeal.

An experience designed around you

In the future, Volvo Penta believes that how and why people boat will change, with a more human-centric approach elevating the experience and new technology and business models making it more accessible. Individually tailored experiences offer stronger emotional connections and greater scope for reaching new levels of enjoyment. As part of this, the new customer experience must embrace less experienced boaters and new entrants. For both first-time boaters and highly skilled enthusiasts, there is a need to create a more personalized experience.

Sustainable — above and below the surface

Sustainability will be essential for boating to evolve. Under a call-to-action to move 'beyond the boat', Volvo Penta imagines a future on water that can help protect life above and below the surface, as well as giving leisure boaters more sustainable enjoyment.

Technology evolution will be a key enabler in bringing Volvo Penta's 'Boating for everyone' concept to life. Here are some highlights:

• **Boating as a Service:** Boating as a Service could provide a completely new way of enjoying the water, making it easy to access personalized, on-board experiences, so users can choose their own adventure. Boating today requires planning, but Volvo Penta imagines a subscription-based, on-demand single-source platform/ experience that can re-shape that, way beyond anything today's boat clubs or shared ownership models offer.

This concept could see anyone ordering a boating experience, with tailored preferences and equipment based on need and experience levels. This alone has the potential to immediately increase the audience. Boating experience 'packages' could be ready-to-collect at the marina at a chosen time, while experience levels could be accommodated onboard, e.g. with full automation for newcomers and lower levels of automation for accomplished boaters.

Going beyond the boat - Volvo Penta Island experience - photo © Volvo Penta

• **Going beyond the boat** — Volvo Penta Island experience: One of the most ground-breaking examples of innovative concepts is what the company calls Volvo Penta Island. This idea to extend the experience beyond the boat is visualized through a floating, independent structure. It begs the question: what if self-sustaining, floating, man-made offshore islands could serve as a platform to take care of the future customer experience?

Above sea level, the islands could offer charging services for electric boats, to help accelerate the transition to electric solutions at sea. They could also act as a boating community hub with facilities such as restaurants, service and support, concierge services and more. These centralized gathering points could allow boaters to relax and explore, while also delivering peace of mind.

Each island could come with its own independent energy production capabilities, harnessing sun, wind and wave power. And they would be mobile too, with the ability to position themselves within easy range of boaters in need of a recharge.

Below sea-level, Volvo Penta Islands could play a powerful role, supporting the company's desire to push sustainability beyond the boat. For example, hosting an underwater mussel farm which could act as a refuge point for local marine life.

• **Artificial Intelligence and automation:** For Volvo Penta, AI and automation are key enablers in delivering Boating for everyone. First-time boaters (or those with experience, who simply prefer to enjoy the on-water experience instead of driving) could choose high-level automation. This could be activated at the start of the experience — for example, having the boat automatically deliver itself to the customer meeting point at the marina and then navigating itself out to open water.

In between the limits of no experience and full experience, automated 'nudging' could enable inexperienced boaters to learn more of the driving process as they progressed. Through AI, the user could learn about driving gradually. This would ensure peace of mind, but also increase boating competence and confidence steadily.

AI could also be integral to delivering more personalized experiences: understanding user preferences and offering recommendations around experiences, sports, destinations and more.

Vessel-to-vessel energy sharing and autonomous recharging - photo © Volvo Penta

Wildlife protection technology - photo © Volvo Penta

• **Vessel-to-vessel energy sharing and autonomous recharging:** In addition to imagining a future where electrically powered boats can be recharged on Volvo Penta Islands, the company is also presenting two more exciting concepts.

The first is vessel-to-vessel energy sharing. Imagine if a community of boats in close proximity could redistribute energy according to needs? This could be done through automatic monitoring of energy levels and predictive knowledge of the next step in the boat's journey. Each boat could then automatically ensure it has sufficient charge to reach its next destination.

The second concept involves recharging from mobile, autonomous submersible pods. Nicknamed 'Stingray' these pods could carry charge to docked vessels and automatically connect and re-charge as needed, without user input. The vessel might simply reach an overnight anchor point, settle for the evening, then the user wakes up to a fully-charged battery.

Future initiatives such as these have the power to shift the concept of what it means to go boating, making it a truly shared and sustainable experience — designed around the boater and aiming to deliver peace of mind.

• **Connectivity and Community:** Harnessing cloud-based infrastructure it could be easier than ever to meet with friends and like-minded boaters both online and on-water. Digital anchoring could enable boats to meet out in the open water and allow gatherers to socialize and share services (while also sharing energy, vessel-to-vessel).

There's the possibility to evolve the experience further while out on the water, with new features and services downloadable on-demand. Similarly, this technology infrastructure could be used to deliver help and assistance. That might be remote driving assistance or concierge-level guidance - for example, harnessing on-board AI to re-route the vessel around troubling weather conditions.

Travel data from individual boats could also be gathered from surroundings and analyzed, generating recommendations based on a user's profile and current conditions. Volvo Penta believes this kind of functionality has the potential to truly make Boating for everyone.

Wildlife protection technology: The holistic focus on sustainability that Volvo Penta imagines in tomorrow's boating incorporates multiple facets. One of the intriguing proposals it has is for wildlife protection technology. Here, connected vessels send signals to each other when vulnerable sea life is nearby, such as whales and dolphins. Such technology could automatically alert vessels to slow down to boost protection or avoid the area entirely.

Alongside this, Volvo Penta also believes we will see new behaviours in boaters, with many opting to enjoy the low-speed, near-silent cruising that electric boats can deliver. This would also be less intrusive and disruptive to marine life.

Collaborating to deliver an immersive boating experience

As part of showcasing its vision and experiences, CES 2023 became an opportunity for Volvo Penta to spark a dialogue with visitors about the future of the boating experience.

"We see unlimited potential in future boating, harnessing technological advances in AI, automation, electrification and digital experiences, plus new business models that open up accessibility. This will allow us to shape a new world of wonder and enjoyment — beyond even what we've seen on land," adds Johan Inden. "There is a unique and exciting future at sea that will be more sustainable, intuitive, easy, and seamless. What we are sharing is not a ready-made blueprint for the future. It is a conceptual look at how the future could evolve — intended to spark a dialogue. Capturing feedback from CES is a key opportunity to define the future of boating, where we aim to apply this feedback directly into our R&D process."

You can watch a video about Volve Penta's future vision at **https://www.youtube.com/watch?v=m3UOQcuuFpw**. Video run time is nearly 8 minutes.

The 46-year-old sailing ketch, *Francis Drake*, is being lovingly brought back to life by Dan Couchman who is running the build management restoration under the banner of H2Eau Projects, an arm of H2Eau Sports Ltd. The task of renovating the 1970s structure began less than two years ago and the project is now well underway with the re-building and alteration of the hull.

*Ex-*Ocean Youth Club 72ft ketch, *Francis Drake*, being restored in Plymouth

"Clearly, we all know that there are many difficulties attached to approaching a restoration. One of the more complicated technical difficulties regarding the composite works is how to bond new e-glass to a very old glass fibre/polyester resin structure," says Couchman. "It's fairly easy for small repairs but for larger structural areas it gets complicated."

The restoration is welcomed by many ex-OYC pupils, including Andy Reed. He enjoyed his first trip onboard in 1978 as a 17-year-old and says that *Francis Drake* being restored is incredible. "GRP is a massive issue, everyone accepts that in the industry," he says. "Anything that helps towards dealing with that is a major step forward."

Richard Brocklesby, who also sailed on her as a teenager, agrees. "I am really pleased that she's being restored now. I'm a bit of an environmentalist and I'm excited to see the sustainable development of what otherwise would be a landfill disaster. Rebuilding the boat using the shell is a great idea.

"I saw her in the boatyard at Plymouth. She's recognisable as she's a big old boat. She was really stripped down and had no beauty about her. No blue paint, no masts, holes in the side. She laid there for a couple of years."

Several epoxy systems were tested extensively prior to Pro-Set and West System epoxy being chosen. Both are manufactured by Wessex Resins and Adhesives (under license from Gougeon Brothers Inc).

Couchman says he chose Pro-Set epoxy for the structural hull repairs because: "It's one of the purest yet most advanced epoxy systems on the market." As the 'donor' hull was originally constructed in polyester resin, it presented a technical product challenge for ultimate structural adhesion.

"*Francis Drake* was originally built to MCA code category 0, a go-anywhere yacht, and we are rebuilding her back to code under survey, so we had to get the epoxy selection absolutely spot on to deliver this."

The goal for the build is to maintain the classic hull shape but to re-purpose the vessel into a modern, high-end, yacht charter (with a totally new interior – featuring a master cabin, twin aft guest cabins and a two-berth crew cabin).

The work involves a major amount of secondary bonding to the existing hull. To gain interior volume and standing height, the topsides are being raised by around ½ metre along with a brand-new deck.

This not only provides a completely transformed interior arrangement but saves the extensive time involved in repairing the old deck which, after years of water ingress, was well beyond repair.

Couchman says the five-person team in Plymouth has been restoring *Francis Drake*'s hull using Pro-Set epoxy products.

"We've upgraded some of the normal practices for GRP repair and created a semi-production repair template kit. Using this we are not only able to speed up the preparation process for bevelling the repair areas on the hull and for bulk cutting the glass fabric repair kits, but we can deliver high finish and precision composite repairs, normally only seen in the aerospace sector."

Couchman says the quality of the repairs laminated in place with Pro-Set Lam-135 Resin/Lam-226 Hardener are exquisite. "We have taken time to quality check these with destructive testing, the results are completely astounding us," he says.

The lamination of a new shear-tie against the existing outer hull skin will be the next stage. The entire outer hull will then be sheathed in glass and epoxy. This will effectively mummify the old hull for a great many years to come. The adoption and application of highly advanced technical glass fabrics and Pro-Set epoxies all make this challenge possible.

Project completion is estimated to be mid-2024 when *Francis Drake* will enjoy sea trials prior to heading to the Mediterranean as a commercial charter vessel.

"*Francis Drake* is a sustainability template," says Ian Oliver, MD at Wessex Resins and Adhesives. "We're delighted that the epoxy systems we manufacture are being used in this way, helping a vessel which would otherwise have ended up in landfill see at least another fifty years or so of service.

Memories & History

Francis Drake was originally commissioned for the Ocean Youth Club and took over 15,000 students to sea between 1976-97. Her original design was by Robert Clark. His famous designs include British Steel for Sir Chay Blyth and Gypsy Moth III for Sir Francis Chichester.

Richard Brocklesby, RYA yachtmaster, blames sailing on *Francis Drake* for the fact he ended up buying his own boats. He says it was definitely life changing.

"Sailing on *Francis Drake* inspired me," agrees Reed who is now a yacht skipper and RYA examiner, working across the UK. "I loved the environment and the camaraderie on the boat. I didn't realise until that trip what was possible. It got into my blood and never left."

Boat owners remain cautious about sustainable marine coatings

By Greencorp Marine

An increasing number of environmentally aware, ocean-loving yacht owners yearn for more sustainable marine coatings. They want to do their bit to protect sea-life and the ocean environment. Boat owners and vessel operators are increasingly hearing and using the following four buzzwords below. Here is our attempt to briefly define and explain them:

SUSTAINABLE: A product or material that uses fewer of our planet's resources in its manufacture and use. These materials are usually derived from natural biological renewable resources, however recycled materials are also viewed as sustainable.

RENEWABLE: A product or material that that can be readily and rapidly replenished by Mother Nature.

ENVIRONMENTALLY FRIENDLY: A product or material that has fewer deleterious effects on the overall environment due to it being less harmful in its manufacture or use than earlier technologies.

GREEN: This has become a convenient 'catch all' word to describe a product or material that is one or more of the above.

The truth is, however, that large sections of the marine industry are risk-averse and still rely on solvent-based paint technologies that have been used for generations. Why is this the case? Boat owners may be conscious of the availability of more sustainable coatings, but at the end of the day their focus is on protecting their vessel and its coatings systems from weathering (where the vessel loses its looks); corrosion (where the vessel loses its structural integrity); and fouling (which results in higher fuel consumption, engine wear and emissions).

If it takes a trusted, but less environmentally friendly product, to safeguard their boat, they may take that option. Boat owners will typically only switch products if the cost, appearance, performance and longevity of their coatings are not compromised.

In some cases, they may be prepared to pay a 'green premium' for sustainable products that work, but they will typically not adopt a product that may make their vessels run less efficiently or look less good. There is a view, too, that it may be counter-productive for budgets and the environment if less-efficient coatings have to be applied more often. Whatever lasts longest in a harsh ocean environment wins the day.

GREENER OPTIONS EMERGE

The positive news is that, during the past 20 years or so, many innovative solvents and resins have come on to the global chemical market which are derived from plant-based renewable resources. These are slowly finding their way into commercial marine paint formulations.

Over time, we can expect more operators in the marine industry to turn to newer, lower volatile organic compound (VOC) coatings formulations which offer a more sustainable coating solution by eliminating the release of solvent fumes into the atmosphere.

While water is the least toxic solvent known, it is a poor solvent for the organic resins in coatings formulations. However, producing water-based versions of formerly solvent-based coatings has become routine by formulating with surfactants to emulsify the organic resin components of a paint with water.

Such coatings emit lower levels of potentially harmful solvent vapours during the evaporation drying process, and they contain fewer VOCs or hazardous air pollutants. As a result, they offer the prospect of a cleaner and safer work environment, in addition to being less damaging to the local and even global environment.

As mentioned, however, coatings end-users in marine industry have been slow to trust such new innovations. So, considering the status quo, most marine paints are still solvent based. These solvents and the resins within them are almost always petrochemical in origin, as well as being non-sustainable, non-renewable and often toxic to the user and the environment.

THEY HAVE A BIG ADVANTAGE, THOUGH. THEY WORK VERY WELL.

The marine coatings market is forecast to be worth $15 billion by 2024. Demand is growing in the Asia-Pacific region, and China specifically, because of growing shipbuilding and dry-docking activity. Anti-corrosive coatings account for the biggest share of the market, followed by antifouling coatings.

Coating manufacturers now face a double whammy of new national and international regulatory burdens and the corporate social responsibility expectations of their shareholders, obliging them to reduce or remove volatile solvents, resins and additives of petrochemical origin in their paints, and innovate newer formulations containing more sustainable, renewable and environmentally friendly components. Already, paint companies' chemists are expected to favour raw materials of non-petrochemical origin as their default starting position for new formulations.

While many sustainable and renewable bio-based solvents are now available which are chemically identical to their petrochemical counterparts, the consensus among industry experts is that bio-based resins will eventually have the greatest impact on 'greening' coatings formulations. Bio resins are partially or completely, based on monomers which are derived from biological sources. They are becoming more popular as they provide the opportunity to replace petrochemical-based ingredients with plant-based alternatives derived from crops such as reactive oils from soya, linseed and resinous chemicals derived from cellulosic waste materials like sawdust, corncobs and sugar cane bagasse. The ongoing debate as to whether edible food crops should be grown to provide chemical raw materials rather than as food for the hungry is a troubling one which is forcing raw materials manufacturers to focus on crop wastes as a source of new bio-based materials.

Today, newer and genuinely more environmentally friendly products, especially water-based paints, are already becoming more visible in the market. Their quality has also improved to the point where they present a viable alternative to older solvent-based coatings in some applications such as marine varnishes.

EDUCATION THE KEY

As more people question the use of paints that draw from fossil raw materials, bio resins are likely to move into the mainstream. So, we can expect to hear a lot more about them in the marine industry in the next few years.

Resistance among some boat owners is likely to persist as they stick with what they know. However, education and the emergence of ever-improving, lower VOC coatings, containing more and more renewable and sustainable components should lead to a more dynamic and adaptive market.

That will be a positive for boat owners who want their running gear to work efficiently while feeling they are doing their bit for the environment too.

About Greencorp Marine

Greencorp Marine is a specialist Australian producer of marine coatings. Their product range includes:

PropOne - a non-biocidal foul release coating system which prevents sea life adhering to propellers and underwater running gear;

Crystilium - a coating range that renews, protects and extends the life of marine surfaces;

JustTeak - a complete system that will rejuvenate and protect teak decking and furniture.

With thousands of applications each year worldwide, Greencorp Marine coatings provide a high performance level for boat owners and their products are exported to more than 30 countries worldwide.

Website: **https://www.greencorpmarine.com**

This article first appeared on the Greencorp Marine website and is republished here with our thanks.

How to improve grain cargo shortage claims?

by Kenji KOIKE, MIIMS

There are many kinds of dry bulk cargoes traded worldwide, but the main cargoes are iron ore, coal and grains.

The method of determining the trading quantity for these trades is a ship draft survey or a shore scale, and which one to adopt depends on the contract between the shipper and the consignee, but in practice it is generally determined by the type of cargo. Usually, a draft survey is used for iron ore and coal, and a shore scale is used for grains.

In this report, we would like to pick up shortage claims about grain cargo that are occurring frequently around the world and propose improvement measures.

1. Outline

The annual trade volume of grain at sea is about six hundred million tons. The main export countries are US, Argentina, Brazil, EU, etc. Meanwhile, the main importing countries are China, EU, Japan, Mexico, etc.

The trading quantity of grain is generally determined by a shore scale at loading and discharging, and the shore scale figure at loading is the quantity noted on the Bill of Lading (B/L quantity).

If the shortage of the discharged quantity exceeds 0.5% (Trade Allowance) of the BL quantity, it is common business practice for the consignee to file a damage claim against the carrier.

In Japan, the compensation for the loss damage is paid once by cargo insurance, and then the insurer generally seeks subrogation from the carrier.

However, the shortage insurance is a special clause for cargo insurance, and the insurance condition is generally "Excess 0.3%."

I would like to give specific examples below and consider specific improvement measures based on the causes of grain shortage claims.

2. Specific examples for shortage claim of grain cargo

Suppose that in exporting country A, 50,000 tons of corn in bulk is loaded on a Handymax type vessel and transported to importing country J, and importing country J has three unloading ports, and the planned unloading quantity at each port is 20,000 tons at the first port, 15,000 tons at the second port, and 15,000 tons at the third port.

The following abbreviations are used to make the explanation easier to understand...

Grain terminal at loading port	:	LT
Grain terminal at the first port of discharge	:	DT1
Grain terminal at the second port of discharge	:	DT2
Grain terminal at the third port of discharge	:	DT3

- Corn in bulk was loaded onto the vessel at LT, and its loading was weighed at 50,000 tons on the shore scale of LT, which was B/L quantity.
- The vessel arrived at the discharge country J, was discharged at the first port, and was weighed at 20,000 tons by the shore scale of DT1.
- Next, it was unloaded at DT2 of the second port and weighed to 15,000 tons by the shore scale of DT2.
- Finally, the cargo was unloaded at DT3 of the third port, and the result of the DT3 shore scale was 14,750 tons, 250 tons less than the planned 15,000 tons. Since the shortage of 250 tons exceeds 0.5% of the B/L quantity, the consignee files a claim for damages against the carrier for the shortage.

3. Cause of the shortage claims

From the example above, the probable causes of shortage claims are:

❶ Insufficient quantity of cargo shipped from LT
❷ Evaporation of moisture in cargo during transportation from LT to DT1
❸ Handling loss (dust loss) during loading / unloading
❹ Some cargo remained in the hold due to cargo damage such as cargo contamination
❺ Cargo exceeding the planned quantity was discharged at DT1 and DT2

4. Verification of the cause

- Regarding ❶ and ❺ above, all figures are the shore scale quantities of loading and unloading ports, and since there were no draft survey quantities this time, it is not possible to compare and verify the figures, but the following points can be clearly stated.
  The shore scale itself was not the same as the shore scale of LT that weighed the loading quantity and the shore scale of DT1, DT2 and DT3 that weighed the quantity at the ports of discharge. Therefore, the weighted quantity results of different scales will always result in quantity differences.
- Regarding ❷ above, we believe that there was almost no evaporation of moisture in the cargo due to measures to control the temperature and humidity of the loaded cargo at the loading port and measures to prevent sweating in the hold due to natural ventilation during transportation.
- Regarding ❹ above, considering the current status of the ship loader at the loading port and the ship unloader at the unloading port, we believe that there was almost no dust loss during cargo handling.
- Regarding ❺ above, during the final dredging at each hold, heavy rust scales from the hold tank top plates did not mix with the cargo, and there was no contamination damage remained on the vessel.
  Based on the above verification, it is believed that the shortage claims this time is mainly due to the reasons ❶ and ❺ above.

5. Specific improvement measures for shortage claims

Judging from the above marine logistic, only draft survey can weigh the amount of cargo on board on the same scale for both loading and unloading.

However, the draft survey quantity is affected by the weather and sea conditions at that time because it is calculated by reading the draft marks of the vessel floating on the water.

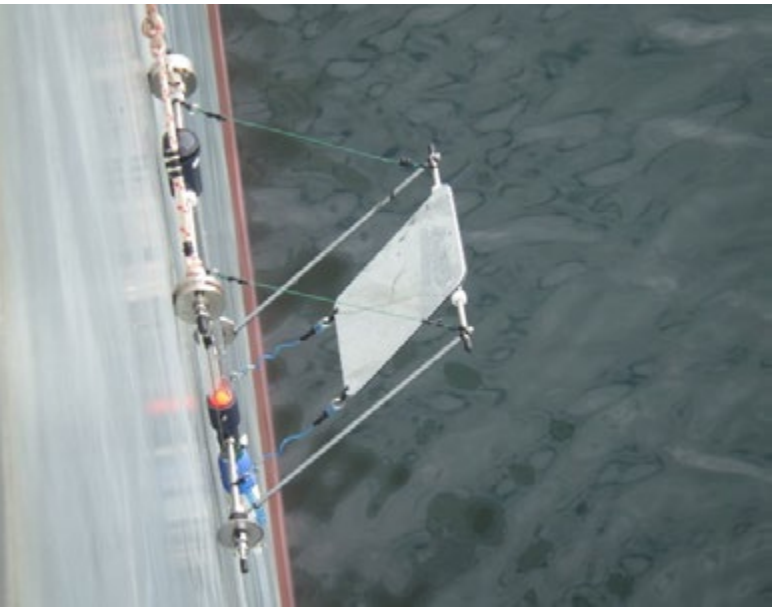
In addition, since the sea density around the vessel varies depending on the sea area, it is necessary to use a unified calibrated hydrometer at both the loading and unloading ports.

In other words, it is impossible to fundamentally improve the shortage claims that occur between the loading and unloading ports unless draft surveys are conducted after scientifically making the various work environment changes that have been occurring at the loading and unloading sites into the same working environment.

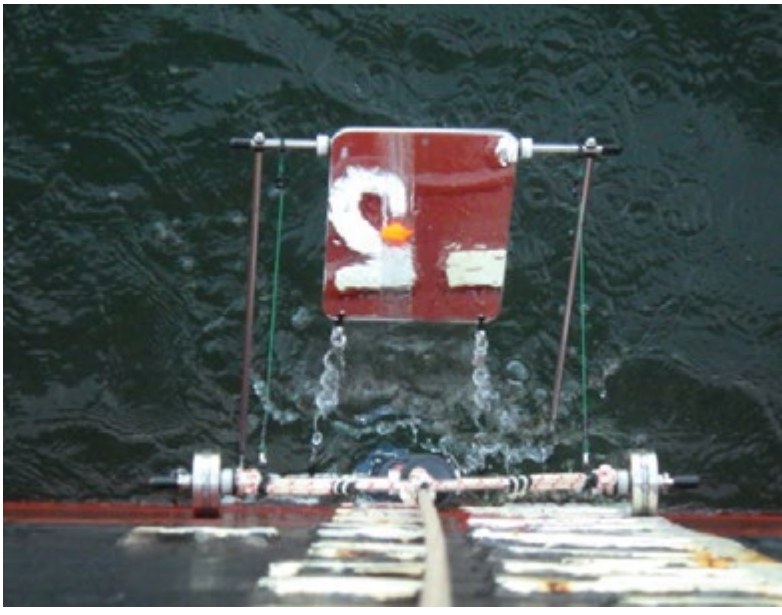
Based on the above, we propose the following as specific measures to improve shortage claims.

(1) Draft reading device (KENDRAFT ©) should be used at both ports of loading and unloading to obtain the same readings no matter when, where, or by whom, under any weather and sea conditions.

With KENDRAFT, you could keep reliably the difference in draft mark readings between the loading and unloading ports to within 1 cm at any time. For a Handymax type vessel, the TPC (tons per centimeter) is about fifty tons, so it is possible to keep it within 0.1 percentage of the B/L quantity.



KENDRAFT



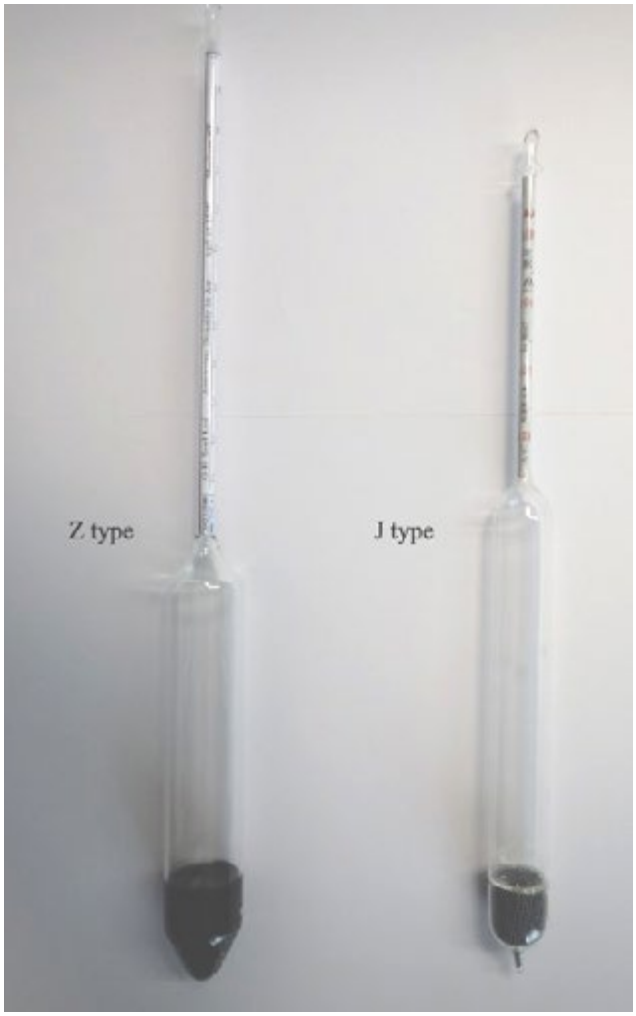
Draft mark reading : 5m25cm

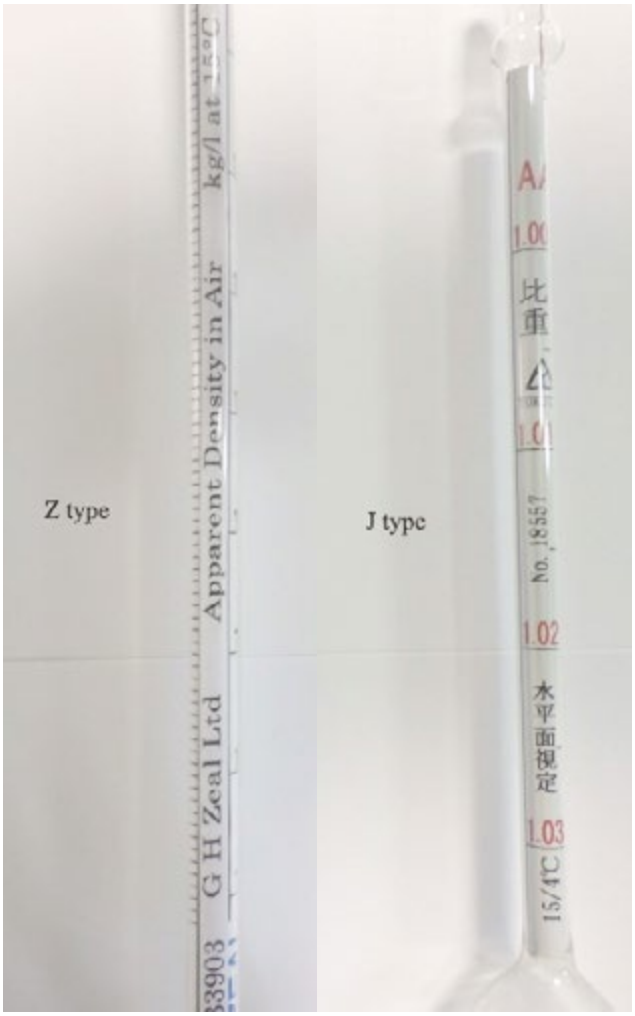
(2) There are two types of seawater hydrometers used in the world:
   - Hydrometer for measuring relative density: J type (tentative name)
   - Hydrometer for measuring apparent density: Z type (tentative name)

   The above two types of hydrometers are mixed and used all over the world because there is no clear international standard on which one to use.

The actual measured value difference is 0.002, resulting in a quantity difference of one hundred tons for a loaded cargo of 50,000 tons.

We will use the same type of calibrated seawater hydrometer at loading and unloading ports to eliminate quantity differences due to different hydrometers.





By introducing the above two new verification schemes (consistent survey of loading and unloading) into the existing grain marine transportation logistics, we will specify the point where the shortage loss occurs and constantly improve the shortage loss to within 0.3% of the B/L quantity.

For more information visit our URL: **https://koikemarinesurvey.com/english/englishkms.html**

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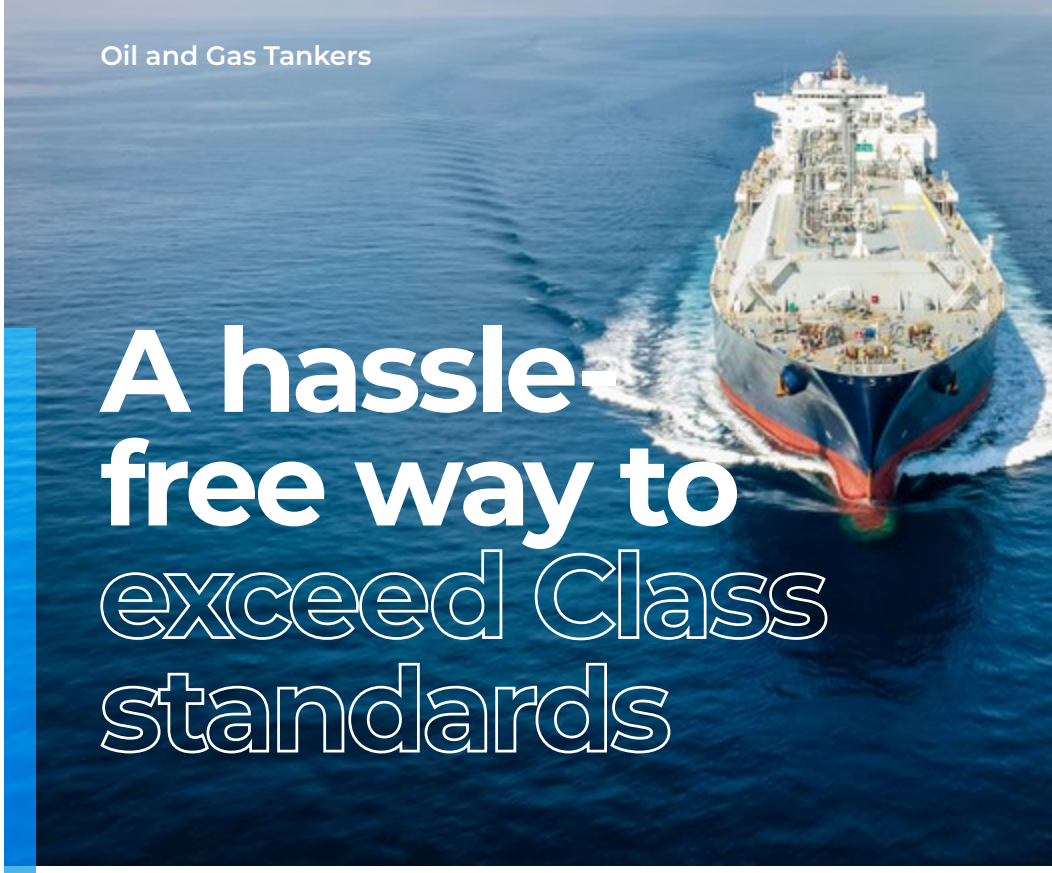

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Is Lithium-ion the Ideal Battery?

This article is a combination of two that were originally published on the Battery University website (**https://batteryuniversity.com/**) last year and are republished here with our thanks. This article, although not directly related to marine use, gives an overview of lithium-ion, its properties and some of the issues surrounding the batteries. So, before we can understand the implications for marine use that are certain to increase exponentially over the next decade, we need to understand the concept behind lithium-ion batteries Surprisingly, the technology is not new.

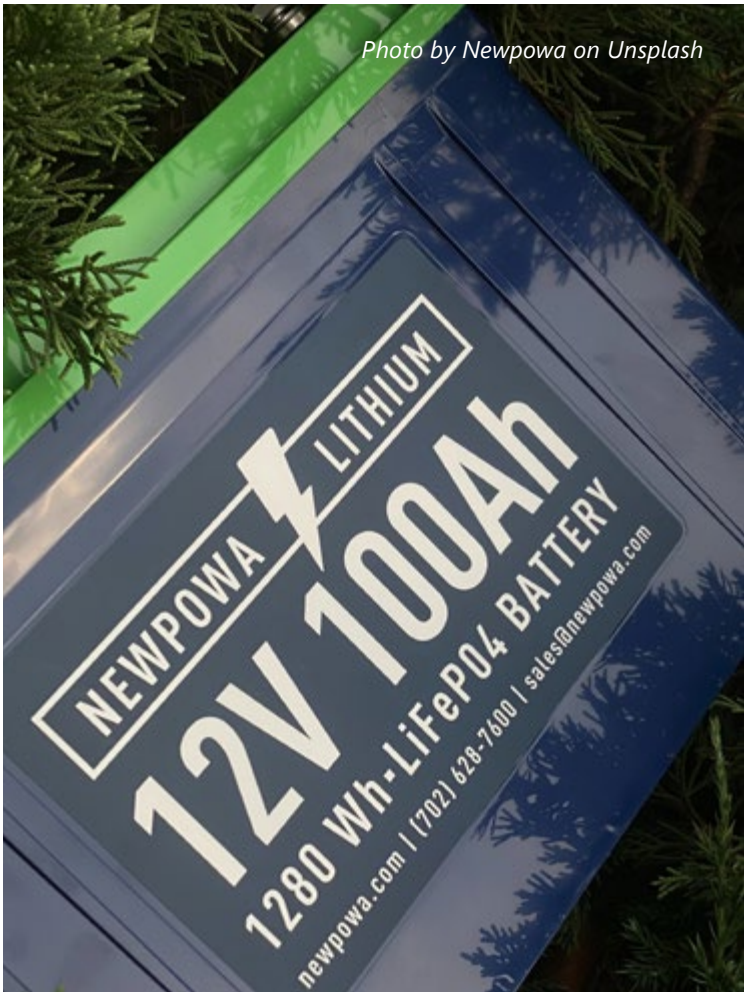


Photo by Newpowa on Unsplash

Pioneer work with the lithium battery began in 1912 under G.N. Lewis but it was not until the early 1970s when the first non-rechargeable lithium batteries became commercially available. Lithium is the lightest of all metals, has the greatest electrochemical potential and provides the largest energy density for weight.

Attempts to develop rechargeable lithium batteries failed due to safety problems. Because of the inherent instability of lithium metal, especially during charging, research shifted to a non-metallic lithium battery using lithium ions. Although slightly lower in energy density than lithium metal, lithium-ion is safe, provided certain precautions are met when charging and discharging. In 1991, the Sony Corporation commercialized the first lithium-ion battery. Other manufacturers followed suit.

The energy density of lithium-ion is typically twice that of the standard nickel-cadmium. There is potential for higher energy densities. The load characteristics are reasonably good and behave similarly to nickel-cadmium in terms of discharge. The high cell voltage of 3.6 volts allows battery pack designs with only one cell. Most of today's mobile phones run on a single cell. A nickel-based pack would require three 1.2-volt cells connected in series.

Lithium-ion is a low maintenance battery, an advantage that most other chemistries cannot claim. There is no memory, and no scheduled cycling is required to prolong the battery's life. In addition, the self-discharge is less than half compared to nickel-cadmium, making lithium-ion well suited for modern fuel gauge applications. Lithium-ion cells cause little harm when disposed.

Despite its overall advantages, lithium-ion has its drawbacks. It is fragile and requires a protection circuit to maintain safe operation. Built into each pack, the protection circuit limits the peak voltage of each cell during charge and prevents the cell voltage from dropping too low on discharge. In addition, the cell temperature is monitored to prevent temperature extremes. The maximum charge and discharge current on most packs is limited to between 1C and 2C. With these precautions in place, the possibility of metallic lithium

plating occurring due to overcharge is virtually eliminated.

Aging is a concern with most lithium-ion batteries and many manufacturers remain silent about this issue. Some capacity deterioration is noticeable after one year, whether the battery is in use or not. The battery frequently fails after two or three years. It should be noted that other chemistries also have age-related degenerative effects. This is especially true for nickel-metal-hydride if exposed to high ambient temperatures. At the same time, lithium-ion packs are known to have served for five years in some applications.

Manufacturers are constantly improving lithium-ion. New and enhanced chemical combinations are introduced every six months or so. With such rapid progress, it is difficult to assess how well the revised battery will age.

Storage in a cool place slows the aging process of lithium-ion (and other chemistries). Manufacturers recommend storage temperatures of 15°C (59°F). In addition, the battery should be partially charged during storage. The manufacturer recommends a 40% charge.

The most economical lithium-ion battery in terms of cost-to-energy ratio is the cylindrical 18650 (size is 18mm x 65.2mm). This cell is used for mobile computing and other applications that do not demand ultra-thin geometry. If a slim pack is required, the prismatic lithium-ion cell is the best choice. These cells come at a higher cost in terms of stored energy.

Advantages
- High energy density: potential for yet higher capacities.
- Does not need prolonged priming when new. One regular charge is all that's needed.
- Relatively low self-discharge: self-discharge is less than half that of nickel-based batteries.
- Low Maintenance: no periodic discharge is needed; there is no memory.
- Specialty cells can provide very high current to applications such as power tools.

Limitations
- Requires protection circuit to maintain voltage and current within safe limits.
- Subject to aging, even if not in use: storage in a cool place at 40% charge reduces the aging effect.
- Transportation restrictions: shipment of larger quantities may be subject to regulatory control. This restriction does not apply to personal carry-on batteries.
- Expensive to manufacture: about 40 percent higher in cost than nickel-cadmium.
- Not fully mature: metals and chemicals are changing on a continuing basis.

The lithium-ion-polymer battery

The lithium-ion-polymer differentiates itself from conventional battery systems in the type of electrolyte used. The original design, dating back to the 1970s, uses a dry solid polymer electrolyte. This electrolyte resembles a plastic-like film that does not conduct electricity but allows ions exchange (electrically charged atoms or groups of atoms). The polymer electrolyte replaces the traditional porous separator, which is soaked with electrolyte.

The dry polymer design offers simplifications with respect to fabrication, ruggedness, safety and thin-profile geometry. With a cell thickness measuring as little as one millimeter (0.039 inches), equipment designers are left to their own imagination in terms of form, shape and size.

Unfortunately, the dry lithium-polymer suffers from poor conductivity. The internal resistance is too high and cannot deliver the current bursts needed to power modern communication devices and spin up the hard drives of mobile computing equipment. Heating the cell to 60°C (140°F) and higher increases the conductivity, a requirement that is unsuitable for portable applications.

To compromise, some gelled electrolyte has been added. The commercial cells use a separator/electrolyte membrane prepared from the same traditional porous polyethylene or polypropylene separator filled with a polymer, which gels upon filling with the liquid electrolyte. Thus, the commercial lithium-ion polymer cells are very similar in chemistry and materials to their liquid electrolyte counter parts.

Lithium-ion-polymer has not caught on as quickly as some analysts had expected. Its superiority to other systems and low manufacturing costs has not been realized. No improvements in capacity gains are achieved - in fact, the capacity is slightly less than that of the standard lithium-ion battery. Lithium-ion-polymer finds its market niche in wafer-thin geometries, such as batteries for credit cards and other such applications.

Advantages
- Very low profile: batteries resembling the profile of a credit card are feasible.
- Flexible form factor: manufacturers are not bound by standard cell formats. With high volume, any reasonable size can be produced economically.
- Lightweight: gelled electrolytes enable simplified packaging by eliminating the metal shell.
- Improved safety: more resistant to overcharge; less chance for electrolyte leakage.

Limitations
- Lower energy density and decreased cycle count compared to lithium-ion.
- Expensive to manufacture.
- No standard sizes. Most cells are produced for high volume consumer markets.
- Higher cost-to-energy ratio than lithium-ion

Restrictions on shipment of lithium-ion batteries

Anyone shipping lithium-ion batteries in bulk is responsible to meet transportation regulations. This applies to domestic and international shipments by land, sea and air.

Lithium-ion cells whose equivalent lithium content exceeds 1.5 grams or 8 grams per battery pack must be shipped as "Class 9 miscellaneous hazardous material." Cell capacity and the number of cells in a pack determine the lithium content.

Exception is given to packs that contain less than 8 grams of lithium content. If, however, a shipment contains more than 24 lithium cells or 12 lithium-ion battery packs, special markings and shipping documents will be required. Each package must be marked that it contains lithium batteries.

All lithium-ion batteries must be tested in accordance with specifications detailed in UN 3090 regardless of lithium content (UN manual of Tests and Criteria, Part III, subsection 38.3). This precaution safeguards against the shipment of flawed batteries.

Cells and batteries must be separated to prevent short-circuiting and packaged in strong boxes.

Lithium-ion Safety Concerns

Because of the inherent instability of lithium metal, research shifted to a non-metallic lithium battery using lithium ions. Although slightly lower in energy density, the lithium-ion system is safe, providing certain precautions are met when charging and discharging. Today, lithium-ion is one of the most successful and safe battery chemistries available. Two billion cells are produced every year.

Long battery runtimes have always been the wish of many consumers. Battery manufacturers responded by packing more active material into a cell and making the electrodes and separator thinner. This enabled a doubling of energy density since lithium-ion was introduced in 1991.

The high energy density comes at a price. Manufacturing methods become more critical the denser the cells become. With a separator thickness of only 20-25µm, any small intrusion of metallic dust particles can have devastating consequences. Appropriate measures will be needed to achieve the mandated safety standard set forth by UL 1642. Whereas a nail penetration test could be tolerated on the older 18650 cell with a capacity of 1.35Ah, today's high-density 2.4Ah cell would become a bomb when performing the same test. UL 1642 does not require nail penetration. Lithium-ion batteries are nearing their theoretical energy density limit and battery manufacturers are beginning to focus on improving manufacturing methods and increasing safety.

Recall of lithium-ion batteries

With the high usage of lithium-ion in cell phones, digital cameras and laptops, there are bound to be issues. A one-in-200,000 failure rate triggered a recall of almost six million lithium-ion packs used in laptops manufactured by Dell and Apple. Heat related battery failures are taken very seriously and manufacturers chose a conservative approach. The decision to replace the batteries puts the consumer at ease. Let's take a look at what's behind the recall.

Sony Energy Devices (Sony), the maker of the lithium-ion cells in question, says that on rare occasions microscopic metal particles may come into contact with other parts of the battery cell, leading to a short circuit within the cell. Although battery manufacturers strive to minimize the presence of metallic particles, complex assembly techniques make the elimination of all metallic dust nearly impossible.

A mild short will only cause an elevated self-discharge. Little heat is generated because the discharging energy is very low. If, however, enough microscopic metal particles converge on one spot, a major electrical short can develop and a sizable current will flow between the positive and negative plates. This causes the temperature to rise, leading to a thermal runaway, also referred to 'venting with flame.'

Photo by Kumpan Electric on Unsplash

Lithium-ion cells with cobalt cathodes (same as the recalled laptop batteries) should never rise above 130°C (265°F). At 150°C (302°F) the cell becomes thermally unstable, a condition that can lead to a thermal runaway in which flaming gases are vented.

During a thermal runaway, the high heat of the failing cell can propagate to the next cell, causing it to become thermally unstable as well. In some cases, a chain reaction occurs in which each cell disintegrates at its own timetable. A pack can get destroyed within a few short seconds or linger on for several hours as each cell is consumed one-by-one. To increase safety, packs are fitted with dividers to protect the failing cell from spreading to neighbouring cells.

Safety level of lithium-ion systems

There are two basic types of lithium-ion chemistries: cobalt and manganese (spinel). To achieve maximum runtime, cell phones, digital cameras and laptops use cobalt-based lithium-ion. Manganese is the newer of the two chemistries and offers superior thermal stability. It can sustain temperatures of up to 250°C (482°F) before becoming unstable. In addition, manganese has a very low internal resistance and can deliver high current on demand. Increasingly, these batteries are used for power tools and medical devices. Hybrid and electric vehicles will be next.

The drawback of spinel is lower energy density. Typically, a cell made of a pure manganese cathode provides only about half the capacity of cobalt. Cell phone and laptop users would not be happy if their batteries quit halfway through the expected runtime. To find a workable compromise between high energy density, operational safety and good current delivery, manufacturers of lithium-ion batteries can mix the metals. Typical cathode materials are cobalt, nickel, manganese and iron phosphate.

Let the reader be assured that lithium-ion batteries are safe and heat related failures are rare. The battery manufacturers achieve this high reliability by adding three layers of protection. They are: [1] limiting the amount of active material to achieve a workable equilibrium of energy density and safety; [2] inclusion of various safety mechanisms within the cell; and [3] the addition of an electronic protection circuit in the battery pack.

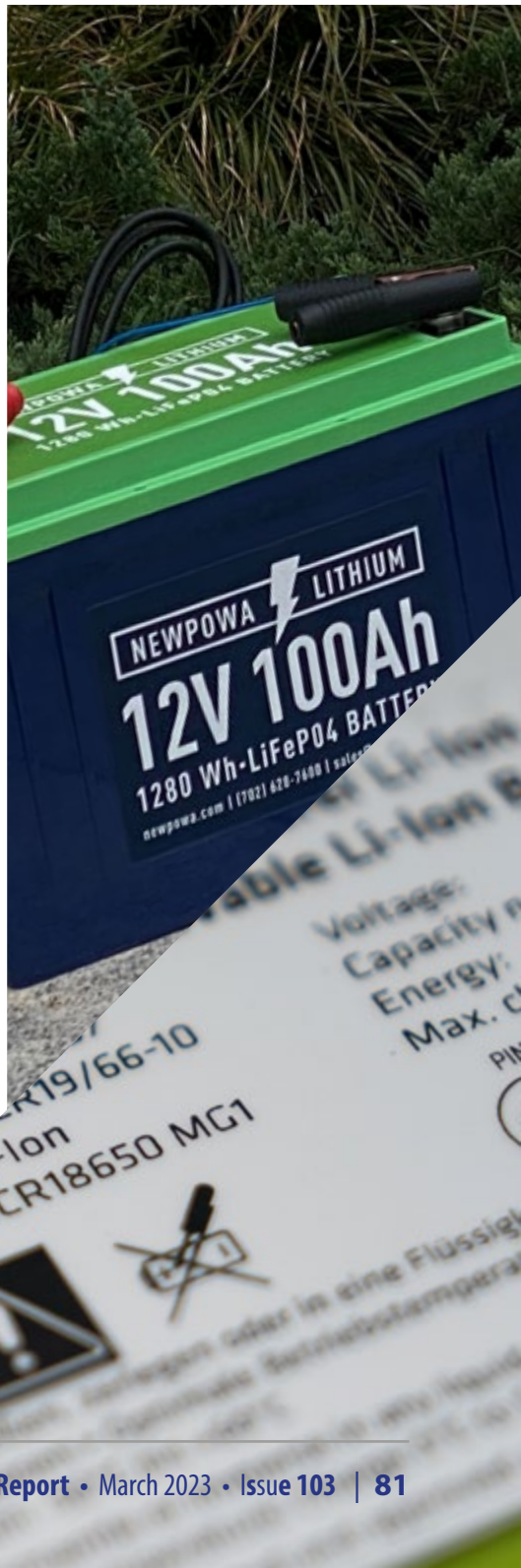
These protection devices work in the following ways: The PTC device built into the cell acts as a protection to inhibit high current surges; the circuit interrupt device (CID) opens the electrical path if an excessively high charge voltage raises the internal cell pressure to 10 Bar (150 psi); and the safety vent allows a controlled release of gas in the event of a rapid increase in cell pressure. In addition to the mechanical safeguards, the electronic protection circuit external to the cells opens a solid-state switch if the charge voltage of any cell reaches 4.30V. A fuse cuts the current flow if the skin temperature of the cell approaches 90°C (194°F). To prevent the battery from over-discharging, the control circuit cuts off the current path at about 2.50V/cell. In some applications, the higher inherent safety of the spinel system permits the exclusion of the electric circuit. In such a case, the battery relies wholly on the protection devices that are built into the cell.

We need to keep in mind that these safety precautions are only effective if the mode of operation comes from the outside, such as with an electrical short or a faulty charger. Under normal circumstances, a lithium-ion battery will simply power down when a short circuit occurs. If, however, a defect is inherent to the electrochemical cell, such as in contamination caused by microscopic metal particles, this anomaly will go undetected. Nor can the safety circuit stop the disintegration once the cell is in thermal runaway mode. Nothing can stop it once triggered.

A major concern arises if static electricity or a faulty charger has destroyed the battery's protection circuit. Such damage can permanently fuse the solid-state switches in an ON position without the user knowing. A battery with a faulty protection circuit may function normally but does not provide protection against abuse.

Another safety issue is cold temperature charging. Consumer grade lithium-ion batteries cannot be charged below 0°C (32°F). Although the packs appear to be charging normally, plating of metallic lithium occurs on the anode while on a sub-freezing charge. The plating is permanent and cannot be removed. If done repeatedly, such damage can compromise the safety of the pack. The battery will become more vulnerable to failure if subjected to impact, crush or high-rate charging.

Considering the number of lithium-ion batteries used on the market, this energy storage system has caused little harm in terms of damage and personal injury. Despite the good record, its safety is a hot topic that gets high media attention, even on a minor mishap. This caution is good for the consumer because we will be assured that this popular energy storage device is safe.



Lithium-Ion Batteries in Marine applications

By Ian Bartle

Ian is the Managing Director of Nobel Fire Systems Ltd. He has over 30 years' experience in the fire industry from technical sales through to senior management. He has developed significant experience in a wide range of disciplines from detailed fire equipment and systems design to product fire testing and certification across the full spectrum of fire suppression systems.

The increase in Lithium-Ion battery (LIB) technology is affecting every walk of life as we become surrounded by a myriad of differing formats and chemistries. With the millions of batteries already in circulation and the ever-increasing demand, incidents involving lithium-ion batteries are inevitably, becoming more common place. There is currently a thirst for knowledge around battery technology which means as incidents occur, they are very much thrust into the spotlight. We should however get some perspective around these incidents, acknowledging the quantity of them is still relatively small, and look to rationalise the reasons behind them.

The task of gathering incident information on these worldwide events is both difficult and time consuming and I am pleased to be able to include a link that provides some of the pertinent statistics at **https://www.evfiresafe.com/**. Thank you to EV Fire Safety for sharing these important facts with us and allowing the link so readers can view the information you have gathered.

The events that we see in the media are predominantly linked to more domestic use of Lithium-Ion batteries such as E-scooters and E-bikes. Incidents of this type have become very prominent and continue to grow in number prompting authorities such as Transport for London to issue

a ban on them across their transport network. EV incidents are growing in number and as their global uptake increases so will the quantity of reported incidents.

This shouldn't come as any great surprise as this type of battery energy storage technology is subject to a wider, less controlled, and regulated circulation in a domestic setting where owners can be completely oblivious to the potential risk that these devices can pose. This isn't their fault necessarily as there is scant information available around key safety factors.

Familiarity with phones, laptops and hand tools with their ease of use and charging also breeds complacency and an expectation that you can treat them any way you please. This lack of understanding has translated into major incidents and now sadly deaths.

Larger more commercial and industrial energy storage system failures do happen. Take for instance the BESS installation in McMicken Arizona, and the Orsted BESS installation in Liverpool, as well as the sinking of the cargo ship Felicity Ace carrying thousands of EVs to name just a few. All of these were highly publicised due to their early occurrence in this emerging technology each with a large, hazardous, uncontrolled, and protracted nature.

That isn't to say there are lots of these types of incidents, which again is understandable as they are borne from highly regulated and responsible industries that are wise to the risks and mitigate against creating issues which could escalate to the point of thermal runaway. When you consider the reasons why LIB's enter thermal runaway, physical abuse tops the charts as the most likely cause of failure, followed by other forms of "abuse". These can include mischarging, thermal overheat fluctuations, battery management and control, manufacturing faults or their environmental conditions. The latter of these reasons are particularly pertinent for fixed installations, be they installed in land or marine applications.

Fires of this nature create headlines, far more than their traditionally fuelled counterparts. We have simply become a little desensitised to car, boat and house fires which experience fire in the more "traditional" sense.

The one overriding reason that LIB fires hit the headlines is down to their ferocity. Fires are intense, destructive, and protracted. The level and duration of fire service attendance required is invariably extensive and expensive. The Felicity Ace incident demonstrated the potentially destructive results which can occur when limited fast and decisive firefighting interaction is hindered.

Battery technologies are evolving with various reports stating there are changes around energy density, safer chemistry and battery structure, while some of these benefits will get to us sooner, some may be 5-10 years in development. Battery manufacturers are in search of nirvana, a safe, ultra-stable product that stores huge amounts of energy in the smallest format possible. They must be able to release that stored energy on demand in a controlled and safe manner with the greatest possible resistance to shock and vibration. They have to cope with greatly varying environmental challenges around temperature and humidity and they must have the ability to recharge as rapidly as possible. This is an impatient world we live in.

Marine applications can amplify some if not all of these challenges. Temperature changes can be wider and more rapid, with moisture levels a continual battle. Batteries, during their charge and discharge function produce heat which needs to be adequately catered for whilst maintaining an ability to resist water ingress.

Electrically energised equipment fires are nothing new and there are both manual and automated fixed fire suppression methods which can deal with these "standard" electrical risks admirably. Lithium-Ion battery fires however, present significant additional risks to standard energised control rooms and plant. The term "thermal runaway" being the final and destructive outcome to be avoided at all costs.

Thermal runaway is a cycle of ever-increasing temperature within the structure of the battery cell that once initiated self-perpetuates irreversibly into the release of toxic and explosive gas vapours. This is the thermal runaway process which can happen gradually or explosively producing high volumes of gaseous vapours with the appearance of a very thick smoke cloud. This initial localised failure affects surrounding cells and structures very quickly, resulting in an incident that is both self-sustaining and deep seated in nature.

As fire engineers we have a number of fire suppression agents that can be deployed, however the potentially explosive gas release coupled to the escalating heat production and self-sustaining deep-seated risk eliminates the use of so many and makes containment and suppression of that incident difficult and protracted. There is no one agent that encompasses all of the virtues needed to deal with a fire of this nature although some get close. The fires are invariably deep seated and obscured sources preventing direct access for cooling, flame front attack or chemical interaction. This in turn means that the fires have an ability to escalate and become more intense before suppression agents have chance to exhibit their worth.

Some agents can be applied from fixed equipment automatically and some through hand portable devices such as extinguishers. I personally prefer the fixed route as I believe the exposure of untrained personnel to such a high risk is a health and safety hazard too far. Even the best trained fire fighters need to evaluate the developing fire to stop, start and reposition to get the best out of the portable device and agent idiosyncrasies. This must also be done in breathing apparatus and protective firefighting kit from as safe a location as possible.

Guidance documents and standards are in continual development with various agencies around the world. As the understanding and best practices evolve leading documents such as UL 9540a and NFPA 855 will encompass these changes and set out clearer guidelines and assistance. In addition to those global standards, testing of various firefighting agents will establish application rates and deployment methods in "Type testing" scenarios. These are usually completed by manufacturers of fire systems and undertaken by independently assessed test houses to some form of recognised bench marking process. These include and are not limited to authorities such as DNV, UL, BSI, MCA, IMO etc.

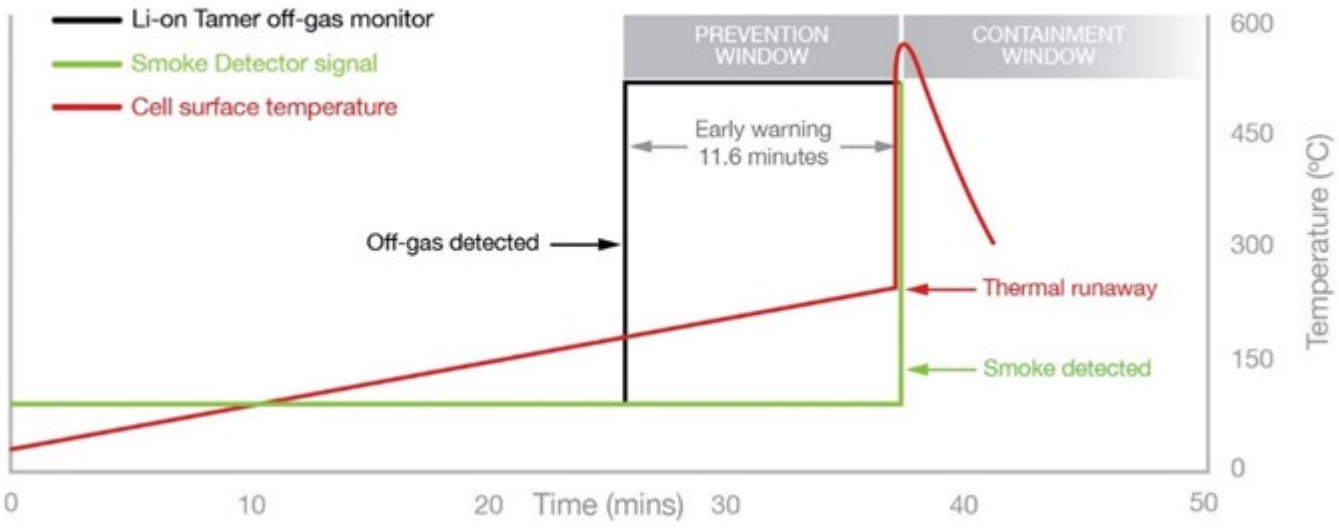
As a fire company we believe prevention is always better than the cure and we also believe there should a multistage approach to fire protection. With this particular type of fire risk there is no one fire suppression agent or application method that provides 100% security. Part of that protection package is to provide an early warning signal that detects when batteries are approaching the point of thermal runaway, the point of no return. This early warning symptom is known as the "Off Gas" stage which occurs in the short period just before thermal runaway commences.

The Off Gas element of battery breakdown consists of very specific types of gases and there is now a detector available which is designed specifically to be sensitive and reactive to these gases. Testing has shown that if these gases are sensed early enough and the charge or discharge process of that battery can be isolated then invariably thermal runaway can be prevented.

Typically, those "off gases" pre-thermal runaway are Carbon Monoxide, Methane, Ethane and Ethylene and as thermal runaway commences those gases and vapours can include Hydrogen Chloride, Hydrogen Fluoride and Hydrogen. The production of these usually leads to a fire which could be in an explosive or deflagration format involving further exposed cells usually resulting in an ever-increasing intense fire as thermal runaway rolls through packs of cells or pouches.

Independent testing of these detectors and their controls has been undertaken to establish, sensitivity, speed of reaction, and repeatability of that function coupled to long term reliability. The following graph shows the variable time potential for intervention before thermal runaway becomes unavoidable. What also becomes visible is the issue with the time taken for standard detection methods to receive their initiating conditions of both heat and smoke production. It is clear both are too close to the point thermal runaway commences, to prevent it.

Battery failure timeline



The primary course of action is to send a signal to the Battery Management System to shut off power to batteries, with the aim of preventing any further increase in battery cell temperature, i.e. lower than the point of thermal runaway. Also, ventilation activation to remove flammable gas accumulation, if required.

UL 9540a recognizes and quantifies off-gas events as pre-cursors to thermal runaway, while independent testing by DNV-GL has concluded that Li-ion Tamer® can prevent thermal runaway after a two-year battery failure testing program.

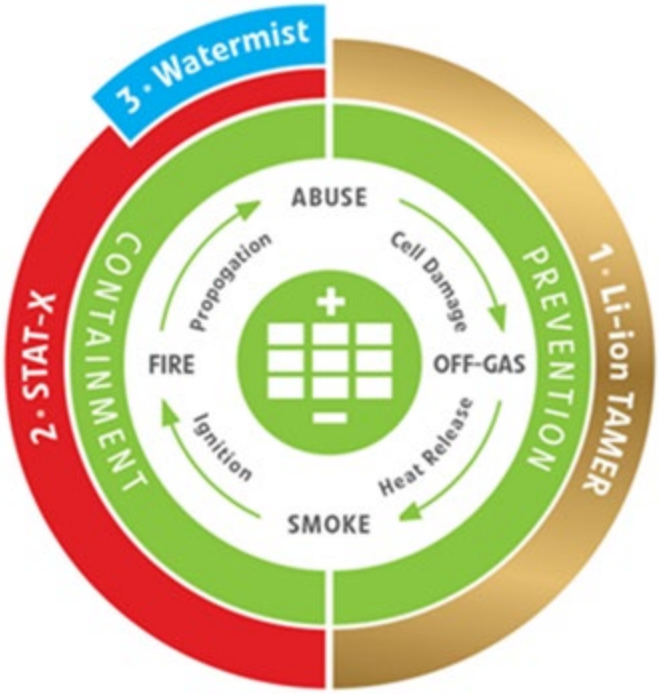
Fire suppression and containment becomes the next phase of protection. Some fire suppression agents are reliant on the reduction of oxygen, some on a chemical gas producing a cooling effect whilst others provide a chemical reaction with the burning material. A number of fixed system agents have undergone fire testing by independent authorities to an established set of risk parameters and an established battery installation set up to set a performance benchmark.

We utilise two of those agents to provide a second and third level of protection. Initially we utilise Stat-X a condensed aerosol that has been tested to UL 9540a and DNV which imparts a penetrative gaseous suspension of Potassium Nitrate particulate into the deep-seated battery configuration to suppress and contain the fire chemically.

DNV testing has concluded that Stat-X® can put out a lithium-ion battery fire, that residual Stat-X® airborne aerosol in the hazard will provide additional extended protection against a re-flash of the fire, and that Stat-X® can reduce oxygen in an enclosed environment during a battery fire. (Fireaway DNV report March 2017) It is however essential to remember that access of the agent to the point of ignition of the fire is greatly restricted by the structures and enclosures around the affected battery cell, so the chances of getting agent to the seat of the fire are greatly constrained.

Every battery installation and ESS set up should be subject to an individual assessment of risk and it cannot be assumed that even though some products have undergone very successful fire testing that it will be successful when set up in a generalised configuration.

All parameters that could inhibit effective detection and the suppression agent's successful deployment must be considered.



It is these restrictive influences that prompts the consideration of a third level of protection, water-based containment. This provides cooling to the affected area and also sets up a physical barrier of water spray that should be designed to create a larger area of entrainment to encompass the affected area whilst providing cooling to the surrounding structures. Water mist lends itself better to marine applications than standard sprinklers due to their superior heat absorption capabilities and lower water volume demand.

When those fire suppression resources are to be deployed would be determined by a detailed understanding of the environment into which those batteries are contained, coupled to an effective fire detection management system.

For more information visit the company's website at **https://nobel-fire-systems.com/**.

Key trends *driving* marine insurance claims activity

from fire to inflation

Fire and explosion incidents cause the most expensive insurance claims in the marine industry, while at a time of rising exposures and inflation, cargo damage is the most frequent cause of loss, according to Allianz Global Corporate & Specialty (AGCS). The marine and cargo insurer analyzed more than 240,000 marine insurance industry claims worldwide between January 2017 and December 2021, worth approximately €9.2bn in value, and has identified a number of claims and risk trends that are driving major loss activity in the sector. Inflation is another key concern for marine insurers and their policyholders as recent increases in the values of ships and cargos mean losses and repairs are becoming more expensive when things go wrong.

[1] Allianz Global Corporate & Specialty, Lithium-ion Batteries: Fire Risks and Loss Prevention Measures in Shipping

[2] Splash 247.com, Value of the Global Merchant Fleet Hits an All-Time High, August 23, 2021

*"**The number of fires on board large vessels has increased significantly in recent years, with a string of incidents involving cargo, which can easily lead to the total loss of a vessel or environmental damage,**"* says Régis Broudin, Global Head of Marine Claims at AGCS. *"**At the same time, the shipping sector is also having to deal with many other challenges including a growing number of disruptive scenarios, supply chain issues, inflation, time-pressured crew members and employees, increasing losses and damages from extreme weather events, implementing new low-carbon technology and fuels, as well as Russia's invasion of Ukraine.**"*

Fires accounted for 18% of the value of marine claims analyzed (equivalent to around €1.65bn) compared with 13% for a five-year period ending July 2018. A contributing factor to this increase of fire risk on board vessels is often mis-declared/non-declaration (of) dangerous cargos, while a recent increase in engine room fires may reveal some underlying risk around crew competencies. The potential dangers that the transportation of lithium-ion batteries on vessels pose only add to these concerns, with AGCS having already seen a number of incidents. A report from AGCS highlights a full list of loss prevention measures to consider here. [1]

Inflation driving up the values of vessels, cargo and repairs in a time of growing exposures

With many countries seeing rates at or around 10%, inflation is compounding existing trends driving higher claims severity. The rising prices of steel, spare parts and labour are all factors in the increasing cost of hull repair and machinery breakdown claims.

In addition, the value of both vessels and cargo has been increasing at a time of growing exposures associated with bigger ships, the largest of

which can carry 20,000 containers at one time. The combined value of the global merchant fleet increased 26% to $1.2trn in 2021 [2] while the average value of container shipments has also been rising with more high-value goods such as electronics and pharmaceuticals. It is not unusual to see one container valued at $50mn or more for high-value pharmaceuticals.

Damaged goods, including cargo, is the top cause of marine insurance claims by frequency, and the third largest by value, the AGCS analysis shows. The most common claims are physical damage, typically from poor handling, storage and packing. However, recent years have also seen a number of high-value theft and temperature variation claims – the latter can particularly impact pharmaceuticals. Theft is the third most frequent cause of claims with criminals targeting consumer electronics and high-value commodities such as copper. Cargo is typically stolen from ports, warehouses or during transits. The recent boom in container shipping has also affected cargo claims with a global shortage having resulted in substandard and damaged containers being brought back into use resulting in losses.

"***The risk of theft and damage to high-value cargos needs to be addressed with additional risk mitigation measures, such as GPS trackers and sensors that provide real-time monitoring on position, temperature, moisture shock, and light and door openings, for example,***" says Captain Rahul Khanna, Global Head of Marine Risk Consulting at AGCS. ***"At the same time cargo interests need to keep a close eye on insured values. Clients may need to adjust their insurance and policy limits, or risk being underinsured – we have already seen claims for high value container cargos where the cargo interest was underinsured by as much as $20mn."***

AGCS also identifies a number of risk trends in the analysis that are likely to impact loss activity in the marine sector – both today and in the future:

Sources of disruption continue to increase: Recent years have seen a number of maritime incidents, natural catastrophes, cyber-attacks and the Covid-19 pandemic cause major delays to shipping and ports. Further disruption has also been caused by congestion, labor shortages and constrained container capacity. There are also greater concentrations of cargo risk on board large container vessels and in major ports, so any incident has the potential to simultaneously affect large volumes of cargo and companies.

Commercial pressures are already a contributing factor in many losses that have resulted from poor decision-making. With the pressure on vessels and crew currently high, the reality is that some may be tempted to ignore issues or take shortcuts, which could result in losses.

Climate change is increasingly affecting marine claims: Natural catastrophes is already the fifth biggest cause of marine insurance claims, by frequency and severity according to AGCS analysis. Extreme weather was a contributing factor in at least 25% of the 54 total vessel losses reported in 2021 alone, while drought in Europe during 2022 again caused major disruption to shipping on the Rhine. In the US, it dropped inland waterways around the Mississippi River to levels not seen for decades, impacting global transportation of crops such as grain.

A more sustainable, greener approach in shipping sector is needed, but comes with risks: Efforts to decarbonize the shipping industry, which is a major contributor to global greenhouse gas emissions (GHGs) will also impact claims going forward. Reducing GHGs requires the shipping industry to develop more sustainable forms of propulsion and vessel design and use alternative fuels. As much as the introduction of new technology and working practices is needed to move to a low-carbon world, it can result in unexpected consequences – insurers have already seen a number of machinery breakdown and contaminated fuel claims related to the introduction of low sulphur fuel oil in recent years as part of the move to cut sulphur oxide emissions. Machinery breakdown is already the fourth largest cause of claims by frequency and value.

Impact of Russia's invasion of Ukraine: The shipping industry has been affected with the loss of life and vessels in the Black Sea, trapped vessels in blocked Ukrainian harbours and the growing burden of sanctions. Although the signing of the 'Black Sea Grain' Initiative in July 2022 enabled some vessels trapped in ports to move out of the conflict zone others remain. The full value of these trapped vessels is unclear, but industry reports have estimated it could be as much as $1bn. Under some marine hull and cargo insurance policies an insured party may be able to claim for a total loss after a specific time has passed since the vessel/cargo became blocked or trapped.

Beware of the danger of in-transit fumigation

Many agricultural bulk cargos and forestry products are required to undergo fumigation on board ships to prevent infestation. However, to achieve the efficacy, the fumigation operation started at the load port often needs to continue in transit to the discharge port. Such "in-transit fumigation" may endanger the safety and lives of crew members and shore-based personnel if not handled properly. The toxicity of the fumigant makes it extremely important to raise awareness of the dangers of in-transit fumigation.

In transit fumigation begins at the load port with application of the fumigant in the loaded cargo holds by an expert "fumigator in charge" followed by gas-tight sealing of the hatches. The process is intentionally continued in the sealed space during the voyage. According to IMO Recommendations on the Safe Use of Pesticides in Ships applicable to the Fumigation of Cargo Holds (IMO Safety Guidelines), in transit fumigation is at the discretion of the master. However, the process is common for agricultural products. This is reflected in the 2015 BIMCO clause that provides time or voyage charterers with the option to fumigate cargo in transit at their cost and risk provided the fumigation is in conformity with the IMO Safety Guidelines.

Hydrogen phosphide (phosphine) is the fumigant used in transit. Phosphine gas is toxic and in concentration, fatal to humans. Inhalation of this fumigant may cause respiratory problems, nausea and ultimately suffocation. Tragically, seafarers have lost their lives due to leaks into accommodation spaces or by entering an enclosed space where the gas is active.

Safety steps for in-transit fumigation

- **The IMO Safety Guidelines** specify that at least two members of the crew (including one officer) after receiving training, should be designated as the trained representatives of the master responsible for ensuring that safe conditions in the accommodation and working spaces are maintained in-transit. Training includes familiarity with the relevant Safety Data Sheet and recommendations of the fumigant manufacturer concerning methods of detection of the fumigant in air, its behaviour and hazardous properties, symptoms of poisoning and treatment and emergency procedures.

- **Pre-fumigation Inspection:** As part of the process of determining whether in-transit fumigation can be carried out safely, the trained representative of the master and the fumigator in charge appointed by the shipper/charterer should conduct a thorough pre-fumigation inspection of the vessel, while the holds are empty. Such an inspection will also ensure that the fumigation team is fully aware of the vessel's condition, e.g., whether the relevant cargo holds are sufficiently gas-tight to prevent seepage of toxic gas to the accommodation and/or working spaces.

The fumigator in charge should present documentation attesting his competence and that of his team, as well as the letter of appointment from the shipper/charterer.

The fumigator in charge should provide to the master a written statement attesting the result of the pre-fumigation inspection, as well as the intended fumigation procedure, including specific comments regarding the type(s) and quantity of fumigant to be used in each hold, the hazards involved and safety precautions to be taken.

- **Familiarization:** Prior to any fumigation, the master must ensure that the relevant officers and crew have been made familiar with the fumigant label, detection methods, as well as safety and emergency procedures.

- **Equipment:** Adequate respiratory protective equipment and gas detection equipment must be available on board and the crew should be well trained in how to use the specific equipment. The fumigator in charge should also ensure that the necessary equipment on board is in good condition and that adequate equipment is available to monitor the air in accommodation and working spaces. The relevant officers and crew must also be shown how to use the equipment.

- **Commencing fumigation and checking for leaks:** Fumigation must not commence until all cargo operations have been completed and all unauthorized personnel have left the unsafe areas of the ship. The fumigator in charge must remain on board long enough for the gas concentrations to build up to a level where testing for leaks can be carried out. Prior to final departure from the ship, the fumigator in charge shall furnish the master with a certificate stating that each hold has been checked for leakage and proper sealing and that all living and working spaces are gas-free.

- **Warning signs and sealing off unsafe areas:** All crew members on board must be made aware of the spaces that are being or have been fumigated, and hence are considered unsafe. This may include adjacent spaces which have not been treated. All entrances to unsafe areas must be posted with adequate "Poisonous Gas" warnings, properly signed and dated by the fumigators. Often, as an additional safety measure, plastic sheeting is used to seal off areas adjacent to hold access points. Special attention should be paid to the dangers of adjacent spaces to cargo holds where fumigants may leak and linger even after the fumigated cargo has been discharged.

- **Monitoring during the voyage:** During the voyage the PH3 concentrations in living or working spaces should be monitored at regular intervals as instructed by the fumigator-in-charge, in order to detect any unexpected gas seepage as quickly as possible. The IMO Safety Guidelines specify 8-hour intervals or more frequently if so advised by the fumigator in charge. The readings should be recorded in the vessel's logbook.

- **Dispersal of fumigant gas:** The fumigator in charge should also issue instructions stating how the fumigant gas is to be dispersed at the end of the period of exposure. This is usually done via the hold ventilation system and/or by opening the hatches. During dispersion it is important to avoid gases blowing into enclosed accommodation/working spaces and to keep persons away from the holds. The IMO Safety Guidelines specify that not less than 24 hours in advance of arrival at the discharge port, the master should inform the appropriate authorities that in transit fumigation is being carried out and whether ventilation is in process.

- **Disposal of fumigant residues/ remnants:** Instructions should also be given by the fumigator in charge at the load port on how fumigant residues/remnants are to be safely and properly disposed of using appropriate safety equipment. If the instructions are that this will be done by shore labour at the discharge port, those representing cargo interests should be advised before discharge commences.

Top up fumigation of log cargos

Unlike grains, log cargos require additional "top up" fumigation while in transit. This process has been done by an expert fumigator in charge who begins the fumigation process at the load port and sails with the vessel to discharge port.

For logs bound for China, the Covid-19 pandemic restrictions have changed this practice and charterers continue to request that the crew perform the top up in-transit under remote supervision and without an expert fumigator on board.

Handling fumigants by crew is not recommended

The IMO safety guidelines states that the crew should not handle fumigants and requires fumigation to be conducted by qualified operators. The BIMCO Fumigation Clause provides that the charterers have the option to fumigate the cargo holds in transit. However, "such fumigation shall be performed always in accordance with IMO Recommendations on the Safe Use of Pesticides in Ships applicable to the Fumigation of Cargo Holds, MSC.1/Circ.1264 (IMO Recommendations) and any subsequent revisions" Thus, the inclusion of the BIMCO Cargo Fumigation Clause does not necessarily include the top up procedure as top up requires the crew to handle the fumigant which is contrary to the IMO recommendations.

Due to COVID restrictions, some flag and port states have approved the use of crew members, trained and deemed competent by a fumigation company, to carry out the on-board technician role involved in fumigant (phosphine) top up and leak testing. This practice should not continue once COVID restrictions have eased. Should Members be pressed to accommodate the charterer's request to perform top up fumigation of logs or any other cargo by the crew, Members should seek guidance from the Club.

The importance of considering symptoms of phosphine gas exposure

According to the Centers For Disease Control, the symptoms for mild to moderate exposure to phosphine gas include: severe lung irritation; chest tightness or burning chest pain; cough, sometimes productive of fluorescent green sputum; difficulty breathing or shortness of breath (dyspnea); and accumulation of fluid in the lungs (pulmonary edema). Cardiovascular effects include abnormally low blood pressure (hypotension), irregular heart rhythm (dysrhythmia), and decreased ability of the heart to pump a normal blood volume. Nervous system effects include headache, restlessness, irritability, dizziness, lethargy, drowsiness, fatigue, loss of feeling, impaired gait, trembling of the extremities during movement, and double vision. Gastrointestinal effects include nausea, vomiting (emesis), diarrhoea, abdominal pain, gastrointestinal distress, and liver injury. General effects include sweating and bluish discoloration of the skin (cyanosis).

In the case of illness among crew members during fumigation operations one must never exclude the possibility that the individuals may be suffering from poisoning by the toxic fumigant gas. There are cases of crew members thought to have been suffering from seasickness or food poisoning and told to go to bed, never to wake up again. If there is a gas leak into the accommodation area, the worst place to stay could be the cabins.

There is no antidote to phosphine poisoning. Treatment consists of supporting respiratory and cardiovascular functions. In an emergency onboard a ship it is important to get the victims into fresh air.

The IMO Safety Guidelines on fumigation specify carriage aboard a copy of the latest version of the Medical First Aid Guide for Use in Accidents Involving Dangerous Goods (MFAG). The Guide is reproduced in the Supplement of the IMDG Code. Information about on-board treatment for inhalation of poisonous gases can also be found on the Mariners Medico Guide.

The Mariners Medical Guide is a digital app designed by doctors specialised in maritime medicine as an assessment tool specifically for seafarers while at sea. It is possible to search by symptoms as well as condition, and it is written in easy-to-follow language and steps. It can be downloaded for free for desktop as well as Apple and android mobile devices. Once downloaded, the medical guide is available without internet access. The Mariners Medico Guide includes contact details and links to shore based telemedical assistance and is approved by the Norwegian flag state.

IIMS is grateful to Gard P&I Club, the authors of this article.

Unpicking the maritime decarbonization conundrum

By Rear-Admiral John Nadeau

Efforts to decarbonize the maritime industry are underway. The shipping industry has faced and overcome significant hurdles in the past. Just two years ago, we were on the cusp of "IMO 2020" and the implementation of the global fuel sulfur cap. Many were worried about the implications, and some predicted it would cause great turmoil. But in retrospect, and in comparison to the challenges we face today, IMO 2020 seems so easy.

Where are we?

COP27 ended a few months back. Headlines highlighted the creation of a "loss and damage" fund, new green corridors, clean energy hubs, and other maritime initiatives, as well as the increasing scrutiny and scepticism about 'greenwashed claims' and ambitious plans that lack details.

Initial goals and targets have been set and the clock is ticking, but the global regulatory landscape is still evolving. The 79th session of IMO MEPC kicked off on December 12th and member states from all over the world gathered again to discuss levels of ambition for decarbonization, goals and targets to eliminate GHG emissions from shipping, life cycle analysis of alternative fuels and "well to wake" impacts versus "tank to wake" impacts, and additional measures to supplement CII and EEXI regulations, which kicked in on 1 January 2023. Meanwhile, the EU continues its independent efforts to implement maritime decarbonization measures in its "Fit for 55" package.

Unlike previous challenges, the maritime industry can't solve this one on its own. There is no silver bullet. There are some technical hurdles that still must be overcome, but engine manufacturers are confident they can develop combustion engines that run on LNG, methanol, ammonia, hydrogen, and other fuels. However, the availability of carbon-neutral 'green' fuels that have been sourced and produced in a sustainable fashion remains an immense challenge.

Given their compatibility with existing vessel equipment and port infrastructure, biofuels are an attractive option. But there is not a sufficient supply of sustainable biomass to produce enough biofuel to meet the global maritime demand, especially when competing with the aviation industry. Carbon capture and storage technology needed to permit sustainable use of existing fossil fuels remains quite expensive and energy intensive and may never be 100% effective. Production of clean-burning e-hydrogen and e-ammonia requires huge amounts of renewable electricity. In addition, e-methanol and e-LNG also require sustainable carbon from biogenic sources or direct air capture.

Absent a miraculous breakthrough in chemistry or science, wide availability of carbon-neutral green fuels will require the wide availability of renewable energy produced from solar, wind, hydro, nuclear, or other sustainable sources. And they won't be cheap. In addition, enormous investments in infrastructure are needed to accommodate the transition to new fuels. A recent study from DNV estimates that in order to decarbonize shipping by 2050 more than $100B may need to be invested in vessels and onshore infrastructure annually. Depending on the fuel pathway chosen, the total CAPEX could be over $2T.

Lastly and most importantly, though often overlooked or understated, the ability to safely handle some of these fuels on ships and in ports remains an area of great concern.

What do we know?

The regulations will change. IMO will continue to work on its agenda, but the pace of action may remain slower than most would like, and progress will probably be difficult. Any changes or revisions will likely be aimed at accelerating decarbonization while also ensuring it is a 'fair and just' transition that does not have 'disproportionately negative impacts' on the least-developed countries and small island developing states. Stakeholders remain committed and the demand for decarbonization will only intensify.

The U.S. strategy will change and evolve. As was recently announced by the U.S Department of State, DOE, DOT, EPA, and HUD will release a "transportation sector decarbonization blueprint" in early 2023 and then develop a "U.S. maritime decarbonization strategy" for the domestic maritime sector; however, we don't yet know what this plan will contain or look like.

Global factors impacting the transition will change, but it is difficult to predict how. Russia's invasion of Ukraine and the seismic shift in the energy markets and trading patterns demonstrate that we can't rule out 'black swan' events, our assumptions are not always right, and our best plans could be derailed overnight.

What don't we know?

We don't what will result from IMO's efforts to revise the ambitions and strategy, develop mid and long-term measures, and incorporate the life cycle assessment and "well to wake" impacts of alternative fuels.

We don't know the timeline for achieving consensus and implementing any new mandatory requirements.

We don't know what impact global inflation and other contemporary events may have on decarbonization of the maritime sector.

Lastly, we don't know when renewable carbon-neutral fuels will be readily, reliably, and globally available for all commercial vessels.

What should vessel owners, operators, charterers, and other industry stakeholders do now?

That all said, don't despair. I'm an optimist and remain confident that we will all get through this. It won't be as easy as reducing sulfur emissions and implementing IMO 2020, but we will successfully decarbonize the maritime industry. Here are some actions all stakeholders should consider taking at this time:

1. **Focus on efficiency.** Better efficiency will lower the energy intensity of vessel operations regardless of what fuel is used. Pursue effective design measures to increase the efficiency of propulsion machinery, electrical machinery, and hull and propeller. Similarly, pursue operational measure such as optimum speeds and weather routing to reduce fuel consumption. "The greenest fuel is the fuel that you don't use."

2. **Get involved.** Engage others like never before. Watching from the side-lines is not a good option. We all need to be in the game and doing our part. Connect and network with industry peers, clients, customers, equipment suppliers, and service providers. Membership in the Blue Sky Maritime Coalition and similar groups connect stakeholders across the entire value chain and provides a means for engagement.

3. **Collaborate.** Within your industry segment, across segments, and across industries. Collaborate across the entire value chain and ecosystem of energy providers, fuel producers, bunker suppliers, ports, engine and fuel system manufacturers, vessel designers, shipyards, shippers, banks & financing, labor and seafarers, P&I clubs, regulators, and other stakeholder groups. Create and sustain an open, transparent dialogue that seeks to identify areas of mutual interest and benefit.

4. **Develop a personalized compliance strategy**. Every company's decarbonization journey will be unique. The approach to decarbonization for a short-sea ferry operator will probably be much different than the strategy pursued by a company operating a fleet of tankships engaged in the spot market. Understand your risk profile, your threats, and your opportunities. Determine what a successful decarbonization transition looks like for you and your company. Map out the problem, identify your key factors, your corporate ESG goals, your recapitalization plan, your major influencers, your enablers, and catalysts, and build a personalized strategic framework to help you determine when and how you will make critical decisions.

5. **Consult and connect with outside experts.** The challenge of decarbonization deserves the best possible analysis, planning, and preparation. Seek insight from consultants, advisors, and experts outside your organization. Get fresh ideas and perspectives. Have others challenge your thinking and assumptions to ensure your compliance strategy and decision framework are as robust as possible.

6. **Stay informed and adjust.** Actively monitor the landscape and adjust and update your strategy and framework as new information becomes available, existing standards are revised, new regulations are promulgated, technology advances and matures, alternative fuel infrastructure is developed, and financing and incentives evolve. Use your compliance strategy to navigate the sea of change that continues to emerge and apply your decision framework to introduce structure and order in this chaotic and dynamic environment.

7. **Know when to act and do so.** These are challenging times for senior leaders faced with these critical decisions. Complete the preparation necessary to give you the confidence to act decisively. Not everyone can be a "first mover" or early adopter. At this time, it may be best for some companies to exercise 'strategic patience' and preserve their options and decision space. Though some may be best served by waiting until the viability of different potential solutions becomes clearer, all companies should remain prepared to capitalize on technological developments, partnerships, grants, tax incentives, and other options to offset any additional operational risk and cost associated with decarbonization. Don't miss windows of opportunity to make significant advances on your personal decarbonization journey with relatively low risk.

ABOUT THE AUTHOR

John Nadeau (email: John@NadeauMaritime.com) serves as a senior advisor and maritime consultant to owners and operators of commercial vessels, port facilities, and other maritime stakeholders. Recent areas of emphasis include decarbonization and alternative fuels, offshore wind and fossil fuel production, and corporate safety culture assessment. Before retiring from the U.S. Coast Guard in 2021 with 32 years of service, Rear Admiral Nadeau was the Commander of the USCG's Eighth District, where he led 4,500 personnel and was responsible for all Coast Guard operations in a large region spanning 26 states that included the ports of Houston, New Orleans, Corpus Christi, Port Arthur and Mobile, and all waterways from the Florida panhandle to the U.S./Mexico border, the Gulf of Mexico and Outer Continental Shelf, and the Mississippi, Ohio, and other western rivers. He also served as the Coast Guard's Assistant Commandant for Prevention Policy and the senior executive for Coast Guard regulations, policy, and programs to promote marine safety, maritime security, and environmental stewardship.

Automation & situational awareness: Key considerations

As the transition towards autonomous vessel operations begins to advance, the situational awareness of the system operator is key. Thus, it is imperative that the system operator has the knowledge and understanding to be able to assess and, if required, correct any malfunction or abnormal behaviour caused by the system.

With autonomous operations, it is crucial that operators have the knowledge and acumen to be aware of automation bias and complacency and the influencing factors of human input. According to a recent study, more than half of the participants displayed signs of trust in the autopilot.

This is despite acknowledging various cues such as the vessel's position altering and the sounding of the off-track alarm, highlighting that seafarers require additional training to help develop and enhance their situational awareness to ensure that they are equipped with the skills and knowledge should they experience situations such as this on watch.

As a matter of fact, due to the high technical level of autonomy, it would be easy for an operator's situational awareness to begin to degrade over time and for the operator to ultimately become complacent under autonomous operation.

"Should the autonomous system degrade or lose its reliability, the officer's situational awareness should not be negatively affected allowing them to correct the fault. However, should an officer's situational awareness begin to degrade, it will result in a slower reaction time in fault detection which will have a resultant impact on the individual's reorientation time with regard to their current situation and system parameters," the study concluded.

HOW AUTOMATION BIAS AFFECTS NAVIGATION

Automation bias can occur due to the uncertainty of the operator, resulting in the operator beginning to search for evidence to justify their decision-making. Poor decision-making can occur when the system malfunctions to a level where the human operator begins to trust the system against their own knowledge, judgement and understanding of the situation.

With autonomous technology aiming to reduce the human error in incidents, maritime officers may become accustomed to a much slower paced working environment than they are currently experiencing. As a result, the day-to-day operations of the wheelhouse may become far more mundane and monotonous, introducing a potential risk of automation complacency.

Furthermore, with seafarers being subjected to a slower paced working environment, research has shown that there are fundamental problems with monitoring and a work underload which ultimately results in a difficulty in vigilance retention.

BENEFITS OF ADOPTING AUTOMATION TECHNOLOGIES

As Callum O'Brien, Deputy Underwriter, Standard Club, has explained, "the advantages of autonomous ships are plentiful. They eliminate human error, reduce crewing costs, increase the safety of life, and allow for more efficient use of space in ship design and efficient use of fuel."

When further considering what does automation has to offer shipping, two key factors always come up:

1. Avoiding collisions with AI and machine learning: Machine learning avoidance systems are able to collect data based on position, speed, and route to suitably assess the risk of collision. By using collision avoidance systems, ships can leverage data to create an awareness system that predicts hazards, alerting operators of impending collisions. These systems calculate the risk of collision and near-misses from traffic control rooms, giving the ability to operators to proactively detect vessels at risk and prioritise them. "This will help in preventive planning while offering accurate information to vessels," says Hiraku Fujimoto, manager of systems division IV, social systems unit at Fujitsu Limited.

2 Reducing fuel consumption with autonomy: Another positive of using AI and machine learning techniques, is that operators are given the right tools to predict sea conditions, while they also allow ship captains to alter their fuel consumption. As a matter of fact, scientists from Shell and the University of Southampton have trialed a new digital dashboard that predicts sea conditions whilst also interpreting the depth and angles of a ship to optimise the amount of fuel needed in any situation.

TIMELINE OF LATEST DEVELOPMENTS

More and more companies and organizations are starting to adopt autonomous technologies. In fact, 2022 saw plenty of these projects initiated or announced:

February 2022: MOL completed a successful sea trial of autonomous sailing using a large commercial coastal car ferry, in a voyage from the Tomakomai Port to the Oarai Port, Japan. The trial took place as part of the Nippon Foundation's MEGURI2040 unmanned ship project.

February 2022: The Japanese container ship 'Suzaku' was retrofitted for autonomous shipping as part of the Designing the Future of Full Autonomous Ships (DFFAS) project.

April 2022: ABS granted autonomous notation to Keppel O&M's 'Maju 510', the first tug in South Asia that can be remotely operated by joystick control.

April 2022: China announced operation of Zhi Fei, what it claims to be the world's first autonomous, electric container feeder ship into commercial service.

April 2022: Norway celebrated the christening of Yara Birkeland, the world's first electric, autonomous container vessel.

May 2022: CSSC Huangpu Wenchong claimed to have launched the world's first ship with an intelligent unmanned system.

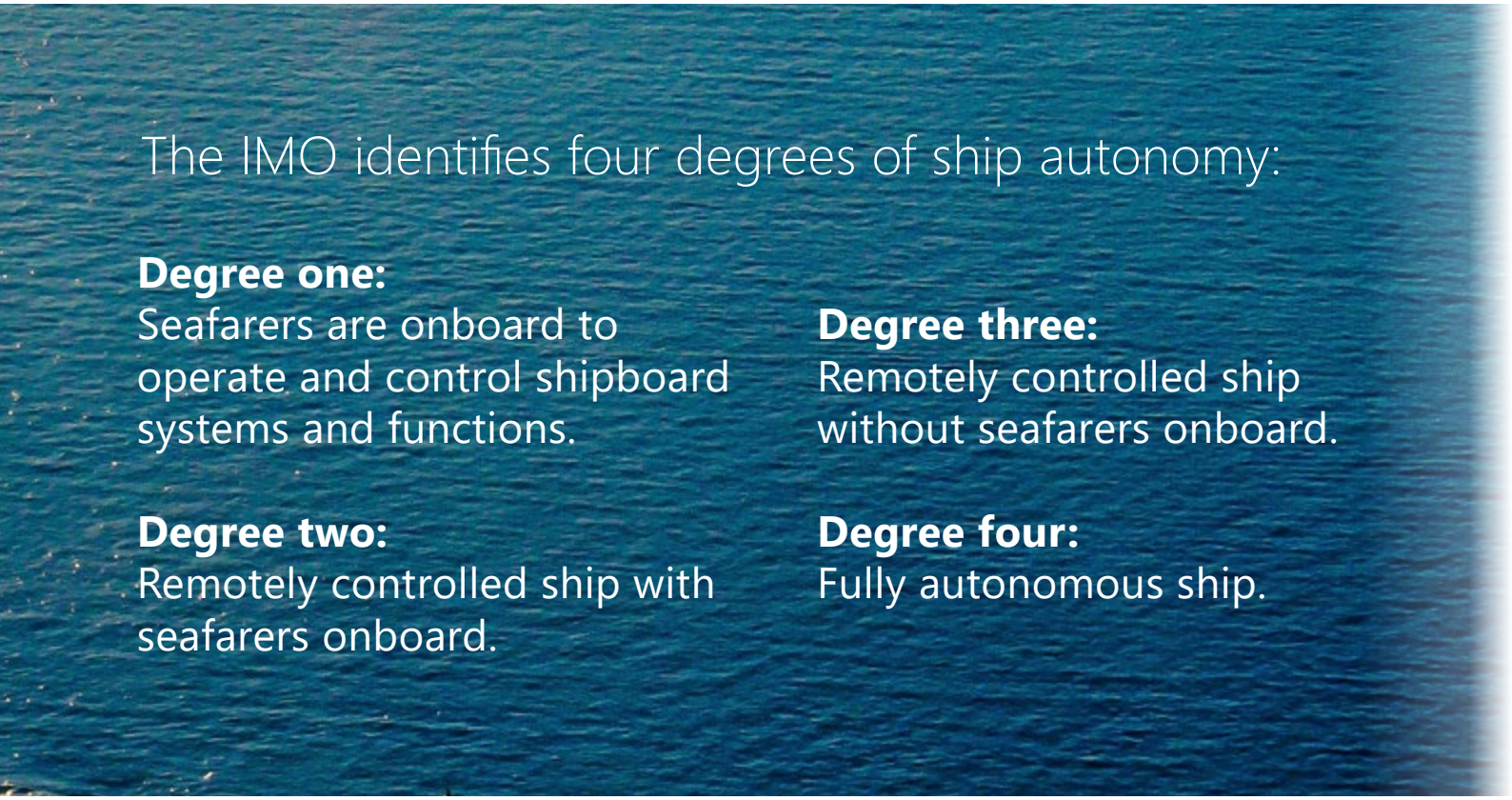
May 2022: The Plymouth Marine Laboratory started developing the first long-range autonomous research vessel in the world, the Oceanus, expected to be 24 m long, with a beam of 3.5 m.

June 2022: Norwegian state enterprise ENOVA approved a NOK150 million (€15M) fund from the SeaShuttle, a project to build two hydrogen-powered, remotely controlled and autonomous-ready containerships for delivery by 2025.

June 2022: The unmanned Mayflower Autonomous Ship (MAS) arrived in Plymouth, Massachusetts, becoming the largest uncrewed vessel to complete the trans-Atlantic crossing and marking a milestone in the development of autonomous technologies.

August 2022: Korean Register (KR) signed an MoU with HHI and its subsidiary Avikus as well as the Liberian Registry (LISCR) to commercialize HiNAS 2.0 as an autonomous navigation technology.

September 2022: DNV signed an MoU with Hyundai Heavy Industries (HHI), AVIKUS and LISCR on a joint study to deploy autonomous navigation systems onboard ships to increase technology uptake by the industry and flag states. The Hyundai intelligent Navigation Assistant System (HiNAS 2.0) is an AI-based navigation solution that covers all steps for voyage from detection to situation analysis, planning and control.



By Geraldine Koon, Legal Advisor, ITIC

State the facts and only the facts in post incident reporting

Managers are often required to produce a report post-incident, whether for Flag State, Owners or in accordance with the Vessel's SMS, for example. While it is helpful to have a report outlining the facts of the incident, what went wrong, and what could be improved, managers must take care when drafting a review of this kind that any findings are not used against them or their principal. The ISM code promotes a no-blame culture. However, when something goes wrong, it can be the very opposite.

Any incident may lead to a dispute and costly litigation. Parties involved will inevitably ask for any reports into the incident and scrutinise them for anything that can be used to assign blame and liability.

ITIC regularly see reports and correspondence issued by managers keen to state they were negligent and apologise to owners for the sake of appeasement and provide a "good service". However, in some instances, this encourages owners to bring a claim against managers (or a third party to sue owners) for the incident or other issues, especially when relationships deteriorate at a later stage or when owners want to find an excuse for non-payment of management fees. It should be remembered that an apology can be taken as an admission of liability. This could put the manager in breach of their insurance policy which usually states that liability must not be admitted.

Managers should therefore ensure when reporting on the incident that they do not comment on anything outside their knowledge and, is not strictly necessary to

About ITIC

ITIC provides professional indemnity policies at cost, both directly and via brokers, designed around the specific requirements of those who serve transport customers. ITIC is a mutual insurer, with over 3,100 members and no external shareholders – ITIC's surplus funds have been paid out to ITIC's members in the form of continuity credit for the last 20 years. ITIC is managed by Thomas Miller.

the understanding of the incident. As far as possible, any report should contain factual statements only, not opinions or apportionment of blame or liability. The former is for experts to comment on, and the latter, for lawyers, based on the relevant laws and contractual provisions.

How an issue is described, and blame is assigned can make significant differences in liability or how allegations or arguments regarding liability are shaped. For example, under the SHIPMAN agreement, broadly speaking managers are not liable where the crew has caused this issue, even if they have been negligent. However, they could potentially be in breach of the contract where the crew's incompetence was caused by the manager's failure to provide proper training, where they have a duty to do so.

Further, where the crew is incompetent, the vessel may be considered to be unseaworthy and leave owners unable to defend against certain claims from third parties.

Managers should also remember that any incident can be the result of one or multiple causes, and often, until the issues are fully investigated, it will not be possible to say which factors were causative. They should, therefore, be careful when setting out the reasons for the incident. Liability under the Shipman is restricted to where the loss has been caused "solely" by the manager.

Where not necessary, the report should not refer to other documents as this immediately brings attention to material that may ultimately not be relevant. For example, it will likely not be essential to include the performance review history of a crew member.

Finally, in case of any doubt, managers should refer the matter to their insurers and/or lawyers so that the draft report can be reviewed first before being finalised and sent.

If managers feel that they may face some claim, they should also avoid discussing the issue internally in writing and should be careful what they say in correspondence to owners. Should the matter be litigated subsequently, under English law (and many other jurisdictions), such correspondence would be disclosable to the other side, so managers should take care not to prejudice their position. Again, managers are advised to inform their insurers and lawyers as soon as possible. This would also make it more likely that litigation or legal advice privilege may be asserted over subsequent correspondence on the matter, so these documents would not need to be disclosed in litigation.

Bulk carrier safety: be aware of vessel structural limitations

By Bruce Liu, Loss Prevention Executive, Gard Hong Kong

Not long ago, a Gard member's vessel was detained at the load port because the density of the solid bulk cargo being loaded exceeded the maximum allowable cargo density for that particular vessel. Recently, Gard was also approached by another member because the master of a capsize bulk carrier had refused the charterer's request for alternative hold loading due to serious concerns about the ship's safety.

The above instances appear to have come about due to a lack of knowledge of the CSR-BC Class Notations.

What are the CSR-BC Class Notations?

CSR-BC means the Common Structural Rules for Bulk Carriers which were adopted by the International Association of Classification Societies (IACS) in December 2005 and came into effect on 1 April 2006. CSR-BC Class notations are assigned to bulk carriers of 150 meters or above in length based on the service features of dry bulk cargo densities and cargo hold loading patterns. There are three primary class notations for CSR bulk carrier: BC-A, BC-B and BC-C. These are stated on a vessel's class certificate and loading manual.

What does each CSR-BC Class Notation mean?

Simply put, the CSR-BC Class Notations define both the range of cargo density and the loading conditions for bulk carriers.

Class	Sample Class Notation
Bureau Veritas	CSR CPS(WBT) BC-A (holds 2,4 may be empty) ESP GRAB[25] VeriSTAR-HULL, AUT-UMS, MON-SHAFT, GREEN PASSPORT, FORS, INWATERSURVEY Service Restriction: Unrestricted navigation
ABS	A1, Bulk Carrier, BC-A 2,4,6, ESP, AMS, ACCU, CSR
China Classification	CSA Bulk Carrier BC-A(Holds Nos.2,4 & 6 may be Empty);ESP:In-Water Survey:Loading Computer (S, I, G); BWMP:Grab(20);CSR; AUT-0;CMS;
Korean Register	KRS1 BULK CARRIER ESP (CSR) BC-A (Hold Nos. 2, 4, & 6 may be empty) GRAB[25] Seatrust(HCM) CLEAN1 IWS ERS LG LI UMA BWE STCM
Lloyd's Register	bulk carrier:CSR:BC-A:GRAB(25):Nos. 2, 4, & 6 holds may be empty:ESP:ShipRight (CM, ACS(B)):*IWS:LI LR Machinery Class: LR Maltese Cross LMC LR Machinery Notations: UMS (Unmanned Machinery Spaces)Fee Numeral: 15676 LR Hull Notes: 98H WB37452.5T
Nippon Kaiji Kyokai	NS* (CSR, BC-A, BC-XII, GRAB 20, PSPC-WBT, NC)(ESP)(IWS)(PSCM)(IHM), Strengthened for heavy cargo loading where hold nos. 2,4 & 6 may be empty
Det Norske Veritas	100 A5 Bulk carrier (holds 2, 4, 6 may be empty) BC(A) CSR DBC ESP Grab(20 t) IW NAV-O
Indian Register of Shipping	SUL, BULK CARRIER, ESP, CSR, BC-A, "STREGTHENED FOR HEAVY CARGOES, HOLD NO. 2, 4, 6 & 8 MAY BE EMPTY", GRAB {30}, LOAD COMP(3), INWATER SURVEY, IY, SYJ, TCM, BWE(s,f) & BWT NK: Special Survey Date: 2019-04-08 Class Notation: NS*(CSR, BC-A, BC-XII, GRAB 30, PSPC-WBT, 1C)(ESP)(WIS)(PSCM) / MNS* CHG, MPP, LSA, M0, AFS, BWM
Registro Italiano Navale	C+ Bulk carrier ESP; BC-A - allowed combination of specified empty holds - heavy cargo (+)AUT-UMS Service Restriction: unrestricted navigation

Sample Class Notations of IACS Societies showing CSR-BC (subject to change over time)

Bulk carriers with a BC-A Class Notation are the most robust of the three. They are designed to carry solid bulk cargoes with a density of 1.0 t/m^3 and above up to 3 t/m^3 or maximum cargo density as long as it is less than 3 t/m^3. The cargo holds that may be empty at maximum draughts are normally indicated in parenthesis suffixed to the class notation. Such vessels can be loaded in homogenous, alternative or block loading conditions at maximum draught. Sometimes compromises have to be made. For example, when carrying heavy cargo, alternative loading may be used to reduce the metacentric height so as to ease the ship's rolling motion for structural safety and crew's comfort during the voyage.

Bulk carriers with BC-B Class Notation are less robust than BC-A ships. Although they are allowed to carry dry bulk cargo with similar density specifications, they can only be loaded in homogeneous condition at maximum draught. Both BC-A and BC-B vessels can carry cargo with a density of less than 1.0 t/m^3.

Bulk carriers with BC-C Class Notation are the least robust of the three. The nominal cargo density carried by such vessels must be less than 1.0 t/m^3. Like BC-B ships they can be fully loaded only in homogeneous condition.

How does CSR-BC Class Notations affect bulk carrier safety?

The Class Notation A, B and C must not be confused with Group A, B and C of cargo as defined in the International Maritime Solid Bulk Cargo (IMSBC) Code. The Class Notations are about the construction of the ship itself, while the IMSBC Code classification relates to the cargo characteristics. However, it is important to understand the full implications of both classifications as related to the operations of vessels, the primary purpose of which is to transport cargo.

CSR-BC Class Notations are assigned to bulk carriers under CSR-BC. Vessels with different Class Notations are designed and constructed differently so they must be operated in compliance with the applicable service features. If a vessel loads a cargo with higher density than the maximum allowable cargo density, it may cause structural failures to the vessel. Even when a vessel loads a cargo the nominal density of which is within the permissible limit, if the loading condition is not followed, structural failure is also likely to occur.

Ship operators and masters usually refer to the IMSBC Code together with vessel's Statement (Document) of Compliance for Carriage of Cargo in Bulk and Loading Manual before accepting a consignment. Although there is nothing wrong with that, the first priority should be to check the vessel's class status or limitations. Under the IMSBC Code, a solid bulk cargo with a stowage factor of 0.56m³/t or less is defined as a High-density solid bulk cargo, while chapter XII of SOLAS puts it more explicitly as solid bulk cargos having a density of 1780 kg/m³ and above as evidenced by the equilateral triangular marks on the side shell at midships of certain bulk carriers. However, it should be noted that for individual vessels, the cargo does not have to be that heavy to cause structural failure.

Recommendations

1. Verify that the ship is "cargo worthy"

Ship operators and masters may have experience with several types of bulk carriers. But new bulkers may be introduced into the fleet and masters may be sent on different types of bulk carriers. It should be noted that previous experience does not necessarily apply to "new" vessels. It is important to be familiar with the vessel's structural limitations. Before accepting a consignment, it is always good practice to ask the question if the vessel is suitable for the carriage of the intended cargo with supporting cargo documents to show the stowage factor / cargo density and other physical properties. This can be easily done by checking the vessel's class certificate which sets out the structural limitations.

2. Follow Applicable Service Features

When a ship is deployed to carry the cargo, proper planning of cargo operations is essential to ensure the safety of vessel. The applicable service features stipulated by Class Notations must be complied with. For all bulk carriers, regardless of the robustness indicated by class notations, it is important to control high-capacity loading of solid bulk cargoes, especially heavy cargo, through efficient communication between ship and terminal to prevent the vessel's structure being over-stressed.

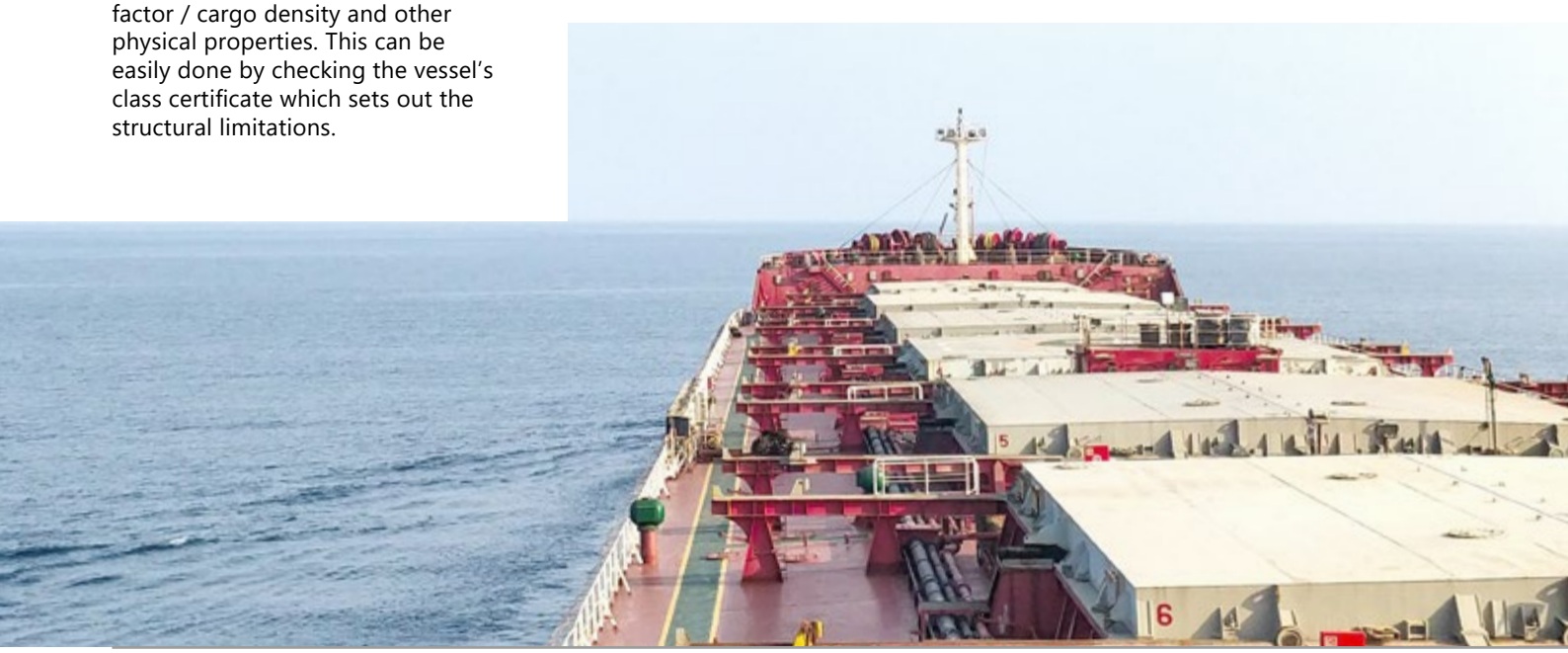
Useful references

IACS - Common Structural Rules for Bulk Carriers and Oil Tankers. Go to https://bit.ly/3W0g8Cs.

IACS Recommendations No.46: Guidance and Information on Bulk Cargo Loading and Discharging to Reduce the Likelihood of Over-stressing the Hull Structure. Go to https://bit.ly/3j3PGJn.

ABS: Common Structural Rules for Bulk Carriers. Go to https://bit.ly/3VchIA9.

DNV Ship rules Pt.1 Ch.2 – Class Notations. Go to https://bit.ly/3hnny3J.



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FINDING THE CRACKS BEFORE THEY APPEAR

As a result of the current surge in sustainability developments in the maritime sector, a major shift is taking place in winch technology. After having dominated the playing field for decades, hydraulic winches are losing ground to electric-powered systems. Electric drives used to be far less compact than their hydraulic counterparts. Since free space is a scarce commodity on virtually all ships, that disadvantage was a dealbreaker.

The electric winches that are emerging on the market nowadays, however, have slimmed down significantly. They sometimes weigh even less than hydraulic drives, while still matching their power and torque. Dromec, a Dutch company specializing in winch technology, realized the potential of electric-powered winches years ago. They have been actively developing the technology, adjusting and modifying electric drives to accommodate their customer's requirements. It wasn't always smooth sailing, however. As is generally the case with innovative technology, there are still some teething problems to overcome.

Luckily, they love a good challenge at Dromec. So, when the owner of a fishing vessel approached them in 2015 to see if Dromec could transform the hydraulic winch drive on his trawler to an electric drive, the project sparked their interest.

WINCH CONVERSION

Cees Drost, Dromec's sales representative and co-owner, discussed the project with Geerart de Vree, the engineer in charge of Dromec's technical department. "Only when Geerart says that something is impossible, will I believe that it really can't be done," Mr Drost states confidently.

They decided to take on the challenge. The first step was to measure the specific surroundings of the hydraulic systems on board. Dromec collected the data regarding cable speeds, vessel speed, maximum working load, as well as tension levels on the winches. These data served as a basis for the configuration of the winch drive and gearboxes.

After three years of preparing, manufacturing, and installing, the vessel took to sea. Most elements in the converted winch system functioned properly right away; others needed some adaptations. When all other issues had been resolved, one crucial kink remained: the gearboxes kept breaking down. No matter what Dromec's engineers tried, they couldn't keep them going.

Geerart de Vree

GEARBOX MONITORING

But what was going wrong? Were the calculations off? Did they overlook something? To answer those questions, Dromec needed to find a way to monitor the gearboxes during operation. To do so, they joined forces with the automation experts at Bachmann to set up a vibration monitoring system. Three sensors were placed on each 200kW gearbox, another two were set up on each electric winch motor. Bachmann supplied the sensors, cables, and software. They also monitored and analyzed the collected data.

The two companies set up meetings at regular intervals to assess the data reports. The vibration sensors provided Dromec with an incredible amount of information. "They basically allow us to observe the gearbox as if through a microscope," says Mr de Vree. "They provide such meticulous insights. We can distinguish engine speeds, frequencies, bearing elements, and even gearbox components. They all have their own, specific vibration signals."

DETECTING DEFICIENCIES

Over time, the sensors detected several defects. At one point, they picked up a distortion on the output switching frequency of the frequency inverter. "Probably a wiring issue on the motor, we figured. One check on the EMC later, the problem was fixed," explains Mr de Vree.

Another time, the sensors registered an unusually high vibration at the back of the engine. When Dromec investigated it, a small bearing in the forced ventilation turned out to be the culprit. It had been affected by corrosion. "The wear on the bearing had altered its vibration profile. What's so remarkable about the sensors picking up this signal, is that the bearing wasn't even broken," clarifies Mr Drost. "It was still turning, just with a little more friction."

Bachmann BAM100 sensor mounted on the electric motor

"To us, that really was an eye-opener," adds Mr de Vree. "It showed us the great potential this technology has for early damage detection."

However, in the case of the gearboxes, the monitoring system didn't work. Small hairline cracks seem to have damaged the material without changing the vibration profile. Then, without prior warning, one of the gearboxes broke down.

"We expected gearbox failure to occur when both load and torque levels were high. But when the gearbox actually broke down, the load was low, while the speed was high. Apparently, this combination also caused heavy vibrations," explains Mr de Vree.

"Being able to test whether your assumptions are correct, is so valuable," says Mr Drost. "But it is a long-term process. You need to monitor during a longer period of time to determine the regular patterns. Only then will you recognize anomalies in the data," he concludes.

SETBACKS

While the gearbox monitoring system was up and running, the next issue presented itself. The vessel's satellite connection wasn't always strong enough for the vibration sensors' data transmission. The next time a gearbox broke down, the data wasn't stored properly, making it impossible for Dromec to figure out what cause the breakage. "Precisely the data that we wanted to analyze most of all, was missing. We really wanted to see that breakdown coming," says Mr Drost.

"It is an iterating process, which makes it so important that there is a continuous connection to the system," adds Mr de Vree.

The missing data was a major setback for Dromec, leaving them unable to find a fitting explanation for the recurring gearbox failure. Later on, the company found out that structural mechanical errors had been made by the (external) gearbox manufacturer. "This finding was somewhat of a relief, since it meant that we hadn't selected an ill-suited gearbox," explains Mr Drost. "The gearboxes should have been perfectly adequate for the job, but simply had some manufactural deficiencies." At the time of writing, the company is conducting an investigation to figure out the cause of these flaws.

Another important factor in the recurring gearbox problems seems to be the tremendous forces that the equipment on trawling vessels is exposed to. Trawlers will make 90 degree turns at full throttle during some parts of the fishing process, for example, causing extreme vibrations.

After consulting with the client, Dromec configured some limitations in the control management software. When the ship speed is too high during the last leg of its track, the control screen sends out a warning signal by blinking. "The speed loss is absolutely minimal. On a full, 90-minute fishing track, the limitations cause a delay of merely 30 seconds, adding up to a maximum of five minutes a day," states Mr Drost. "But slowing down at the end of the track makes it easier to pick up the buoys. This could even compensate the time loss. Moreover, a lot of damage is prevented on the machines."

CRITICAL PROCESSES

Dromec will continue monitoring the vibrations on board.

Even though the conversion project wasn't a success in all respects, it proved to be of great value to Dromec. "This project offered great insights in the future potential of sensor-based monitoring," says Mr de Vree.

"Our service attitude is increasingly pro-active. Monitoring systems can be a great asset for our customers in preventive maintenance, helping them replace worn elements before they break down," adds Mr Drost. Mr de Vree is particularly enthusiastic about the potential for critical, non-stop processes that involve great speed variation. Water injection dredgers, for example. "It could prevent unexpected downtime on ships, or be used to optimize revision planning," he concludes.

What to consider about the storage of batteries and their on-board maintenance

"The Port State Control code 04103: Emergency, lighting, batteries, and switches is one of the most common inspection deficiency codes marked worldwide and includes battery related items. Most of the findings are related to battery room and protective measures and missing equipment."

Batteries are part of almost all on-board vital systems as the backup power provider. The batteries themselves do not produce power but they provide the stored power which is produced during the charging phase by other power producers.

The main types of batteries used on board are:

- Main battery backup system (in the battery room)
- Small batteries used on portable equipment
- Batteries for starting emergency generator and/or boats

For small batteries used on portable equipment and batteries starting emergency generator and boats, storage requirements are the common rules of battery use. Manufacturers' storage requirements should be followed and the charging circuit should be checked to be free from the presence of dust/liquid as well as the cool temperatures that are needed in storage areas.

However, for the main battery system the storage requirements are detailed in SOLAS as batteries are regarded as hazardous risk sources on-board. On most ships the battery room is an isolated area on open deck. A battery room intended to accommodate the batteries of electric carts and trolleys being charged is a potentially dangerous area. Charging the batteries (particularly those made from lead-acid) releases dangerous gases.

Construction guidelines for battery room

- A battery room environment must be dry and well ventilated.
- Charging equipment is to be free from dirt, overheating, loose connections and the indicators should function correctly.
- The ventilation arrangement for the battery locker should be inspected and checked. Battery installations of both lead acid and alkaline require good ventilation. The fans should be of the non-sparking type and should not produce any static charge.
- An independent exhaust fan is to be provided.
- The inlet duct should be below battery level with the outlet at the top of the compartment.
- The use of externally fitted lights or flameproof lights is essential.
- The paint used in the battery room and the materials for ducting should be corrosion resistant.
- All cables should be of adequate size so they can be well connected.
- The use of insulated spanners and plastic jugs for distilled water is necessary to prevent short circuit.

It is of key importance that the battery room is not adjacent to the emergency switchboard. The battery room must not contain other systems related to the essential services of the ship. Pipes should not penetrate into the battery room as leakage of them may cause damage to or failure of the battery system. However, in the case of unavoidable installation of pipes, the pipe joints should be welded joints and flanges. Threaded joints or mechanical joints are not to be used.

A system should be installed to provide the following information into the engine room:

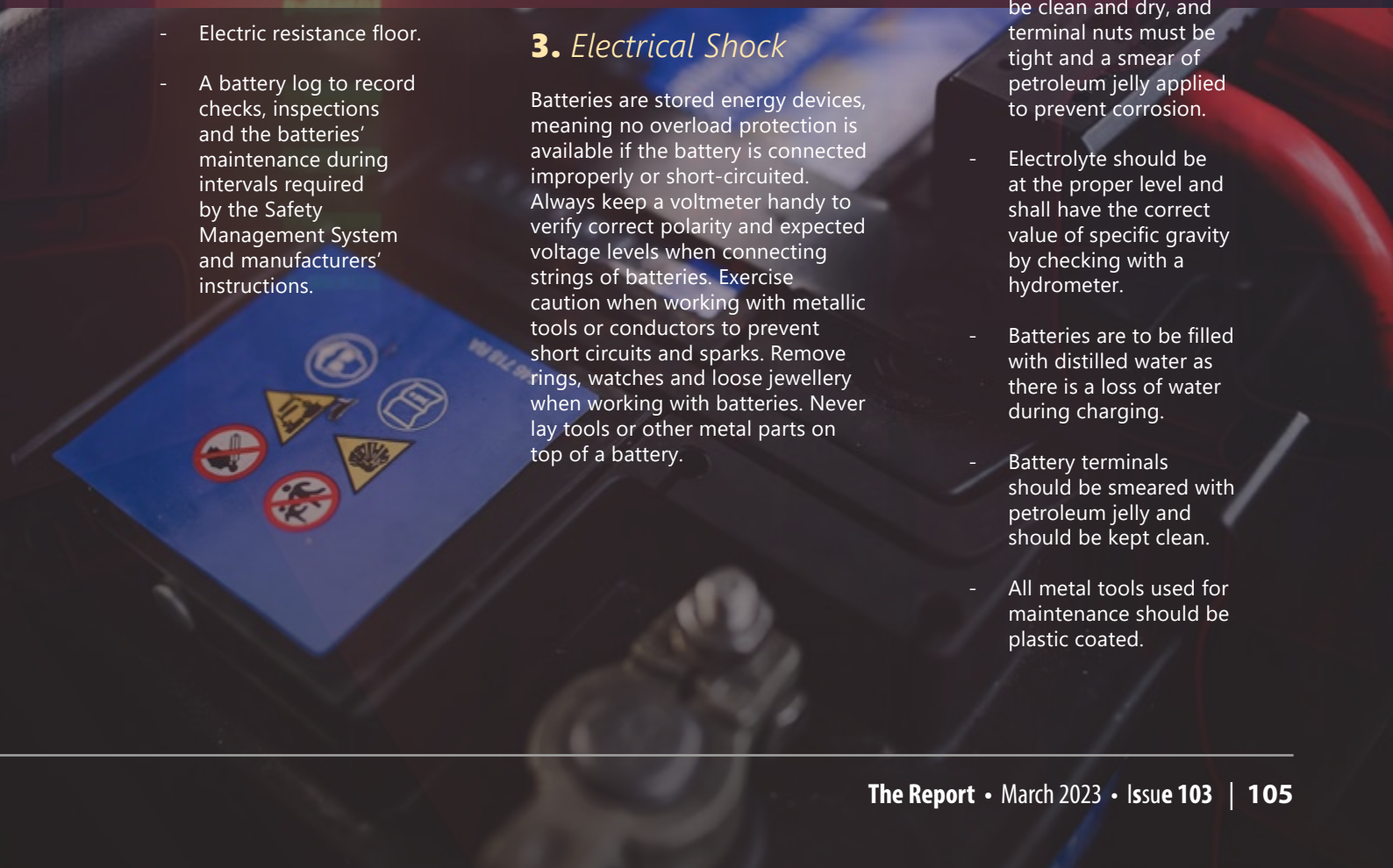
- The battery room temperature.
- The operating condition of the ventilation system in the battery room.
- The operating condition of the cooling system in the battery room.

The battery room temperature should be maintained at 15-25 °C. The door to the battery room should be kept closed at all times. An alarm signal should sound when the door is opened, or a self-closing door should be installed. Steel works and decks adjacent to a lead acid battery should be painted with acid resistant paint.

Key equipment of the battery room

Apart from the aforementioned construction requirements, an on-board battery room should be equipped with the following for enhanced safety:

- An eye wash station.
- Portable dry powder fire extinguishers or CO2 fire extinguishers of at least 5 kg capacity located near the battery room.
- Personal protection equipment (PPE) for testing and handling the batteries, including face shields or eye-glasses, chemical handling gloves, chemical resistant shoes or boots and a suitable apron. PPE must be stowed clear of the batteries to avoid possible contamination from battery acid.
- A "No Smoking/No flame/No naked light" sign should be posted outside the door.
- Electric resistance floor.
- A battery log to record checks, inspections and the batteries' maintenance during intervals required by the Safety Management System and manufacturers' instructions.



Key precautions during maintenance

During maintenance the following precautions should be taken to avoid risks and injury:

1. Battery Acid

Sulfuric acid in a battery is corrosive and can severely burn the skin or eyes, eat through clothing or even a concrete floor. Appropriate personal protective equipment (PPE) is essential when working on batteries or any UPS equipment.

2. Flammable gases

Batteries emit flammable hydrogen gas, especially during charge and discharge cycles. Hydrogen ignites easily and can cause a fire or explosion if allowed to accumulate in a small area. Hydrogen is not toxic, but at high concentrations is a highly explosive gas. In such concentration, all it takes is a source of ignition to cause an explosion. Sparking from a battery terminal as it is connected or disconnected from the charging system is more than adequate as a source of ignition energy. Check of adequate room ventilation should be undertaken.

3. Electrical Shock

Batteries are stored energy devices, meaning no overload protection is available if the battery is connected improperly or short-circuited. Always keep a voltmeter handy to verify correct polarity and expected voltage levels when connecting strings of batteries. Exercise caution when working with metallic tools or conductors to prevent short circuits and sparks. Remove rings, watches and loose jewellery when working with batteries. Never lay tools or other metal parts on top of a battery.

4. Battery Weight

Battery cells used on board can weigh anywhere from 20 to 50 plus pounds each. Use safe lifting techniques while exercising caution of electric shock. Do not attempt to stop a battery if it slides out of the equipment.

Maintenance guidelines for the battery room

As with all systems on-board, batteries should also be checked for adequate operational condition and maintained if required. Inspections and maintenance intervals are needed as per the Safety Management System and manufacturers' requirements.

Most generic items for maintenance are:

- Batteries are to be maintained in a full charge condition and charging circuit is always connected.
- Battery installation and its charging rectifier to be checked.
- Battery tops are to be clean and dry, and terminal nuts must be tight and a smear of petroleum jelly applied to prevent corrosion.
- Electrolyte should be at the proper level and shall have the correct value of specific gravity by checking with a hydrometer.
- Batteries are to be filled with distilled water as there is a loss of water during charging.
- Battery terminals should be smeared with petroleum jelly and should be kept clean.
- All metal tools used for maintenance should be plastic coated.

The fourth propulsion revolution and preparing for a green maritime industry

By The Standard Club

Two industry experts - Professor Lynn Loo and David Roberts - offer their insights on alternative fuels and decarbonisation in shipping in an extract taken from a recent podcast.

Decarbonisation is fast approaching. All industries are having to adapt and maritime is no different. International, national and regional regulations are in progress, alternative fuels in development and operational practices under scrutiny.

David Roberts, Managing Director of Standard Asia, sat down with Professor Lynn Loo, CEO of the Global Centre for Maritime Decarbonisation (GCMD), a Singapore based NGO formed last year, to discuss the "the fourth propulsion revolution" and its implications for shipping in a recent Alongside podcast.

Professor Loo, explained that her centre's mission is to help the international shipping sector eliminate its greenhouse gas emissions. "We do this by helping shape future fuel standards by financing first-of-a-kind projects. And by piloting low carbon solutions and technologies under real-world operation conditions and the ideas," Professor Loo said.

David added that the IMO's intentions signalled that the industry and the club needed to "develop its own expertise in this important area so that we're in a position to advise and assist our members in the transition."

GCMD is looking for support to participate in pilot schemes ranging from low-level financing to active involvement in new energy trials. "We are a group of engineers and scientists. So we can do the due diligence, understand the pain points and scope pilots so we can address these," Professor Loo added.

Members of Standard Club, a specialist marine and energy insurer, are being offered guidance and assistance by the club in adopting alternative fuels.

Administrative hurdles

Many parts of the industry are "ready for the transition", David Roberts explains. Others, however, are less ready. Nevertheless, the extent of the challenge is significant, which is why Standard Club has been promoting a collective response.

"We're trying to make up for lost time by doing a whole load of stuff in a concise period," David Roberts told the podcast.

According to David Roberts, a high proportion of the Standard Club members show they are either ready or will shortly be prepared in anticipation of the January 2023 deadline. But financial and logistical challenges remain.
Professor Loo explained that there is a reliance on stakeholders and external players for shipping to decarbonise.

Zero carbon fuels are a final goal and green hydrogen, in particular, has many end applications for every industry. One is to generate green fuels, whether ammonia, methanol, or any synthetic fuels, for the shipping sector.

The drive towards green fuels is thus a double-edged sword. Shipping

firms have every interest in taking the necessary steps, but the development of many of these energy sources is coming from elsewhere.

"We're sort of at the mercy of players outside the sector. It requires us to think about new infrastructure because these are new fuels that we've not used as bunker fuels before," Professor Loo said.

David Roberts added that the new technologies and fuels, while available, are still effectively experimental.

GCMD is trialling some, but the infrastructural base is not currently sufficient to deal with them, and global-scale revision is a challenge in itself. Vessels and ports across the world are built to rely on traditional energy and a move away from that will require new technologies, ship and engine designs.

"We're going through effectively a fourth propulsion revolution. First, the world developed through coal and steam, then to oil, and now we're looking at zero-carbon fuels," David Roberts said.

All of these logistical challenges are present even before one considers the financial cost and who is willing to be the first to trial these new energies. "This is why organisations like GCMD are so important," Professor Loo said.

GCMD is looking at ammonia as a potential future for your green shipping. The first engine is said to be available in 2024, and the first ship in 2025.

Ammonia has been widely hailed as a potential escape from fossil fuel entanglement, but the lack of safety associated with bunkering ammonia as a marine fuel has historically been problematic. "We realised quickly that we can't actually do a pilot to bunker ammonia because there are no safety guidelines associated with bunkering ammonia and using ammonia as a fuel," Professor Loo said.

This is a microcosm of the problems the industry faces: from testing a new fuel to drawing up basic safety guidelines for its use, there are many hurdles to be jumped before a new fuel type can be adopted.

Adapting insurance

"The P&I Club system has been going for about 150 years; we have adapted our cover always to meet the needs of new challenges, new situations, for the protection of our members," David Roberts said.

The primary risks of introducing new fuels are injury, illness or death risks to the crew. Others are pollution, environmental damages, fines, and other related penalties imposed by international authorities for breach of the statutory requirements.

P&I coverage is already set up to respond to many extreme situations. However, there is an issue that emerging risks and potentially unforeseen risks are not considered. This is where the flexibility of mutual insurance is most essential.

"If it becomes necessary to tweak or enhance the cover that we give to respond to, to particular risks that we don't yet fully understand or not fully be aware of, at this point in time, then we would consider such adjustments," David Roberts added.

Brighter shores

Rather than frustration, there is broad enthusiasm for the green shift, the experts said. If anything, IMO targets are being criticised for not being harsh enough, which could result in late compliance.

Professor Loo explained that GCMD intends to accelerate their journey towards alternative fuels. The question of decarbonisation is no longer "if". It's "how fast".

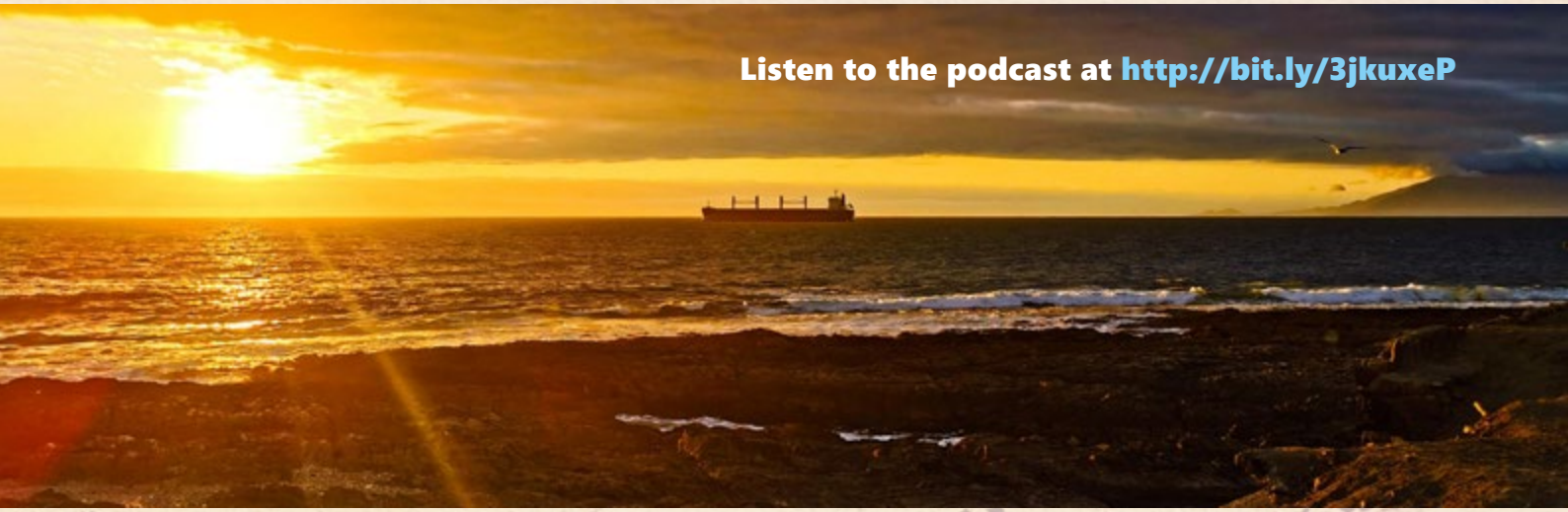
"There is optimism in saving the planet," David Roberts said. "Higher oil and gas prices will probably spur increased exploration and development, but by 2050, we should be looking at a situation where at least half of global energy supply is coming from non-fossil fuels."

"It is very much about partnership. We live in an ecosystem, a maritime ecosystem, and indeed a wider economic, financial ecosystem, and we all have to support each other," he added.

Professor Loo agreed, referring back to the integrated nature of maritime.

"Shipping is such an integral part of the global supply chain. If we don't decarbonise, many sectors can't decarbonise," she said.

"Alongside developing alternative propulsion, both GCMD and Standard Club have the ability to raise awareness."



Decarbonisation in shipping: an introduction

By Kirsten Cottrell-Conacher,
Associate, Clyde & Co

Kirsten is an Associate in the Clyde & Co London Marine Assets and Projects Group with extensive experience of all types of transactional shipping work. She also advises marine and non-marine clients on sanctions compliance.

Decarbonisation of the shipping industry is a high-profile current issue. In this article, one of a series, we examine the various IMO and EU regulations which are due to come into force over the next few years with the aim of regulating and reducing shipping's carbon footprint through various initiatives. We discuss the key practical and legal considerations they raise for owners, charterers, and other stakeholders.

IMO

There are two upcoming IMO measures directed at reducing greenhouse gas emissions from ships, both added to MARPOL Annex VI in 2021. The two new measures are the Energy Efficiency eXisting ship Index (EEXI), a one-off certification assessing the design, construction, and technical features of the ship; and the Carbon Intensity Indicator (CII), an ongoing measure of how environmentally friendly a ship's operations are. The IMO's stated goal is to reduce the carbon intensity of all ships by 40% by 2030 and 70% by 2050 (as against 2008 levels), and EEXI and CII build on existing measures to try and achieve this.

Energy Efficiency Existing Ship Index (EEXI)

EEXI is a one-off classification of the energy efficiency of a ship's design, construction, and technical features, and seeks to impose a minimum standard on the global fleet. A wide range of ship-types are caught by the EEXI regulations (all existing ships of 400 GT and above falling under MARPOL Annex VI) and existing vessels will be required to have their EEXI technical files prepared by the time of their next International Air Pollution Prevention (IAPP) Certificate Renewal from 1 January 2023. Newbuilds will be required to do so by their initial survey before entering service. Information from various vessel documents is used to assist in preparing the EEXI technical file, including capacity plan/lightweight certificate, the trim and stability booklet, any sea trial reports, NOx technical files, the IAPP and, for newer vessels, the EEDI (Energy Efficiency Design Index) technical file.

There is not a single, universal EEXI figure for all vessels – rather, a "required EEXI" exists based on ship type, capacity, and engine and the "required EEXI" represents the minimum standard for each ship type. Each individual ship is then ascribed a calculated "attained EEXI". The "attained EEXI" for that ship needs to be less than or equal to the required EEXI for that ship type in order to comply with the regulations

The EEXI describes the ship's anticipated carbon emissions, expressed per cargo ton and mile, taking into account factors like engine power, fuel oil consumption, and cargo capacity. These factors are all added into a formula which calculates the ship's EEXI value. Improvements to the carbon intensity of the ship's design and technical features will reduce its EEXI value.

While EEXI compliance does not necessarily require technical modifications to a ship, in practice this is likely to be required for many vessels in order to achieve the minimum required EEXI rating of "C" or above. The regulations do not prescribe any particular modifications or means of achieving compliance. The most popular choice of measures is Engine Power Limitation (EPL) and/or Shaft Power Limitation (SHAPOLI) as these are relatively cheap, quick, and straightforward to implement (though such modifications can have detrimental effects on speed and other performance metrics, with potentially adverse consequences for any warranties given to charterers, an issue which we will consider in greater detail in a future article in this series).

In 2021, BIMCO published a model EEXI transition clause for time charterparties, specifically addressing EPL/SHAPOLI modifications. Major charterers and/or shipowners also have their own bespoke clauses which we have seen being used, more than the BIMCO "standard" clause.

Other options which may enhance a ship's EEXI classification include increasing cargo capacity, installing more efficient propellers and associated equipment, or potentially more radical (and expensive) alternatives such as switching to carbon-neutral fuel or introducing entirely green power technologies.

It is important to note that EEXI is a theoretical figure, based on a ship's design and technical features, not an indicator of its actual carbon emissions. This aspect is covered by the CII.

The IMO intends (under MARPOL Annex VI Regulation 25.3) to review the effectiveness of the EEXI measures by 1 January 2026 to assess their effectiveness, and will possibly make amendments to them once there is real-world data available on the effectiveness of the measures and their practical consequences (such as what steps owners take to ensure vessel compliance; what, if any, consequences vessels with poor EEXIs face; and whether the measures result in a significant reduction of shipping's contribution to global carbon emissions).

Carbon Intensity Indicator (CII)

CII is an ongoing (annual) measure of the carbon intensity of a ship's operations – i.e., its greenhouse gas emissions relative to the amount of cargo carried and the distance travelled. CII will regularly fluctuate depending on factors such as speed, length of voyages, and nature and volume of cargo, and it is to be calculated and reported annually using a formula prescribed by the IMO. Ships are then given an energy efficiency rating, with those attaining the lowest score obliged to take steps to improve it, while – it is hoped – authorities incentivise the achievement of those with the highest ratings.

Ratings range from A to E, with A being the highest rating. Stakeholders (such as flag states and port authorities) are being included in discussions of the CII regime to provide positive incentives to ships rated as A or B, while those with the lowest ratings (D for three consecutive years, or E for any length of time) will be required to submit corrective action plans setting out the remedial steps they will take to reach the required index of C or above. No other specific consequences for low-rated ships have been set out, but one might anticipate that these would include higher port dues and other fees. The lower rated ships would also be less attractive to charterers, thereby reducing their attractiveness to the market, which would impact the rates that owners would hope to achieve.

In practice, in order to collect the necessary data for ongoing CII reporting and compliance, owners will need to monitor and record a wide range of operational data. Various proprietary software solutions are available that assist in monitoring the relevant factors.

By 31 December 2022, all ships subject to the CII rating regime will be required to have prepared a SEEMP Part III (a specific part of the Ship Energy Efficiency Management Plan developed to support CII targets). From 1 January 2024, a Statement of Compliance containing fuel consumption and CII-related data will be issued. Audits of SEEMP Part III/CII compliance will need to be carried out every six months from the issuance of the Statement of Compliance.

As CII compliance (particularly for older or less efficient ships) is likely to necessitate changes to the speed, route, or cargo capacity of a ship (or indeed all three), there are obvious potential tensions between charterers' requirements and the need to minimise the ship's carbon intensity. To this end, specific clauses addressing CII ratings, compliance, and monitoring (including liability for poor CII rating and charterers' rights to access/monitor emissions data), and their interactions with other

charterparty provisions, are becoming increasingly common, including the recent publication of BIMCO's CII Operations Clause for Time Charter Parties, which envisages owner and charterer pre-agreeing a target CII value (and places responsibility for compliance predominantly with the charterer). We discuss this clause in greater detail in a separate update (link here).

European Union

The EU has set its own targets for decarbonisation in shipping, as part of "Fit for 55" (a package of proposals to revise and update EU legislation with the aim of meeting the EU's target of climate neutrality by 2050). Its name refers to the intermediary goal of cutting emissions by at least 55% by 2030 (note that the 55% target is based on 1990 emissions levels).

Several of the 13 proposals contained in Fit for 55 have implications for the shipping industry. The Fit for 55 proposals are currently at a relatively early stage, with the EU Council having agreed its negotiating positions (general approaches) in early-mid 2022, but details remain to be fleshed out and so there may well be differences between what is currently proposed and what is actually agreed in the final legislation.

EU Emissions Trading System (EU ETS)

This proposal is expected to apply to all affected vessels operating within the EU, regardless of flag. Those whose voyages start or end outside the EU will only have to participate in the EU ETS for 50% of their emissions, but 100% for voyages between EU ports and for ships at berth in EU ports.

Changes are proposed with the intention of reducing overall CO2 emissions in applicable sectors (including maritime transport) by 61% by 2030 (as compared with 2005). This will come into force from January 2024 with a three-year phase-in period.

The EU ETS is based on a "cap and trade" principle, where a cap is set on the total amount of greenhouse gases that can be emitted by a ship, which is reduced over time. Shipping companies will purchase (and surrender) emissions allowances to cover their fleets' carbon emissions, with fines applying for exceeding these (and a risk of being detained by port authorities or denied entry for unpaid fines or ongoing noncompliance).

The price of these allowances is intended to fluctuate based on market demand (and the availability of emissions allowances), so that as the cap reduces it becomes ever-more expensive to emit CO2, while companies who successfully reduce their emissions and have spare allowance availability can potentially benefit from selling these to their more polluting peers, ensuring that there is a positive financial benefit to investing in decarbonisation.

FuelEU Maritime

This is another proposal that applies to all affected vessels calling at EU ports, regardless of flag.

The intention of this measure is to encourage the use of more sustainable (either renewable or lower carbon) fuels by mitigating market barriers and technological uncertainty that presently discourage their use. It sets requirements for vessels to progressively reduce their greenhouse gas emissions from 2025 onwards, including compliance with monitoring obligations.

For passenger and container vessels there is an additional obligation: if the measures are adopted, then from 2030 they will be required to use shore power while at berth (subject to various exceptions, for example if ships are at berth for under two hours, already using zero emission technology, or if shore power is unavailable or the port call is an unscheduled one made for safety reasons).

In both instances, there are anticipated to be financial penalties for noncompliance.

Other measures

The Energy Taxation Directive (ETD) and Alternative Fuels Infrastructure (AFI) also have implications for the shipping industry, although their application is somewhat narrower.

The ETD proposes to amend the excise duty rates applicable to certain marine fuels, for use on vessels trading within the EU, in order to encourage operators to move towards more sustainable fuel types.

The AFI proposes requiring certain ports to provide LNG bunkering infrastructure and shoreside power in order to facilitate compliance with both limbs of the FuelEU Maritime proposal.

This article first appeared on the Clyde & Co website and is reprinted here with our thanks.

What lessons could be learnt by the Suez Canal Authorities from the Ever Given grounding?

By Graham Inseal, TMC Marine

TMC Marine, a Bureau Veritas Group Company, has been providing advice and support to the marine and offshore energy industries since 1979. Service lines include a wide range of marine surveying and consultancy, from the planning and execution of high-risk marine operations to the investigation and resolution of major maritime incidents and disputes. TMC Marine has carried out more than 18,000 maritime investigations globally, including several investigations each year in the Suez Canal.

The Suez Canal can become one of the safest routes in the world for shipping but reaching that destination will require significant change.

The Suez Canal is one of the most famous and important trading routes in the world carrying about 12% of all global trade each day. In 2021, the 400m long 200,000-tonne super container ship Ever Given grounded in the canal and was stranded for six days whilst salvage crews worked to free her. The vessel blocked access from both ends of the canal holding up an estimated $9.6 billion of trade each day.

Photo by Samuel Hanna on Unsplash

It is important following any incident – let alone one as high-profile as this – to examine the lessons that can be learned to improve access and maritime safety, not only in the unique and taxing shipping route that is the Suez Canal, but around the world.

There are five critical areas that vessel owners and operators should consider to avoid similar scenarios happening again.

1. Better bridge resource management

While external factors such as a wind speed of 40 knots and a sandstorm, were initially suggested as playing a role in the grounding of the Ever Given, pilotage including the interaction between pilot and crew, is an equally if not more important area for concern.

The relationship between a vessel's captain, officers and the pilot can often be a flashpoint and a culture shift towards more mutually balanced respect would be beneficial in many cases. Under most regulations around the world, pilots advise the crew on steering and navigation but the captain has final responsibility and can overrule a pilot's order. However, in the Suez Canal particularly, there is a strong pilot culture and it is not uncommon for the captain or his designate (as a reminder a transit can take 12 hours or more) to defer to the pilots' expertise and only rarely to challenge their advice.

Changes in bridge resource management, specific to the canal, would be an important development in helping to improve the relationship between both sides. These changes should include improvements in management and a greater degree of proactivity in the relationship between the bridge team and the pilot. This would enable bridge teams (especially more junior officers) to feel more empowered to question the pilot's recommendations. It would also increase the potential for the pilot to be recognized and respected more as an integrated member of the bridge team, rather than as a stand-alone entity, which is now often the case.

Good examples of a canal authority, pilots and bridge teams working well together can be seen on the Panama Canal, which is a technically more challenging passage than the likes of the Suez Canal, but has traditionally fewer grounding incidents.

It is noteworthy that the Panama Canal is the only waterway in the world where the pilot has legal responsibility for courses and speeds and the master provides advice. The pilot works as a member of the bridge team, including providing input into the vessel's passage plan. Good teamwork between crews, the pilots and the Panama Canal Authority enhances the certainty of a safe and risk-reduced passage through the canal's challenges including its locks and lakes.

2. A holistic approach to marine operations

From pre-reporting the arrival of the vessel, to a risk assessment of its draft and passage plan, multi-disciplinary assessments of weather forecasts, currents and under keel clearance, vessel windage, clear communication and information share between the bridge team, the pilots and the canal authority is critical for a safe and efficient passage.

An important enabler for more transparent dialogue would be an agreement for communication in a universally accepted language between the vessels transiting the canal, the pilots and the Suez Canal Authority.

Underpinning communication must be a clear and stated set of guidelines and a strong working relationship between the canal authority, pilots, the captain and the ship owner.

The Panama Canal is a good example of the benefits of effective communication. The canal presents difficult technical challenges because it contains many variables, such as the level of fresh water flowing from the top locks through the system, but good information share between all relevant parties reduces transport risks.

3. Two-directional traffic along canals

One of the biggest advances to improved safety on the Suez Canal has been the advances made by Suez Canal Authority in its program of increasing two lane segments.

Following the grounding of the Ever Given, the authority announced plans to widen and deepen the 30km stretch of waterway between the city of Suez and the Bitter Lake area by 2023. Two-directional traffic in the canal lane further north will also be extended by 10km to a total length of 82km.

Despite modern vessels having the most advanced technical equipment ever at their disposal, their increased size means once control is lost it is very difficult to retrieve. Container capacity on vessels has increased

by 1,500 percent over the past 50 years and has doubled in the past decade. From our experience, while the number of incidents investigated by TMC Marine in the Suez Canal has remained constant over the years, their scale has increased due to the greater size of the vessels.

"Dualing" the entire 120-mile canal would eliminate the existing convoy system and the need for anchorage and would significantly support risk reduction in transit, though this will take some time to complete, if indeed it is even possible.

4. To go or not to go?

Once armed with better navigational aids and good information share on issues such as port and canal cautionary warnings, potential hazards and dangers, accurate and reliable weather forecasts, tide heights and currents, the captain would be properly informed and should be empowered to make the final decision on whether or not to transit the canal.

In many ports and canals around the world eager to protect their assets and facilities, such as the Kiel Canal in Germany, or Yangshan Port, China, the operating authority will share information on the conditions and advise whether or not it thinks passage is safe.

In other cases, a lack of good information share means a vessel can start the transit with insufficient detail about what lies ahead.

The captain is ultimately responsible for the vessel in transit. Ensuring that the decision on whether to stop or go-ahead rests with the captain would be an important step in improving maritime safety. But the Captain needs all of the available information to hand in order to make this decision. Of course, other pressures such as commercial may also come into play, but an improved and safer transit process should be embraced and supported by all within the shipping industry.

This of course does not relieve the Master of his obligation to have a proper Passage Plan covering the entire passage from anchorage to clearing the canal at the other end, to guide and inform the crew at each and every step of the transit.

5. Proactivity and transparency

Despite the fact that transiting the Suez Canal is not a technically challenging operation, groundings and other incidents occur frequently. The creation of comprehensive and publicly available reports after every incident following open and transparent investigations, by the Suez Canal Authority (SCA) or by other authorities with input from the SCA, would help ensure lessons are learned and potential improvements could be implemented and promulgated to all relevant parties. More detailed, realistic and appropriate regulations from a marine operations perspective would provide clarity and greater peace of mind to the vessel's bridge team.

Simple initiatives such as obtaining feedback from captains on their observations after every transit of the canal would be a proactive measure to support greater transparency and assist in making marine operations more simple and safe.

Plain sailing?

The Suez Canal has been a vital link for east-west trade for more than 150 years and will remain so for years to come. Its six-day closure last year was a catastrophic event, costing the Suez Canal Authority an estimated $15 million a day. The canal can become one of the safest routes in the world for shipping. However at the moment, reaching that destination is far from a given and will require significant change.

Graham Inseal is a Master Mariner and spent 25 years sailing predominantly in oil tankers worldwide, including VLCC, ULCC, Suezmax and product tankers, including six years in command of VLCC and ULCCs. He came ashore in 2002 and passed a CPE in law. Upon graduation he took up a position as Inspector of Marine Accidents with the UK governments MAIB, and he investigated a wide range of marine accidents leading to the drafting of publicly available reports. After a series of private-sector posts, he joined TMC Marine in April 2019, and as TMC Head of Mariners he is the discipline lead.

For more information on TMC Marine visit **www.tmcmarine.com**

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If you thought the Ever Given incident was bad, wait until you see the FSO *Safer*

By Dr Ian Ralby and Sir Alan Duncan

Dr. Ian Ralby is CEO of I.R. Consilium and a leading expert on maritime law and security issues around the world. He and his team have provided some of the most extensive reporting on the FSO Safer over the last three years.

Photo credit: Chris McAndrew / UK Parliament

Sir Alan Duncan spent 27 years as a Member of the British Parliament and is former UK Deputy Foreign Minister and Special Envoy on Yemen.

The FSO Safer oil terminal moored offshore of Ras Issa port (Photo Credit: Safer)

As most readers of The Report will know, the Ever Given blocked the Suez Canal for six days in March 2021, causing shortages of critical supplies in different parts of the world and sending global trade into a frenzy. The cost to the shipping industry for that one vessel being stuck for less than a week was an estimated $416 million per hour. That will be nothing compared to the disruption to the global economy if the FSO Safer spills its cargo.

Floating in the Red Sea, attached to an oil pipeline that runs nearly 300 miles to the war-torn city of Marib, the FSO Safer was established as a Yemeni oil export facility in 1988. The massive, converted tanker was due to be decommissioned and replaced by a land-based terminal when the Yemen civil conflict erupted nearly eight years ago. Owned by SEPOC, a company which itself is owned by the Government of Yemen, the FSO Safer sits off the coast of Ras Isa, an area controlled by Houthi rebels.

The vessel is still loaded with 1.14 million barrels of oil. While roughly 15,000 barrels have evaporated over the last eight years, and a thin layer has polymerized, the majority of that cargo remains liquid and liable to spill. The portion of the pipeline that runs for five miles beneath the Red Sea has an additional 17,000 barrels of liquid crude in it. Without intervention, the FSO Safer will either explode or corrode and spill its contents - and likely take the pipeline with it.

Deck of the FSO Safer, indicating the lack of basic maintenance (2019)

Corrosion on the control piping system (2019)

Deterioration on the single hull of the FSO Safer (2019)

For context, the amount of oil spilled off Mauritius (which destroyed an entire marine protected area) was 8,450 barrels. This is less than one percent of what is at stake with the FSO Safer, and less than half of what is in the subsea pipeline. And while the Ever Given disrupted trade through the Suez Canal for six days, some projections suggest the FSO Safer's spill could slow or stop trade through the entire Red Sea for weeks or even months, forcing ships to divert around the Cape of Good Hope to avoid spreading the oil by sailing through it.

The combined risks of a massive explosion, the blockage of international commerce, and a devastating oil spill form only part of the concern with the FSO Safer. Add in the deaths of millions of people (already in famine) from loss of drinking water, caused by the contamination of desalination plants, and limited access to food caused by the blocking of Hodeida, and we will have a humanitarian emergency at a level the world cannot currently sustain.

Furthermore, with the annihilation of the world's most temperature-resistant coral system along with 10 unique species of fish, and the long-term damage to economic activities like fishing and tourism, the effects of this one vessel's demise would be felt for generations. The potential consequences dwarf the various other maritime disasters experienced in the last few years.

In 2022, the UN made progress on an agreement with the Houthis where, in exchange for not interfering in the operation, the UN would charter a VLCC, transfer the oil from the FSO Safer to the seaworthy vessel and leave the vessel at sea where she is now, under Houthi control. The UN raised nearly $80 million through a lengthy campaign, but before starting the operation, the price of a charter for a VLCC has gone up, the price of oil has gone down and, while not directly interfering, the Houthis have made a habit of attacking tankers in Yemen with drone strikes.

At this point, the most expeditious and likely effective approach – especially in light of concerns around underwater mines in the vicinity – would be for the UN Security Council to recognize that, for the peace and security of the world, it needs to take action. Given the current state of affairs, however, such a decision is highly unlikely.

As such, the UN team needs to revisit all the options for getting the oil off the water, including supporting the completion of the land based facility in Ras Isa that was supposed to replace the FSO Safer in 2015. And competent parties with an interest in preventing the spill, including the shipping industry, need to add their voice and expertise into the mix to ensure that international commerce is not disrupted.

Maintaining the FSO Safer's oil on the water – even in a seaworthy vessel – is no longer a wise plan. There is too much at stake, and the UN needs to regroup and redirect its efforts before the window of options closes further. At the same time, different industries, particularly the shipping industry, need to speak up to try to encourage viable solutions that will ensure the Red Sea does not become impassable.

The blockage of the Suez Canal in 2021 was bad; we cannot afford to wait to see how much worse a spill from the Safer would be.

If you are interested in providing your support – either discreetly or overtly – to this effort to prevent a catastrophe arising from the FSO Safer, please feel free to contact Dr. Ian Ralby directly by email at imralby@irconsilium.com

New DNV Deck Carrier notation supports new type of ship

Climate change and energy uncertainty in the face of political conflict have brought new urgency to the energy transition, and nations around the world are accelerating the planning and construction of onshore and offshore wind farms to replace fossil energy sources. As wind turbines grow in size, specialized ships are needed to transport their huge and heavy components.

Streamlining the classification process for deck carriers

A new ship type has emerged which is better suited to carrying oversized wind turbine parts: deck carriers. Since no existing ship class described these vessels adequately, they had to be classed individually in the past. In response to customer requests, DNV has created a new ship type notation for deck carriers.

"The Deck Carrier ship type notation defines specific requirements for these vessels," explains Jan Rüde, Ship Type Expert MPV, Hull Structure and Outfitting at DNV. "It covers typical features, such as a front deckhouse, a large, open deck space, the absence of a cargo hold, and strong hull and deck reinforcements. There are specific constraints for operation when loaded, such as acceleration limits, maximum wave height and weather conditions." Any additional features, such as dynamic positioning or a semi-submersible design, can be addressed by adding suitable class notations if desired, he adds.

Design features cut building and operating costs

DNV's new Deck Carrier ship type notation clears the way for tackling unique transport challenges in the age of wind power. "On conventional multipurpose vessels, cargo cannot be stacked very high on deck because it will obstruct the line of sight from the bridge in the aft section. This is why the superstructure on a deck carrier is positioned at the front, with the cargo behind it," Rüde points out. "What is more, hatch covers on most MPVs are not strong enough to support the weight of several sets of blades or very heavy windmill components."

Built for oversized wind turbine parts
Wind turbine blades are a commodity nowadays, manufactured in bulk. Ships need to be able to transport them in large numbers to keep the costs of large offshore wind farm projects to a minimum. "Deck carriers are designed specifically for this cargo," says Rüde. "The simplicity of this design makes them relatively inexpensive and easy to load, ensuring fast turnaround in port and lower port and freight costs."

The first vessels bearing DNV's Deck Carrier class sign, BoldWind and BraveWind, are both owned by United Wind Logistics (UWL) and operated by Vestas on long-term charter, primarily between the Vestas rotor blade factory in Nakskov, Denmark, and various European ports or wind farm sites. "These ships use the available space very efficiently," says Capt. Philipp Tietjen, Managing Director at United Engineering Solutions (UES), the sister company of UWL specialized in heavy-lift operations engineering. "Whether jackets, monopiles, tower sections or rotor blades – these ships can carry large items that would not fit into the cargo hold of a conventional multipurpose vessel," Tietjen explains. UES has already done calculations to clear the way for future projects involving next-generation blades 115 to 120 metres in length.

Working hand in hand with class to develop solutions

UES appreciates DNV's cooperative spirit and willingness to walk the extra mile. "In many cases ships must be modified to carry specific project cargo, for example by adding reinforcements to the deck structure or sea-fastening elements on deck," says Tietjen. Working closely with class is essential to make sure all modifications conform to class rules and are safe, he adds. "DNV supports our work. They understand the environment we operate in and are always ready to listen to us and find solutions which make sense."

Small ecological footprint for wind-farm transports

UWL's BoldWind and BraveWind were designed to minimize emissions to keep the lifetime ecological footprint of wind power projects as small as possible. "Both vessels feature diesel-electric propulsion systems for maximum efficiency in response to power demand," explains Daniel Leonhardt, Team Leader Projects & Hydrodynamic Engineering at UES. "The engine room is located right behind the deckhouse, with the exhaust pipes routed through the superstructure. The entire space below deck is available for fuel and ballast tanks. This allows the ship to match the deck level to the loading pier, so cargo can be rolled on and off."

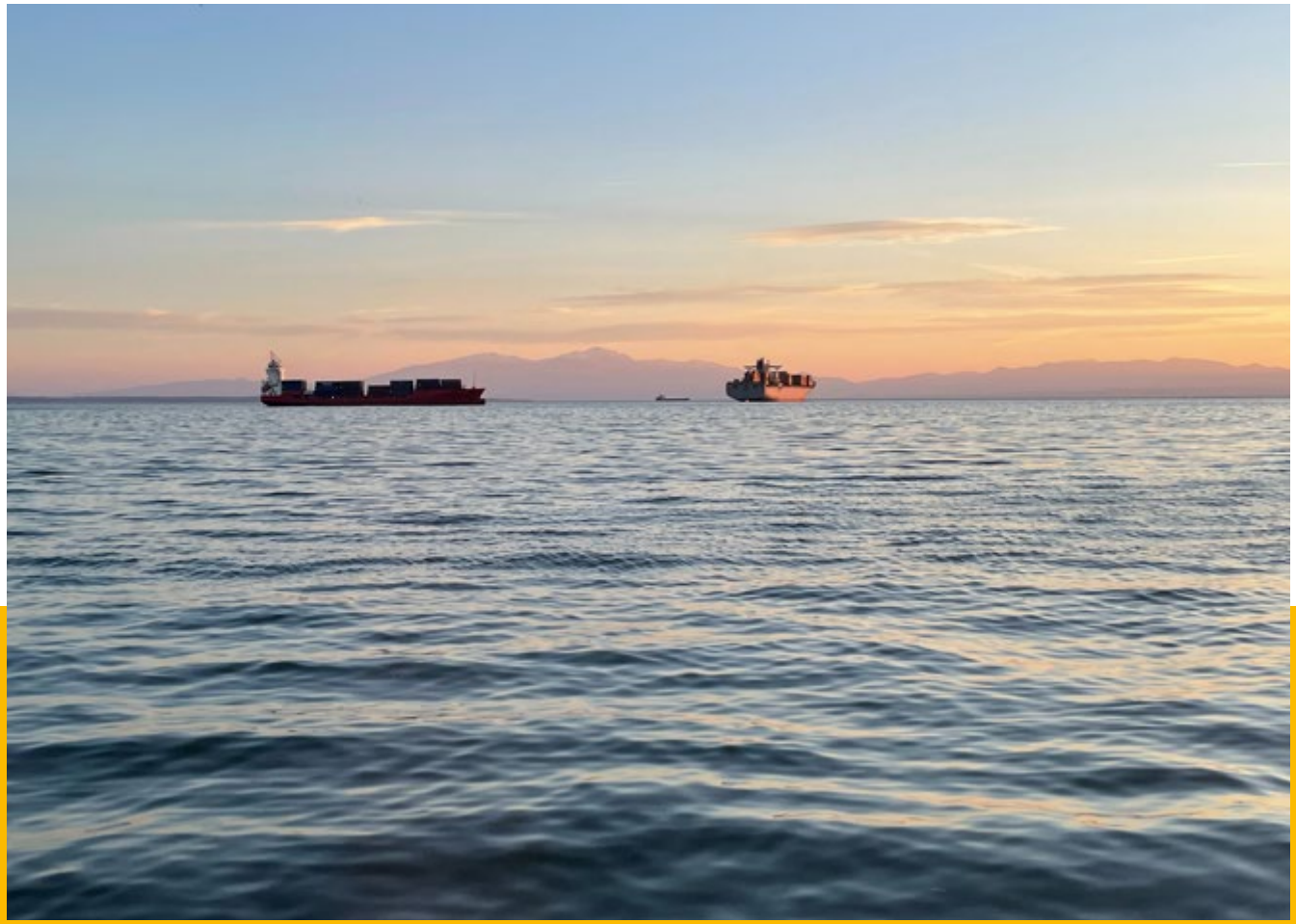
The engines are IMO Tier III-compliant, and the hull is designed to minimize fuel consumption and carbon emissions. Both vessels are prepared for battery installation to ensure compliance with future, stricter IMO decarbonization targets.

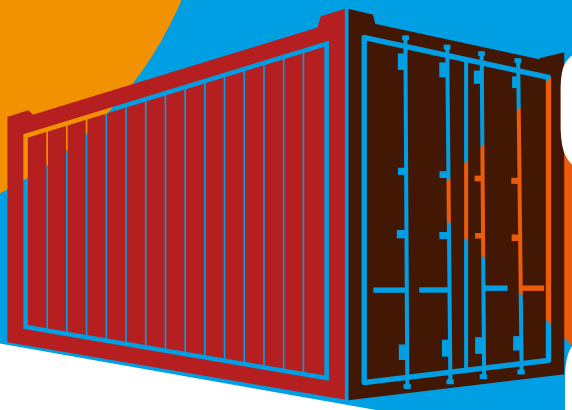
The wide and flat design gives deck carriers high stability, with a very low centre of gravity, while keeping their water resistance low. The limiting factors for the load-carrying capacity are the strength of the blade transport frames and the ability of both the blades and frames to withstand the lateral acceleration forces and wind loads, according to Leonhardt. "At present we can stack up to five layers of onshore blades or three layers of offshore blades before the frames fail," he says. "We anticipate being able to increase the offshore blade stacking height to four soon."

Considering operational limits in the design phase

Wind can make manoeuvring difficult when a deck carrier transports several stacks of wind turbine blades or several tower sections. Therefore, deck carriers are not designed to travel at high speeds and are typically equipped with comparatively low-powered engines. "It is crucial to consider the vessel's operating limits when planning a transport project," stresses Leonhardt. "We perform weather and sea state analyses ahead of each voyage and determine the design accelerations and loads which will act on the cargo and the lashing to establish the operational limits. If the forces are too strong, we will wait for the weather conditions to improve."

Bundling all applicable rules and requirements, the new Deck Carrier notation makes classification much easier, says DNV expert Jan Rüde. "Considering the expected high demand for this ship type, DNV customers will appreciate the clarity these rules provide for newbuilding projects."





What can we get out of a box?

By TT Club

The humble shipping container has existed for over 60 years, admirably facilitating global trade through intermodal supply chains with great efficiency. In recent years, however, there have been numerous innovators seeking to harness emerging capabilities and imagine boxes integrated into broader supply chain activities.

In the digital age, there is no escaping the fact that the standard freight container is simply a disconnected solitary box. Opportunities to make it smart are plentiful.

Smart might mean the capability to geolocate the unit, or enhance security, or monitor and control temperature for reefer containers; there are numerous use cases for a smart container. There are also potential safety gains – imagine a single smart container, positioned in stack of several thousand, that is able to announce an unexpected spike in internal temperature, facilitating early response to a cargo fire.

Reliable communication has been a fundamental challenge, not least in the middle of the ocean. Advances continue to be made to deliver resilient communications between ship and shore, enabling smart containers and internet of things (IoT) devices to leap forward.

IMAGINE THE POSSIBILITIES

As all involved in the global freight supply chain consider what ESG means to them and begin to assess their own emissions and potentially those of their counterparties with a view to reaching net zero, a connected smart container might also present opportunities.

MORE EFFECTIVE FLEET UTILISATION, REDUCING REPOSITIONING.

Visibility and control of the cargo space, potentially mitigating cargo damage and consequent waste. Imagine timely intervention to stabilise temperature fluctuations or adjust humidity settings, precluding damage at destination.

Transparency for the beneficial cargo owner, driving operational efficiencies. Accurate arrival dates or details of transport routing would afford opportunities around staffing levels, warehouse utilisation, and production modules.

Sensing and / or imaging that detects, records and reports issues, providing myriad benefits. Early detection of a developing fire, for example, is critical to successful response – integrating precise location, declared cargo type, and other metadata would be invaluable at every point through transit.

Detection of movement, heat sources or increases in CO_2, providing invaluable assistance in security and potentially saving lives in the context of clandestine migration.

Identification, through camera technology, of unexpected items in the cargo space, disrupting the movement of illicit goods.

Improved security, greater visibility and the ability set geofences, ensuring that the container remains on the expected route – or otherwise early alerts to deviations. There would also be opportunities to mitigate the risks of container theft.

Ability to self-diagnose damage, whether it be a hole in the roof of the container or a developing weakness following an impact event, enhancing safety and cargo protection. This could be an interesting future iteration of smart container technology.

Functionality to prevent the allocation of a unit until repaired, reducing wasted journeys where a damaged container is positioned and then rejected.

Lighter composite construction materials that lead to greater payloads per container, reducing the overall number of trips required.

For insurers, there are also potential benefits, from the ability to quantify the exact volume of each type of unit on risk at any given time, including condition, through to real-time visibility of container numbers and volumes in the path of a windstorm. The availability of these types of data has the potential to reduce burdensome and often lengthy correspondence.

From a claims handling perspective, post incident, having an audit trail and therefore the knowledge of the seat of a fire or being able to readily identify a potential liable party at an early stage would be beneficial. This might reduce lengthy expert investigations or provide early corroboration of findings, both targeting and containing associated costs, whether handling a first-party claim for the container equipment, a counterparty claim for damage to a cargo therein or a third-party liability assertion.

INTEROPERABILITY

Recognising that ownership of freight containers is widely dispersed – not only amongst container lessors and the diverse range of shipping lines (global, regional and niche), but also certain NVOCs (particularly tank container operators) and beneficial cargo owners, there is the need for interoperability and standardisation in order to maximise the potential benefits. Organisations such as DCSA are working tirelessly to develop such standards and resolve these challenges. IoT gateway connectivity and IoT remote reefer container monitoring on board are two such initiatives underway.

With well in excess of 20 million freight containers currently in circulation, it will clearly be some time before the entire global fleet becomes smart; fragmented ownership and use will be compounded by differing replacement and fleet management strategies.

While the cost of the technology continues to reduce, retrofitting existing fleet units might not be an attractive proposition for now. Rest assured though that the disconnected solitary box, that has arguably revolutionised the way we live today and has certainly been a catalyst enabling globalisation over the last 60 years, will not escape digitalisation.

A future vision where all containers are connected and able to communicate is no longer something of a fantasy. Indeed, the ability to integrate this freight facilitator into a multiplicity of business operations opens significant opportunity for numerous counterparties across the global supply chain.

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New Gallileo-powered PLB from Wescom Group

The sMRT Shield is a next generation Galileo-powered PLB. It is a single device incorporating advanced distress alert and locating technologies. It combines the global distress alert of 406 MHz with localised tracking and recovery through AIS.

"This acquisition of MRT accomplishes a significant step forward in the strategy to expand our survival solutions within the marine sector," said Ross Wilkinson, Wescom Group CEO.

And he added that the new products available show the huge strides that are being made in accelerating any search and rescue process.

New compact HP Kilo 220V watermaker

The HP KILO watermarker is aimed at boats from 35ft to 50ft and can produce 120 litres of water an hour using 1kWh.

"HP KILO was born from the demand that came mainly from the French market," says HP Watermakers co-founder Gianni Zucco.

"However, having plenty of fresh water on board is a need that is very much felt by all yacht owners, on both motor and sailing yachts, from 35ft to 50ft.

"Until now, if limited amounts of electricity were available, the solution used has consisted of a 12VDC or 24VDC watermaker which, when operating continuously for long periods, have unfortunately clearly proven to not be fully reliable.

"HP Watermakers has therefore chosen to solve the problem with an innovative solution that promises to shake the market: a 220V watermaker that uses only 1 kWh to continuously produce 120 l/h of fresh water."

ACR unveils new PLB

The ResQLink AIS PLB with integrated man overboard alert combines Cospos-Sarsat's 406 MHz satellite rescue services with AIS signals from nearby vessels. Mikele D'Arcangelo, vice president of global marketing and product management for ACR Electronics, said the combination offered a 'new level of safety'. "Our new PLB gives boaters the best chance of alerting others to a distress situation," he said.

"This next generation device provides our customers with the most advanced technology, plus the innovative design, functionality, features and ease of use that they expect from ACR Electronics."

Designed to automatically activate when used with a compatible life jacket, the ACR beacon links with emergency services, integrating satnav positioning, 406 MHz, 121.5 MHz RDF signals and AIS transmission, as well as the new Galileo Return Link Service technology.

Rolls-Royce in H2 engine first

An interdisciplinary team at Rolls-Royce is developing the company's first hydrogen combustion engine in a move away from its traditional diesel and gas engines. The new sustainably-fuelled units are based on the company's existing mtu gas engines, but developers Andrea Prospero and Rudi Hoff say there are major differences, particularly in the way the fuel combusts.

Andrea Prospero (left) and Rudi Hoff have been testing the new mtu hydrogen combustion engine for over six months. Photo: Rolls-Royce

"Hydrogen is extremely flammable," says Rudi Hoff.
"The hydrogen-air mixture in the cylinder can ignite too early, with a tiny spark enough to ignite the mixture."

The new 12-cylinder engines – each capable of producing just under 1MW of power – differ from the traditional gas engine in a number of ways:

- The new turbochargers are larger because they have to compress greater quantities of air
- The cylinders have been redesigned with lower compression ratios to cater for hydrogen's faster ignition
- The injection system has been modified so that the hydrogen is added just before the air enters the cylinder
- A new management system has been developed to control the more complex combustion process.
- The team is also developing a conversion kit for existing mtu gas engines along with fuel cells for stationary power supply systems which require constant levels of electrical power.

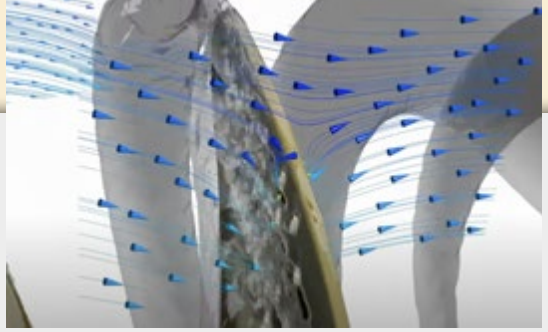
Rolls-Royce is also working on electrolyzers which break down water into oxygen and hydrogen using an electrochemical process powered by electricity. The resulting hydrogen can them by stored to supply power via a fuel cell or power plant when renewables such as wind or solar power are temporarily inactive.

New line of lithium battery fire extinguishers

Sea-Fire Europe has developed a new line of AVD portable extinguishers, providing a cost-effective lithium battery fire suppression solution.

Fires resulting from lithium battery cell failure can be volatile and fast evolving with conventional fire suppressant and extinguishing agents not designed to combat them. The expanding use of lithium in energy storage units in the form of deep cycle batteries and electric craft powerplants, together with a greater reliance on mobile devices such as phones and tablets results in a greater onboard fire risk, says Sea-Fire.

When a lithium battery cell fails, whether due to damage, defect, short circuit or overcharging, the heat generated transfers to neighbouring cells which causes a cascading — and potentially lethal — combustion sequence called thermal runaway. The new Sea-Fire AVD refillable extinguishers use Aqueous Vermiculite Dispersion suppression agent to encapsulate the fire source and provide a non-flammable oxygen barrier to smother flames while delivering a cooling effect to halt thermal runaway.



New propeller technology reduces underwater noise

A new propeller technology capable of reducing the underwater radiated noise (URN) generated by ships' propellers has hit the market.

The PressurePores system, developed by Oscar Propulsion Limited and the University of Strathclyde, works by applying a small number of strategically placed holes in the propeller blades and is said to be a technology that is suitable for all vessel types, including yachts.

"Increasing noise levels, especially in the low-frequency range, is disorientating marine fauna. We now have a cost-effective, easy-to-apply solution that prevents this from happening," said Lars Eikeland, marine director, Oscar Propulsion.

The technology was developed following four years of comprehensive computational fluid dynamics (CFD), modelling and cavitation tunnel tests during the solution's development phase at Strathclyde. Tests demonstrated that PressurePores can reduce cavitation volume by almost 14% and URN by up to 10dB.

Vetus launches easy repower air-cooled E-Line Air electric motors

Vetus has unveiled a new range of three air-cooled propulsion systems at this year's boot Düsseldorf. The manufacturer says this latest innovation in electric motors 'brings the many benefits of electric propulsion to a wider range of boats and navigation areas'.

Available in three sizes, the EAIR04024, EAIR040, and EAIR060 offer outputs of 4kW at 24 volts, 4kW at 48 volts and 6kW at 48 volts respectively, making them ideal for newbuild or repower projects for a variety of hull types up to around 8 metres.

According to Vetus, air-cooled electric propulsion systems can offer certain vessels a range of benefits over water-cooled variants. Firstly, in areas where cooling water inlet blockages are possible such as weed-infested inland waterways – with air cooling there is no water inlet to block.

An AI powered navigation system for boats from iNav4u

The advanced marine electronics system manufacturer, iNav4u, has launched Wayfinder, an integrated single navigational system for boats. Wayfinder is an automated situational awareness system which actively and continuously monitors data coming from a boat's existing onboard electronic instruments or multifunctional display and combines it with artificial intelligence (AI).

"The Wayfinder system will be a gamechanger. It will become the new standard onboard all marine vessels. It's what we strive for - smart, simple and safe," said Olivier Hendrikx, CEO, iNav4u.

"Wayfinder does this by acting as a marine vessel's onboard computer recording and computing sensor data, performance, condition and communications while underway."

Wayfinder is modelled on modern aircraft flight systems, which gather and compute data into meaningful information with real-time notifications, alerts, alarms, voice prompts, and suggestions for course of action or improvement. It's one single system to monitor everything on a boat at a glance.

By removing the human error factor, iNav4u's Wayfinder aims to make boating smarter, safer and simpler for captains and crew so they can spend more time enjoying sailing and less time watching and monitoring for worrisome changes in conditions.

New autonomous navigation system

AVIKUS, HD Hyundai's autonomous navigation in-house startup, has introduced Neuboat, an autonomous phase-two navigation solution for leisure boats.

The system uses the technology of the Avikus Navigation Assistant System (NAS) and Docking Assistant System (DAS). Avikus NAS allows a boat to recognize and assess on-the-water situations in real-time and without human intervention through learning and sensor fusion algorithms. As the data is processed, NAS creates and maintains an optimal route for safe autonomous navigation.

If desired, the system allows users to experience the autonomous navigation process through its augmented reality screen, which indicates risk level using different colour informational boxes. Boaters can also control navigation from anywhere on board the boat with a mobile device.

Mercury launches electric outboard

Mercury Marine has introduced its Mercury Avator 7.5e electric outboard, the first in a series of electric outboards to be released in 2023. The outboard generates 750W of power at the prop shaft and produces similar speed and acceleration as Mercury's 3.5hp four stroke outboard. It is available with tiller or remote steering and is suitable for powering small boats, including tenders, inflatables and kayaks.

"The Avator 7.5e is much more than just an outboard," said Tim Reid, Mercury Marine vice president of product development and engineering. "We created an entire propulsion system, fully integrated from the advanced controls, props and digital gauges to an all-new mobile app."

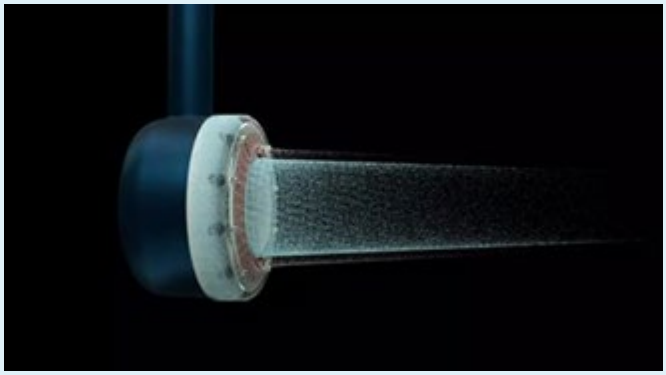
Features of the Avator include swappable batteries, a quick-connect mounting system and intuitive controls.

Bio-technology inspired outboard

FinX has closed a 6 million Euro fundraising round and taken delivery of its first engines. The French company says it aims to revolutionise nautical propulsion with its technology that is inspired by fish swimming, eliminating the need for a propeller on a boat.

Undulating membrane technology is the result of ten years of R&D, initially for industrial fluid transfer pumps. The membrane thrusters - that propel a craft using vibration - not only help protect the environment but also avoid entanglement with seaweed or fishing lines. Maintenance is also simplified compared to a conventional outboard with fewer components.

"By suppressing the rotational movement of the propeller, FinX eliminates the risk of injury and causes less disturbance to shallow environments such as coral reefs, mangroves etc," said the company. "The fluid, propelled in a straight line, produces less turbulence, avoids lifting particles to the bottom of the water and damaging marine animals and fragile aquatic ecosystems."



OPINION ARTICLE
by Mike Schwarz

Are lithium-ion batteries safe on yachts - and other vessels?

"Mike's suffering from mild hysteria", they said. Well perhaps I have been, yes. The cause of my hysteria? Lithium-ion batteries and fires caused by them! There are believed to have been nearly 70 fires last year alone involving large and superyachts. As more new information on this subject comes to light on a regular basis, I simply have to come back to it time and time again and share what we know. It is a massive and worrying subject and one that is consuming the finest technical minds in the marine world right now. We all need to be aware of the phenomenon for it will not resolve any time soon. As always, I say I understand fully the need to decarbonize and embrace this technology and am not against progress. But it comes at a price and one we need to be prepared to pay.

I recently attended an event hosted by Shoosmiths, a firm of maritime lawyers, based near Southampton. The event took the form of a panel discussion involving five expert panellists from different parts of the marine industry and was entitled "Are lithium-ion batteries safe on yachts?" It drew a sizeable audience of about 120 delegates to the event in person, way beyond their expectations and included marine surveyors, yacht management companies, regulators, underwriters, boat brokers and boat builders. As the event unfolded, I would describe the mood of the audience as engaged but concerned. In some cases, many seemed unaware of the immense threat posed by lithium-ion battery fires and all in the room were anxious for guidance. Guidance, however, was in short supply. One marina manager when asked what their policy is for berth holders to mitigate a lithium-ion battery fire disaster in one of their facilities said it is still too early for them and they are "only in the embryonic stages of developing a policy". That frankly sums it up!

There seemed to be a consensus that lithium-ion batteries, if installed in a new build boat or ship, and meeting all the latest requirements on keeping them in sealed metal containers, are no more inherently dangerous than conventional fossil fuelled vessels. Indeed, the evidence would seem to support that; and insurers confirmed they have no issues insuring an electric boat powered by lithium-ion battery propulsion. The picture is less clear to batteries that are retro fitted into older vessels. But the panel discussion focused heavily, perhaps surprisingly, on the other less thought about aspects such as the charging of devices powered by lithium-ion batteries onboard, particularly overnight, including mobile phones, laptops, tablets and superyacht toys, for this is where the major issues lie. Leaving them to charge unattended overnight is potentially dangerous as overcharging can cause thermal runaway resulting in a catastrophic fire. This applies equally to an onboard setting as it does to a land-based home one. There have sadly already been examples. I will never do this again; nor should you, and I would encourage you to pass on this information. Please tell anyone you meet not to do it either.

One of the panel also spoke passionately about the importance of using the right charger for each device and not some cheaper imitation replacement from an unknown supplier, which presents a further unnecessary risk. The advice is use the correct charging mechanism always and read the instructions.

There was an acceptance and understanding that firefighting systems are not yet developed sufficiently to extinguish a lithium-ion battery fire in most cases. Simply chucking the burning object overboard, whilst a highly dangerous thing to do and not recommended, will bring some peace of mind, but won't put out the fire! Early warning detectors of an imminent thermal runaway event are under development and will be available soon. But then we learnt about the lethal mass of unignited toxic gases which hang around at low levels that could easily go undetected and ignite, or simply kill.

Representatives from the insurance and underwriting industries admitted they are still grappling with this whole area. From their comments it seems likely that new clauses are certain to be written into consumer insurance policies to cover the use of lithium-ion powered devices on their vessel.

The discussion turned specifically to superyacht toys and other accessories, many of which are powered by lithium-ion batteries and have been the cause of several fires last year. That might include for example, the jet ski, the tender, the electric scooter or eBike. The list is long.

Whilst regulators are also grappling with this dilemma and trying to decide what regulations to implement, this is fine in the longer term for commercial vessels or boats that are subject to regulation. But what about the millions of pleasure boats worldwide that are unregulated? How do we as an industry get this message to them? I have no simple answer.

For now, it seems educating people to the dangers and encouraging them to use common sense and risk assess is the best way to make progress. But these things take time.

An employee from a large well known boat builder asked what advice they should pass on to their customers without alarming them. The reply was scant.

I mentioned earlier in this article that other developments have recently come to light about lithium-ion batteries. Let me tell you something about two of them.

Early detection key to preventing electric vehicles fires

Following several high-profile ship fires involving electric vehicles (EVs), Survitec has produced some valuable advice for operators of vessels transporting hybrid and EVs, such as ferries, ropaxes, RoRos, PCCs and PCTCs, on how best to prevent and control fire onboard ships involving lithium-ion battery powered vehicles.

According to Survitec there are a number of ongoing initiatives within the industry to improve safety in this area. There is a desire to develop early fire detection systems to better monitor and protect car decks and lithium-ion batteries installed in vehicles onboard.

Any slight deviation in their properties can provide an early indication that conditions are right for a fire and afford time to take preventative measures to protect or quarantine hybrids and EVs. Pre-ignition signs of a battery fire include heat and smoke from parts of the vehicle where the battery is usually placed, popping sounds from battery cells, and toxic gas emissions.

While early detection solutions are available, Rafal Kolodziejski, Survitec's Head of Product Support & Development Fire Systems, revealed that these systems are not yet adapted to allow for pre-fire conditions specific to lithium-ion batteries.

In my simplistic way as always, I ask why not?

The advice from the US Coast Guard is to avoid loading electric vehicles with saltwater damage on ships

The US Coast Guard (USCG) has issued a warning to the shipping industry about the extreme risk of loading electric vehicles (EV) with damaged lithium-ion batteries onto commercial vessels.

Marine Safety Alert 01-23 addresses the issue, and provides recommendations to vessels, ports, shippers and regulators. The safety alert comes just a few months after Hurricane Ian made landfall in South Florida. In the aftermath of the intense and destructive storm, first responders encountered numerous EV fires. Subsequent investigations and research have determined these were caused by exposure of the lithium-ion batteries to saltwater.

Exposure to saltwater can severely harm lithium-ion batteries, leading to a chemical reaction that creates a high fire risk. Records show there are over 7,000 EVs in Lee County, Florida alone with the potential for damage.

Wow, if you thought it could not get worse, it just did.

At the moment it feels to me like the marine industry is way behind the curve on this one, stumbling along towards a distant black hole, learning as we go and making up the rules to suit as best we can as new information emerges.

So, will it take a major incident involving the multiple loss of life before the regulators finally come up with something definitive, just as SOLAS was born out of the Titanic disaster over a century ago? Please, let's hope not!

A day in the life of...

Matt Willis

Interview by Mike Schwarz

More often than not in this feature over the years, I have tended to interview IIMS members who have many years' experience in the surveying game and are doyens of their profession. This time, I am delighted to have been able to speak with Scottish based member, Matt Wills, who is a recent entrant to the surveying business. He completed his Professional Qualification in Yacht & Small Craft Marine Surveying and graduated in 2021. So impressed were his assessors that he was nominated as a recipient of the John Excell Award for Outstanding Achievement for his studies. Despite being new into the business, he assures me he is already busy!

Question 1

I am interested to know what it was that lured you into a career in marine surveying. Please tell me something about your background and what persuaded you to join the profession.

I've taken a fairly circuitous route to arrive at this point. I don't have a remotely nautical background. But from a fairly early age I was fascinated by nautical adventures and the people who undertook them. David Lewis sailing solo around Antarctica and surviving three capsizes, or the early Whitbread Round The World (RTW) races were inspirational. The Ocean always appeared to me to provide the ultimate escape and testing ground.

I finally had the opportunity to start sailing whilst serving in the British Army in the 1990's but my knowledge of boats and how they were built was sketchy at best. My first oceanic voyage was the final trans-Atlantic leg of the Joint Services Transglobe RTW race in 1998, starting in Antigua. On a tired Nicholson 55, that was built before I was born, we got hit by a Force 12 storm (it's the first entry in my log book) half way across and things started breaking. With the Nic falling off the back of some fairly monstrous waves I remember asking the skipper if the keel was likely to fall off, to which he replied "many things may go wrong on this boat today but the keel is unlikely to fall off because it's encapsulated ballast." At that stage I didn't fully appreciate what he meant, but it got me thinking and that voyage really fired my enthusiasm for all things nautical.

Fast forward and on the back of some lucky breaks and some hard work I've been fortunate enough to crew on some impressive boats including the J Class Endeavour. On big yachts, where a broken component can cause serious damage or injury, pre-emptive maintenance and observation are vital. When the sails are up and the gear is loaded the crew are rarely enjoying the view, they're watching the boat for

something that doesn't look right and might break. That was good training and having also reached a milestone age I decided that I had the necessary transferable skills and basic level of knowledge to learn more and take on marine surveying as my next challenge.

Question 2

I always quiz marine surveyors about their area of specialisation in the belief that no one can know everything. Which areas have you chosen to focus on and why?

In the modern world and based on what I've seen so far I would agree that mastering the full range of challenges that marine surveying can serve up would be a tall order for even the most accomplished and experienced surveyor.

Taking the IIMS course was an excellent opportunity to increase my understanding of boats constructed in steel and aluminium and broadened my overall knowledge base. However living on the West Coast of Scotland the reality is that I'm surrounded by marinas full of FRP motor and sailing boats. In the near future I would like to qualify to undertake MCA coding work but at this early stage in my surveying career the focus, driven also by the requirement to earn a living, is what's on my doorstep. So for now it's primarily insurance, pre-purchase and valuation surveys on FRP boats.

Question 3

Having studied the IIMS Professional Qualification were you pleasantly surprised at how much marine knowledge you already possessed, or did you have to grasp plenty of new skills?

Having spent a lot of time delving deep in the parts of various boats that not many people see I started with a reasonably good base level of knowledge concerning what's inside a boat and what makes one work. I've also worked as a dry cargo ship broker which involved developing a reasonable understanding of ship construction which helped. So yes, I had a reasonable level of marine knowledge. However, as I discovered, surveying a boat requires covering a lot of different areas in a limited period of time and I did have to learn and develop new skills.

Undertaking, for example, a pre-purchase survey on a boat that is lifted out and hung in the slings for an hour requires a clear focus on the key components and critical areas that have to be inspected. Even though I'd shadowed and undertaken quite a few surveys under the guidance of my surveying mentor, pulling everything together and doing the first one myself when there was nobody else to bounce observations and questions off was actually quite challenging. Interpreting what I'm looking at and working out the potential causes and implications for the rest of the boat is a skill that I've definitely had to learn and continue to develop.

Question 4

Which of the study modules did you find most challenging and why – and which one gave you the most satisfaction?

Naval Architecture (Assignment 3) was, for me, the most challenging. I'm not a natural mathematician and on a few occasions, I had steam coming out of my ears late at night. Understanding the concepts came on the back of a lot of background reading around the subject. I'll confess that I had to submit one of the calculations for a second time having made a mistake in my initial submission. This module made me use my brain in ways that I hadn't done for many years.

They were all satisfying to complete and getting the feedback and passing the modules one by one I found to be a rewarding experience. I did start out with the approach that I didn't just want to pass the course so that I could start practicing. I wanted to give it my best shot and actually learn as much as I could. At the end of each module I really felt that I had sucked up a lot of theoretical knowledge, obviously there is then another challenge in converting that theory in to practical advantage on the job.

Completing Assignment 1 (An Introduction to Yacht and Small Craft Surveying) was probably the most satisfying. That first assignment was a bit like jumping off a diving board in the dark without knowing how far below the water was. I had no real idea of the level of input required and so when I achieved a good pass I had a much better idea as to what was going to be required for the rest of the course.

Question 5

The IIMS Professional Qualification, based on distance learning, can be quite challenging and some students never fully complete their studies. What advice would you give to them and, indeed, to others planning to take the diploma?

Don't think you can knock this course off in a couple of weekends and appreciate the need to be self-disciplined! I had a demanding full time job and a young family when I booked on to the course and it sat gathering dust on a shelf for over a year before I knuckled down to it.

Take it one assignment at a time and understand that unless you bring a lot of existing knowledge into a particular module there is a requirement to undertake significant background reading and research. The internet is obviously a huge resource to be tapped although it also offers the distraction of disappearing off on tangents that are interesting but not always relevant. The course notes don't have all the answers and I think that is exactly the way it should be. If you're not motivated to research and learn then it's probably not the course for you.

Appreciate the need to get in to 'study and answer writing mode'. I started the course when I was 48, approximately 20 years since I'd last taken a pass/fail course where I'd had to use my brain in this way. For the first assignment it took about 3 weeks and a few false starts before I was 'up and running' and writing in the way that I felt was required.

Question 6

What have been the hardest challenges of setting up and establishing a new surveying business in a quite remote area of Scotland?

The practicalities of setting up my business (albeit for me a relatively simple sole trader model) took quite a lot of input and planning. For example, working out how to get PI insurance, what equipment I required, to name just two. No single task is insurmountable on its own but put together; getting out and marketing yourself, working out how to price and get the business, setting up websites and then actually undertaking surveys and producing the final report was, and frankly remains, quite challenging although it's getting easier.

I think there is a reason that most surveyors are of a certain vintage. To be a competent surveyor you need to know yourself and your limitations and strengths and also have some real world experience.

Question 7

What forms of marketing and promotion have you used to attract clients, for example social media platforms, and which have brought you most success?

My wife was brilliant and set up a website for me using her experience of running a couple of her own businesses. I think this is a 'must have' in today's world as for many people Google or A.N. Other search engine is how they find a service. You need to get as close to the top of that search engine 'results' page as possible. That said, don't rely solely on the internet.

Face to face contact and word of mouth are also, I think, still hugely relevant in the modern world.
I'm fortunate in that I can start a conversation with an inanimate object and I undertook what I called a 'marketing road trip' right at the start and went round every target marina that I had on my list and introduced

myself. The people who drive the hoists and run the yards are the ones who a surveyor needs to know because that's who boat owners ask when they need a surveyor.

I also made a point of getting in touch with all the brokers in my area to make sure they knew I was in business. Obviously they can't recommend a specific surveyor, but I work on the basis that one ' has to be in it to win it' and if they didn't know who I was they wouldn't put me on their list.

I still pop in to marinas and brokers to say hello if I'm passing so that they know I'm available. It's also a good way of finding out what's happening in the market place and you generally get the chance for a conversation after seven hours of having one's head stuck in dirty bilges and lazarette lockers.

Question 8

Which aspects of the surveying business have taxed you most so far technically, or from a business management standpoint?

Report writing is the one specific area that springs to mind. They can take time to get right and craft the wording the way it needs to be but for me, as with I imagine every conscientious surveyor, it's critical as the report is how a survey is judged.

Every surveyor has a different style. I can see the appeal of tick box type surveys from a time management perspective, but for me at present it's still long hand. This is driven both by the fact that sometimes it can take a lot of detail to explain an issue in the way that a layperson client can understand it; and also because I don't think a lot of issues inspected in a boat can be covered by simply ticking a box. Slightly controversial I know and maybe I'll adapt this as I develop my skills and style. At present I quite often find that I'm up late at night writing and my wife now knows that when I say 'just another thirty minutes' whilst I proof read a report, it actually means at least two hours!

Question 9

Of all the key bits of advice you could pass on to other new entrants or less experienced surveyors in the profession around the world, which one would be the most important?

Every surveyor needs to have confidence in their own ability and judgement but this needs to be balanced with a well-developed understanding of when they've reached the limits of their knowledge. We all come into this world knowing nothing and I'm a firm believer that the only way to learn and improve is by watching, listening, asking and doing a lot of background research. I still learn something almost every time I do a survey and I treat every day like a 'school-day'. In particular, if I'm in the vicinity of boat builders and they have time to talk I make a point of tapping them for information. In my opinion, a good boat builder is a font of vital knowledge for a surveyor. We are the observers and they are the 'doers'.

Question 10

Which is your favourite and most useful piece of surveying equipment, or tool, and why?

It's difficult to pick out one single item of equipment. The Tramex moisture meter gets used almost every survey. I have a small peen ball hammer, my universal and well-worn general paint scraper, a torch and a camera in my pocket on every survey along with a variety of different items in my bag which don't see the light of day so often. But if pushed I would actually say my I-phone camera. I make written notes but it's the photographs that I study when I get home. There have been a couple of occasions when I've only picked something up after the survey whilst going through my photographs.

Question 11

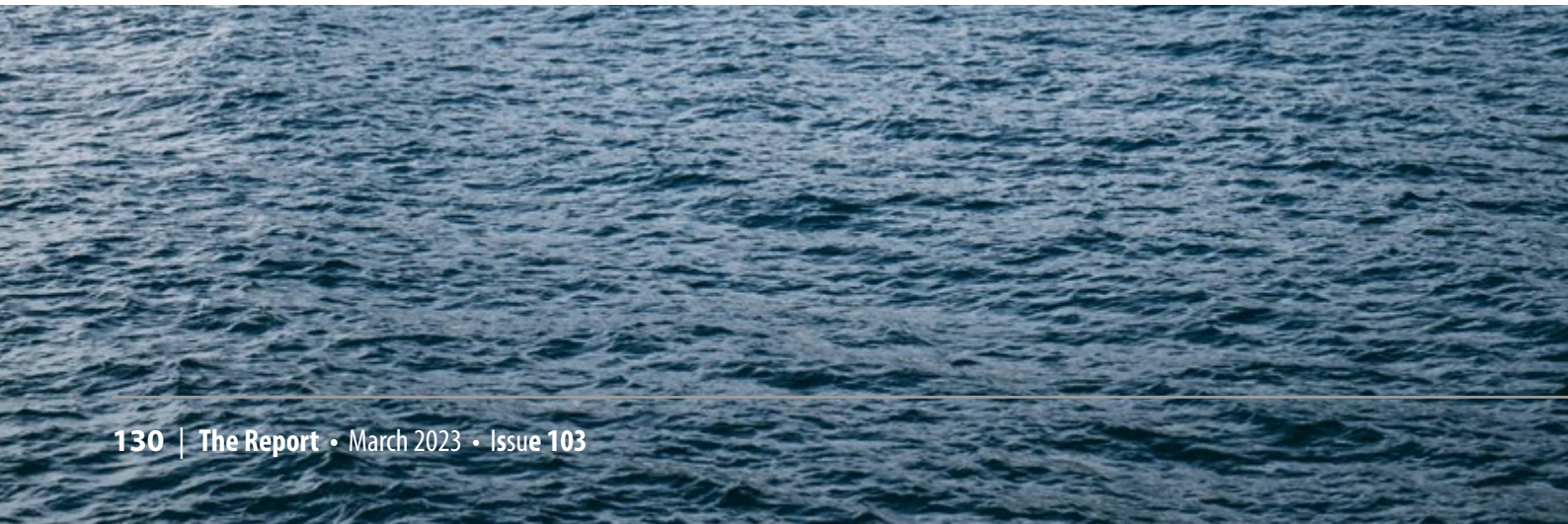
In your spare time when you have downed tools for the day and your report is written, how do you like to relax and unwind?

I'm fortunate in having ticked off a lot of my 'bucket list' when I was younger. Spending time with my wife and 6 year old son, walking the dogs and ending the day in front of the fire with a cup of tea is about as crazy is it gets these days, but that ticks the box for me.

Question 12

Which destination or location in the world inspires you more than any other and why?

The Marquesas Islands in French Polynesia, approximately midway between the Galapagos Islands and Tahiti. They are a long way from anywhere and have spectacular scenery and amazing sea-life. We dived with giant manta rays and 'docile' hammerhead sharks. Human beings have dominated most of the planet and tragically trashed quite a lot of it, but this was one place which I felt was still sort of intact.



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