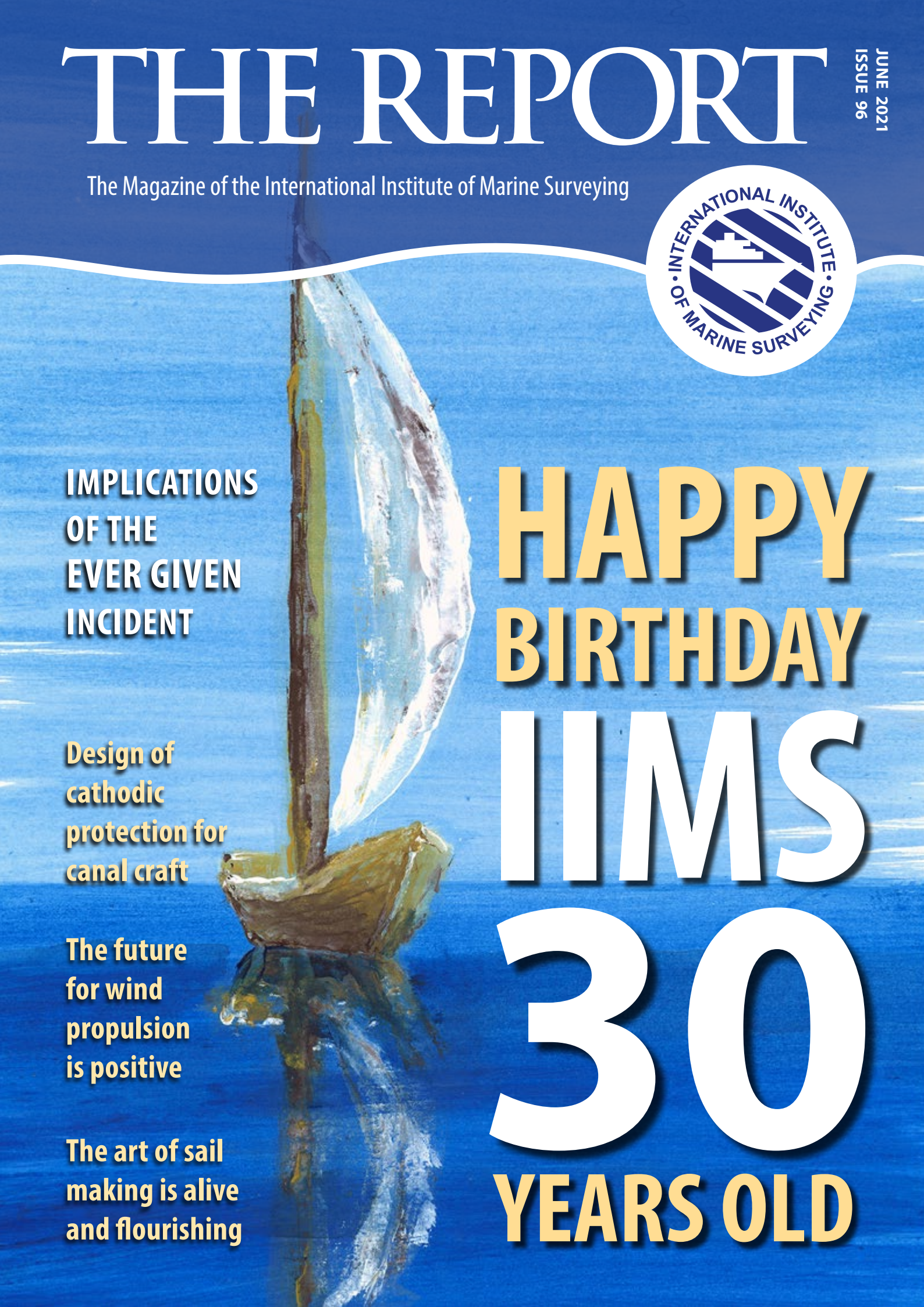
THE REPORT

JUNE 2021
ISSUE 96

The Magazine of the International Institute of Marine Surveying



IMPLICATIONS OF THE EVER GIVEN INCIDENT

Design of cathodic protection for canal craft

The future for wind propulsion is positive

The art of sail making is alive and flourishing

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THE REPORT

The Magazine of the International Institute of Marine Surveying

JUNE 2021 • ISSUE 96

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Editor's Letter

Dear Colleague

Welcome to another bumper issue of The Report Magazine, Edition 96. This issue is published tinged with a mix of emotions. On the one hand, obituaries for two long standing Honorary Fellow members who have passed away make for sad reading as we commemorate their lives (pages 34-38); but on the other, we look forward to the forthcoming AGM and celebrating the 30TH anniversary of the Institute later this month - a chance to reflect how IIMS has changed and grown up over that time. I am grateful to those who have contributed to both areas, in particular the comments and views that have been submitted by some of our Past Presidents.

The front cover of this edition is a copy of an original artwork by IIMS in-house Graphic Designer, Craig Williams, and I am most grateful to him. You can read a short account in *Member News* about the background which led to the creation of this poignant artwork.

The IIMS Annual General Meeting, open to all to attend, is taking place online on 9th June at 14.00. It is preceded by some entertainment as part of our birthday celebrations - online magic and a musical performance. For information see page 32.

IIMS has made some awards to members and I am delighted to unveil the five who have been recognised by their peers - see page 33.

As ever, I am indebted to some excellent contributors who between them have produced great articles and compelling reading. Jeffrey Casciani-Wood remains prolific in his output with a desire to share his extensive knowledge. His series on rivets continues in this edition along with another article on canal boat anodes.

The fallout from several containers overboard incidents and the Ever Given blockage of the Suez Canal rumbles on. I have devoted space in this edition to both subjects, because they offer considerable food for thought.

It is pleasing to see time honoured marine crafts still being carried on. So, I recommend the article by Dieter Loibner - *The art of sailmaking is alive and flourishing* (page 110) - as he lifts the lid on the work being carried out at Northwest Sails and Canvas at Port Hadlock.

Elevators on ships strike me as a niche area, and not one we have looked at before, but as the article inspired by the Australian Maritime Safety Authority (page 76) following two incidents in recent times proves, they need inspecting just like other machinery onboard ships.

Wind propulsion continues to make news headlines. Old technology I hear you say, but it is now starting to make inroads and vessels of the future will, in many cases, inevitably embrace wind propulsion. This issue has two articles on this topic, the first by Simonetta Perogari and the second by Gavin Allwright, Secretary General of the International Windship Association.

Nick Parkyn is the subject of *'A Day in the Life of'* interview (page 130). And as he demonstrates, marine surveyors have skills other than just surveying. His expertise and thirst for knowledge in the area of technology, for example, is engaging.

We are closing in on delivering the first Marine Corrosion Professional Qualification course, which starts on 18 June. This is an excellent development and has been well received and supported by the surveying community. Bookings remain open for the first course and the subsequent one in November 2021 too. Read the more detailed article on page 42 which answers some questions about the programme.

Survey well and stay safe.

Mike

Mike Schwarz,
Chief Executive Officer

The President's Column

Dear Member

I am not sure where to start with my column for this edition of the Report Magazine. So much has happened since I last put pen to paper. In only a few grim weeks in April I have lost friends, associates and family, some of whom will be known to many members of the IIMS. For certain we mourn the loss of one of our past Presidents, Peter Morgan. He was someone who always made me smile with his infectious sense of humour; and then the sad loss of John Excell too - a larger than life character and someone who gave generously of his time to the Institute as Director of Yacht & Small Craft Surveying. John was someone I considered to be a personal friend.

COVID-19 continues to wreak havoc worldwide and another well-known member from our India branch (and former Regional Director for many years) Mr Milind Tambe, sadly suffered the loss of his wife due to this awful disease. As I write this column on the last day of April having just returned from a socially distanced family funeral, I have my fingers crossed that things will and can get better, for surely they could not get much worse?

However I must continue on a sombre note. The maritime industry has suffered 51 serious shipping casualties in April alone, including collisions, sinkings, groundings and fires. Many of these incidents have seen lives lost as a result. The incidents included two Aframax tankers in ballast which ran aground while transiting the Suez Canal, which of course followed on from the momentous grounding of the Ever Given, finally resolved on 29th March.

On a lighter note, I think the digger in the photograph overleaf that came to the assistance of the

Ever Given may have been a little optimistic in offering to give the ship a shove; and the operators of the altogether smaller and therefore less likely to run aground container ship (pictured below) may need to revisit their stow plan and check their stability book!

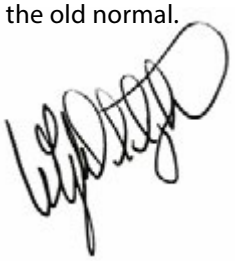
The effects of Brexit seem to have taken a bit of a back seat recently and the initial knee jerk reactions seem to have stabilised somewhat for now. The only events worthy of note seem to be, as published in our April news bulletin, Spain's re-consideration with regard to British qualified skippers and crew on recreational Spanish flagged vessels and the continued use of Red Diesel by UK commercial and recreational boat owners. Behind the scenes I am sure talks and negotiations are continuing in an effort to iron out the 'Bumps in the Road'.

This edition of the Report Magazine marks a milestone in the history of our Institute. I refer of course to the 30th Anniversary of the IIMS. I have written a few words elsewhere in this publication, so will not repeat myself here, suffice to say that the IIMS has come a long way in the last 30 years and I hope with the continuing support of the membership it will continue to strive forward with purpose for the next 30 years.

Also, as I write the, impressive headquarters and home of the IIMS, Murrills House, is still in the process of refurbishment, the results of which I have yet to see. I am very much looking forward to attending meetings and perhaps even social events at Murrills House once we are allowed and COVID-19 restrictions are lifted, or at least relaxed. Last year I hoped for light at the end of the tunnel. This year I am hoping that maybe next year we can all return to something resembling the normal lives we enjoyed over a year ago. However, I do feel that things may never be the same again and the future normal may turn out to be a somewhat new normal rather than the old normal.

The Problem

The Solution



Geoff Waddington
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EUR. ING. JEFFREY N. CASCIANI-WOOD
C. ENG.

Diligentia, Probitas et Veritas

Consultant Forensic, Diagnostic and Marine Engineer,
Naval Architect, Ship and Boat Surveyor
Marine Corrosion Engineer

To the Editor,
The Report.

Dear Sir,

It is commonplace that most marine surveyors who suffer being taken to Court are usually there because of simple errors in their reporting skills. Over the years I have made a collection of other surveyor's reports and they are often very instructive both as to what to put into a report and what to leave out or not to say. Perhaps the most common of the errors that I have seen over the years is the use of so-called reported dimensions not measured ones. I should point out that the marine surveyor's report is a legal document and therefore requires a content that he has measured, weighed, tested, or examined, whatever, not what he has been told by a third party who may, or may not, have given him valid and correct information. Reported dimensions are hearsay and, as such, are not admissible in Court except under very special circumstances. The precise definitions of the principal dimensions of a boat up to 24 metres length are given in the publicly available document ISO8666 a copy of which should be in every small craft marine surveyor's library. I would like to see Karen Brain's comments on this paragraph.

On another, related point, such reported dimensions are usually only the length, breadth and draught, the definitions of which are rarely given. There are no less than six definitions of length of which I am aware, the ISO definition of Hull Length being only one of them.

Similarly, with the breadth, there are three recognised definitions, again, the ISO definition being one of them. If a boat got stuck in a lock, a marine surveyor would have difficulty in defending himself in Court by stating that he had relied on a broker's reported dimension for the overall breadth.

Why do so many people ignore the hull depth and freeboard? Here again, there are two definitions of the hull depth. The depth dimension controls the vessel's longitudinal and transverse strength, the height of her centre of gravity, her stability and metacentric height, the area under the GZ curve, the maximum GZ value and it angle, the deck edge angle and angle of vanishing stability, the freeboard, the amount of reserve buoyancy and the minimum angle and height of downflooding. Measurement of the freeboard on both sides of the vessel will indicate whether or not she sits upright or has a permanent list. None of which are items to be ignored.

Similarly, with the draught which should be measured from the waterline to the underside of keel with an extra measurement taken to any skeg or Dutch keel. In the case of vessels which may have to navigate under bridges or through tunnels, I would consider it good practice to also measure and report the air draught. If the water draught is measured at the vessel's midlength it is possible to check as to whether her sides are parallel and whether or not she is wracked or has suffered other deformations such as permanent set from hogging or sagging. That is particularly so with those marine surveyors who survey narrowboats and similar canal craft. I think it also good practice to measure and report the length of any skeg underneath the bottom plating from the centreline of the rudder stock to the forward end of the skeg which would be a great help to anyone who has to lift the boat from the water and sit her down on keel blocks.

I think it also good practice to measure and report the cabin height from the top of the cabin sole to the underside of the deckhead lining.

Yours faithfully,

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REMOTE INSPECTIONS ACCELERATING TO MEET CHALLENGING TIMES

Bureau Veritas' white paper, entitled "Remote inspections – A solution for the present, an opportunity for the future," has been published. It outlines how important it is for companies to rely on remote inspections to ensure business continuity and their vision goes much wider than the maritime sector.

Organizations worldwide are rethinking the way they do business, following the rapid acceleration of digitalization trends and uptake of remote working. This has created both challenges and opportunities across sectors, driving a shift towards remote inspections that have revealed multiple advantages says Bureau Veritas.

A remote inspection uses technology to enable qualified auditors, inspectors and surveyors to perform an inspection without being onsite. Remote inspections are commonly performed when risks to health and safety, or questions of time or cost, make in-person inspections inadvisable or impossible.

This white paper's goal is to present how businesses, across an array of industries, are reaping the benefits of remote inspections. The paper is the result of collaboration between Bureau Veritas experts in sectors including Industry, Energy, Marine & Offshore, Building and Infrastructure, and Product Certification.

While in-person inspections will never become obsolete, the benefits of remote inspection are so significant that the practice is only gaining traction. This is even more relevant for organizations relying on complex supply chains for which continuity and resilience must be and remain at the highest level.
With remote inspections, asset owners can ensure business continuity, while maintaining both safety and the compliance of their assets and products. They improve efficiency, optimize costs and help companies meet regulatory, health, safety, quality and environmental needs. Remote-enabled services also provide faster decision-making and shorter response times.

AUSTRALIA'S DOMESTIC SUPERYACHT INDUSTRY BOOMING

Australia is experiencing a boom in its superyacht industry, doubling in size. Vessels have been attracted to Australia and its buoyant domestic charter market. With borders closed, many superyachts have moved to Australia to offer a luxury alternative to overseas travel. This increase in charter activity in Australian waters provides a huge economic lift for the country.

Seemingly this increase in vessel activity has a direct correlation to the new charter legislation passed by the federal government in December 2019. The passing of the Special Recreation Vessels (SRV) Act of 2019, coupled with the closure of international borders have contributed to accelerated growth of the industry.

The SRV Act removed red tape restrictions that had been imposed on superyachts operating commercially in Australian waters. Prior to this Act becoming law, the largest domestic charter yacht was 42 metres (138 feet); now the largest Australian based yacht is 74.5 metres (244 feet) which is one of eight vessels over 50m now based in Australia since the passage of the Act.

"We look forward to having more Australian-built superyachts based here in Australia. With such spectacular cruising grounds and two of the world's best superyacht manufacturers in Silver Yachts and Echo Yachts, it's only a matter of time before we will see a large Australian-built superyacht chartering here and showcasing the absolute best of Australia," commented David Good, CEO, Superyacht Australia.

ITIC CLAIMS REVIEW EDITION 44 PUBLISHED

In his opening comments, the editor says, "It is now over a year since the first lockdown was imposed in the UK and we know that many of you all over the world have also been subject to restrictions, with many of us working from our homes during this time.

Whilst we are unable to travel to meet members and insurance brokers, we are continually looking for new ways to reach you and as a result we have launched a new podcast series called ITIC Insight. Episodes are hosted by members of the ITIC team, exploring a key topic with external guests or hosting an interview with a board member or insurance broker. More information about this series can be found on the back page of the ITIC Claims Review publication.

The review provides a selection of cases recently handled by the organisation. We hope that these case histories will be of interest to you and will also help you to identify potential problems in order to avoid these types of situations occurring in your businesses."

Read the review at **https://bit.ly/3mQLhr3**.

BRUNSWICK SUSTAINABILITY REPORT HIGHLIGHTS COMMITMENT TO ENVIRONMENTAL, SOCIAL AND GOVERNANCE STRATEGIES

Brunswick Corp has published its 2020 Sustainability Report: Our Stake in Tomorrow's Tides, highlighting the company's progress toward its sustainability goals, including a continued commitment to advance its Environmental, Social, and Governance (ESG) strategies. The report also reflects Brunswick's dedication to sustainable manufacturing and contributing to the communities in which it operates.

"Brunswick understands the impact our businesses and products have on the environment and our opportunities to lead the way in sustainable, responsible business practices," said Dave Foulkes, Brunswick Corporation CEO. "We are committed to continually broadening, advancing, and delivering on our sustainability mission and to improving the communities in which we live and work, and in which our products operate.

"Our 2020 report highlights some of those collective efforts, including how we prioritised the health and safety of our employees in the face of immense challenges resulting from the Covid-19 pandemic."

Access the report at **https://bit.ly/3aarzli**.

NEW PRODUCTION FACILITY AS OYSTER YACHTS MAKES A SIGNIFICANT INVESTMENT

Oyster Yachts is undertaking a considerable expansion programme by acquiring an additional 27,000 sq ft at the Hythe Marine Park, Southampton. The additional space will be used to create a state-of-the-art production facility for the new Oyster 495 yacht.

"With several Oyster 495s already sold, investment in this dedicated production facility fits seamlessly with our growth strategy," says Oyster's CEO Richard Hadida. "We have great plans for Hythe Marine Park, this location is already a centre of excellence for boat building, and it is the ideal location for our expansion of Oyster."

Oyster Yachts is moving into the historic Grade II listed buildings known locally as the Admiralty Shed or the Flying Boat Hangar, which produced sea planes for World War 1, before becoming a key facility for Vickers Supermarine and later the maintenance base for the pioneering Empire flying boats. This announcement sees Oyster Yachts increasing its existing facilities by 70%, supporting the company's ongoing investment and growth strategy in the UK. To accommodate the expansion, Oyster will be increasing its Southampton workforce by an additional 70 employees.

GIANT WIND BLADES ARE LARGEST NON-CONTAINER CARGO LOADED

The development of the wind turbine sector is creating new challenges for the shipping industry as giant wind blades and elements are shipped from their manufacturers to the staging points for their installation. APM Terminals Pecem, at the port of Pecem in northeast Brazil, recently handled the loading of three blades, which it reports became the largest non-containerized cargo operation in the world.

The shipment consisted of three giant wind blades, each of which measured approximately 238 feet in length. While these blades were only about two-thirds the length of the largest wind blades ever built, they were the largest in Brazil and needed to be shipped from the port of Pecem in the north to the state of Santa Catarina in the south where they will be installed as part of the growing wind energy sector in the region. Each of the three blades weighs 21 tons requiring a complex loading operation.

According to operations manager, Herllon Rossato Rossdeutscher of APM Terminals Pecem more than a month of planning went into the operation. APM Terminals Pecém was the port of shipment with Maersk Brazil's Logistics and Services team providing logistics solutions. Aliança Navegação e Logística, part of the Hamburg Sud group of companies running freight operations along the coast of Brazil and South America, was the carrier transporting the blades.

For the operations, a Ship to Shore (STS) crane provided by APM Terminals Pecém was first used to ship flat rack containers to serve as a base for the support and movement frames on which the blades would be rest. Two mobile port cranes (MHC type) were used to hoist the blades and load them aboard the containerships. The first shipment was aboard the 836-foot long Bartolomeu Dias. Days later a second shipment was loaded aboard her sister ship the Vincente Pinzon.

UPDATED GUIDELINES FOR THE CARRIAGE OF SEED CAKE IN CONTAINERS ISSUED

The International Group together with the Cargo Incident Notification System (CINS) have jointly released an updated version of the "Guidelines for the Carriage of Seed Cake in Containers".

For reference, the term Seed Cake refers to pulp, meals, cake, pellets, expellers and other similar cargo where edible vegetable oils have been removed from oil-bearing seeds, cereals or commodities with similar properties. The carriage of Seed Cake cargoes continues to cause confusion and the potential for undeclared or misdeclared cargo remains high, with the consequent risk of fire on board container ships.

As the new version of the guidelines notes: It is vital that Seed Cake that is not classified in Class 4.2 of the IMDG Code. In fact, it should be declared by the shipper to the receiving carrier and appropriate documentation provided to show that the Seed Cake as offered for shipment has been tested in accordance with the provisions of the IMDG Code.

The shipper should ensure that the correct certification accompanies the cargo and is provided to the carrier in accordance with the oil content and moisture content of the Seed Cake and that the Seed Cake has been properly aged and where appropriate is substantially free from flammable solvents. According to the guidance, the IMDG Code does not specify what 'properly aged' means. In practice, as the duration of ageing varies with the oil content, 'properly aged' means that the Seed Cake should be sufficiently mature for oil content that can oxidize at ambient temperatures to have done so.

Non-declaration of Seed Cake as dangerous goods leads to unsafe stowage and dramatically increases the risk of fire, potentially leading to loss of life, assets and damage to the environment.

Access the updated guidelines at **https://bit.ly/3ebbCMP**.

HM TREASURY CONFIRMS DECISION TO MAINTAIN RECREATIONAL BOATERS' ENTITLEMENT TO USE RED DIESEL BEYOND APRIL 2022

The lobbying campaign, mounted by The Cruising Association, Royal Yachting Association (RYA) and British Marine has argued successfully that having two colours of diesel would cause fuel supply problems and impact on safe sailing in the UK. The decision allows for easy refuelling in England, Wales and Scotland and will avoid the logistical and environmental difficulty for the fuel supply industry of changing from red to white diesel, they say. Now pleasure craft in Great Britain will be able to use red diesel and pay fuel suppliers the difference between the red diesel rate and the white diesel rate, on the proportion intended for propulsion use.

The Cruising Association (CA) believes the government concluded that removing the entitlement to use red diesel in the commercial sector (including water borne freight, ferries, fishing vessels, operating at sea or inland) would have a detrimental effect on businesses' finances and viability.

'The entitlement to use red diesel in these sectors has been kept by Her Majesty's Government beyond April 2022, as otherwise marinas and ports would have had to stock two colours of diesel,' a CA statement says. 'This would have been uneconomic.'

HM Treasury

YANMAR UNDERWAY WITH FIELD DEMO TESTING FOR HYDROGEN FUEL CELL

With marine environmental regulations tightening worldwide, in December 2020 the Japanese Ministry of Economy, Trade and Industry formulated its 'Green Growth Strategy towards 2050 Carbon Neutrality'. The strategy highlights the development of energy and power sources that reduce the impact on the environment, including those for vessels powered by carbon-free fuels such as hydrogen and ammonia. Looking towards the future of powertrain technology, Yanmar has developed a maritime fuel cell system that incorporates hydrogen fuel cell modules from Toyota's MIRAI automobile. The system was installed into Yanmar's EX38A FC pleasure boat for field testing. The boat was the first to officially comply with the safety guidelines for hydrogen fuel cell vessels formulated by the Ministry of Land, Infrastructure, Transport and Tourism in Japan.

Recently Yanmar conducted a field demonstration test for the maritime fuel cell system as the company sought to verify specific issues and solutions in a maritime environment for deployment of the fuel cell system. In the future, Yanmar has plans to scale the maritime fuel cell system by connecting multiple units. The system is planned to be deployed to larger vessels by 2025.

KEY LOSS PREVENTION TIPS FOR CONTAINERS LOST OVERBOARD PUBLISHED IN NEW GUIDE

Amid an alarming trend of containers lost overboard, the Swedish P&I Club has published a 32 page guide offering guidance on planning and loading the containers. According to the Club's statistics, the main reason for containers being lost overboard is related to container vessels navigating in heavy weather, combined with crew failure to reduce speed and/or alter course to avoid it or alleviate its effect. The reasons can often be attributed to a series of multiple failures, rather than a single cause, but raising awareness of these issues to both ship and shore staff will serve to prevent accidents from happening.

The guide also notes that other common factors are:

- Containers not being correctly stuffed or declared by the shipper;
- Containers not being loaded as per the stowage plan;
- Containers not secured in accordance with the Cargo Securing Manual;
- Lashing strengths not checked against the loading computer's lashing module;
- The vessel being too stiff with an excessive GM.

Access the 32 page guide at **https://bit.ly/2P6DbOV**.

2021 CONTAINER SHIPPING REPORT PUBLISHED BY ALIX PARTNERS

Global consulting firm, Alix Partners, has published the 2021 Container Shipping Report. For at least three decades, the container shipping industry has been locked in a recurring boom and bust loop. During times of strong macroeconomic growth, shipping rates would soar and container ship operators would reinvest their profits in new, ever-larger vessels. Then the economy would slide into a downturn, demand would plunge, rates would tumble, and operators would find themselves burdened with heavy debt and idle vessels. As overcapacity kept a tight lid on rates, leverage would expand, revenues would fall, and ship operators would tumble into bankruptcy or stay out of court, thanks only to amend and extend agreements with their creditors. Today, however, the fundamentals that would support a breakaway from that cycle are in place.

The 2021 Container Shipping Report says the sector is enjoying a boom phase, with global container freight rate indexes topping $5,000 per 40-foot container in February 2021 after climbing steeply and steadily since May 2020.1 And this time, with a few notable exceptions, carriers aren't flooding the world's shipyards with orders yet. Instead, carriers have to date successfully managed capacity, keeping rates stable even as demand slipped by 5% during the first nine months of 2020 while overall capacity increased by just 2%. Meanwhile, idle capacity, which rose to 11% in May 2020, retreated to 3% by the third quarter of the year because the industry increased blank sailings and suspended service on some routes. Carriers also cut sailing speeds, which fell 1.8% in 2020.

Access the full report at **https://bit.ly/31vxlsK**.

MARINE INSURANCE COMPANY DEVELOPS AN APP FOR MINIMIZING LOSSES AND KEEPING OPERATIONS ACCIDENT-FREE

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

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

"The main purpose of the Alandia Loss Prevention application is to minimize losses and keep operations accident-free by enhancing communication and integrating safety observation reports into daily routines," says Martti Simojoki, Senior Loss Prevention Manager at Alandia.

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

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

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

Image credit: British Illustrations

100 YEARS ON SINCE THE RNLI USED TRACTORS TO LAUNCH LIFEBOATS, THE INSTITUTION LOOKS BACK

RNLI lifeboats often take centre stage in rescues, however, many can't launch without a tractor and the dedicated shore crew. Operators often launch the lifeboat in raging seas and darkness, and a safe, quick launch can make the difference between life and death. The lifeboat and crew might get the public's attention, but the tractor and the shore crew are the unsung heroes who more than pull their weight – literally.

This year marks 100 years since the RNLI introduced tractors to launch its lifeboats and the technology nowadays – with the very latest Shannon Launch and Recovery System (SLRS) – is unrecognisable to all those years ago.

Prior to the 1920's, it wasn't unusual to see horses being used to pull lifeboats through local communities to reach a point where they could safely be launched. In 1920, Captain Howard FJ Rowley, RNLI Chief Inspector of Lifeboats said: 'If we can find a mechanical means for launching, we shall greatly increase the efficiency, certainty and speed of the service.'

That year, a 35hp Clayton Caterpillar Tractor was trialled at Hunstanton Beach, in Norfolk over flat sands, sand dunes and rocky ground. Despite the tractor once becoming submerged in water, the launch was successful using only crew and four helpers, where under ordinary conditions such a launch would require eight or 10 horses and as many helpers. A year later, the RNLI had purchased 20 Clayton Caterpillar Tractors, adapted and distributed them to stations. By 1928, the four-wheel drive tractor with a 60hp petrol engine, which could cope with steep shingle beaches, was also in service.

RNLI Machinery Trainer Mark Perry said: "The RNLI have progressed not only the development of lifeboats over the years but also the launch and recovery systems associated with the new boats."

"Volunteers training on the new equipment will spend in the region of 40 hours conducting basic training and learning the full extent of all its capabilities – it's certainly come a long way since the first tractor was introduced 100 years ago."

COMPOSITES AND RECREATIONAL BOATING INDUSTRY TEAM UP TO MAKE HEADWAY ON CIRCULAR ECONOMY

European Boating Industry (EBI) and the European Composites Industry Association (EuCIA), representing respectively the Recreational Boating and Composites industries at European level, have agreed on a new partnership. The aim is to jointly tackle the key challenges around circularity of composites used in the recreational boating industry and promote sustainable recycling solutions to the supply chain for end-of-life boats.

Following a common understanding of the importance of the circular economy and aiming to find solutions for end-of-life composites, EBI and EuCIA agreed a formal partnership. The aim will be to find common approaches to the key issues of dismantling, recycling, and the future of composites in the recreational boating industry.

The partnership will also follow policy developments at EU level, such as the European Green Deal, the Circular Economy Action Plan, and the Working Group on End-of-Life boats co-chaired by EBI and the European Commission Directorate-General for Maritime Affairs and Fisheries (DG MARE). Cooperation will also extend to other composite use industries and related industries, such as the wind energy and the transportation segment.

Composites are the main material used for making hulls, decks and large components in boat building, estimated that 95% of all boats will have composite parts. Given that composite boats have been built already for several decades, the number of boats reaching their end-of-life is expected to increase in the coming years.

Concrete cooperation activities between EuCIA and EBI will include:

- Cooperation in the End-of-Life boats Working Group co-chaired by EBI and DG MARE
- Exchange of information on dismantling, recycling, new materials, Life Cycle Analysis, and cross-sectoral cooperation
- Joint advocacy, communication activities and cooperation on projects at EU level

EuCIA European Composites Industry Association | EUROPEAN BOATING INDUSTRY

THE MARINE SURVEYOR SEARCH APP

Available on the App Store

GET IT ON Google Play

REPORT bites

Around 50 skilled jobs could be created with the acquisition of The South West Shipyard by Cockwell's Modern & Classic Boatbuilding.

International Chamber of Shipping has launched the first edition of Maritime Security: A Comprehensive Guide for Shipowners, Seafarers and Administrations.

Brighton based insurance company, Navigators and General, has celebrated its 100-year anniversary.

AMSA inspectors have been conducting a national float-free EPIRB focused inspection campaign to ensure operators meet their obligations and, so far, 90% meet the new regulations.

Peru has shown its support for the safety of fishing vessels by depositing its instrument of accession to the 2012 Cape Town Agreement making it the 16th country to become a Contracting State to the Agreement.

Customs authorities in Germany and Belgium have seized a record haul of more than 23 tonnes of cocaine earlier this year destined for the Netherlands in raids on two shipments.

The Ocean Race says some of its competitors will collect data about the impact that humans are making on the ocean during its inaugural European Race.

Maersk Eindhoven, a containership operated by Maersk, lost several hundreds of containers following an engine stop in harsh weather.

The Maritime and Port Authority of Singapore has joined an industry-led project to advance the use of ammonia as a marine fuel to reduce carbon emissions.

Kamlesd Kumar, Head of Class Systematics & Operational Centre, DNV, said "Remote surveys were catching on for ships before 2020; and for some types of survey, the approach could become 'the new normal' after the pandemic.

Indiana based pontoon boat manufacturer, Bennington Boats, has acquired a second production facility in order to increase its overall production capacity and create new jobs.

Safety Briefings

SAFETY WARNING ABOUT MULTIPLE CRUISE SHIP ANCHOR FAILURES

In early 2020 the COVID-19 pandemic forced the international cruise industry into an unprecedented operational pause, resulting in many cruise ships anchoring off the UK south coast for long periods of time. The MAIB has been made aware of several marine incidents of anchor failures since October 2020 where cruise ship anchors or anchor cables have failed, often while trying to ride out named winter storms. One cruise ship lost both its anchors within a week.

The strength of anchoring equipment is defined by ship Classifcation Rules and it is intended for temporary mooring of a ship within a harbour or sheltered area. In good holding ground, the anchoring equipment should be able to hold the ship to a maximum wind strength of 48 knots in fast water, but this reduces to a maximum of 21 knots wind strength in seas with a significant wave height of 2m.

Safety lessons

- Operational limits for anchoring must be sufficiently cautious to ensure weighing anchor is not left too late, risking overloading anchor equipment. If strong winds are forecast, proactive action should be taken to seek a more sheltered anchorage in good time or proceed to sea and ride out the weather. Do not wait until the anchor drags or until most of the anchor cable has been paid out before weighing anchor.

- Steps should be taken to minimize the wear on the anchoring equipment as far as possible. When the opportunity presents itself, the anchor in use should be rotated and the scope of cable varied on a regular basis to minimize single point loading. An appropriately experienced crew member should also carry out regular checks on the windlass brake condition and areas where the cable is in contact with the ship.

- While at anchor for significant periods, ensure all watchkeepers are confident in the actions to be take in the event of dragging or losing an anchor and there is a contingency plan ready for implementation in the event of having to proceed to sea or re-anchor. Also, watchkeepers and senior officers must be aware of the reporting requirements to the coastal state in the event of losing an anchor so that mitigation measures can be put in place if required.

- As the restrictions on the cruise industry ease, it must be remembered that this period of prolonged anchoring may have decreased the life span of the anchoring equipment. A full assessment of the future suitability of the anchoring equipment should be undertaken at the earliest opportunity or the next dry-docking period.

MAIB SPRING 2021 SAFETY DIGEST OF ACCIDENT REPORTS PUBLISHED

The Spring 2021 Safety Digest has been published by the Marine Accident Investigation Branch. It features 25 case studies involving a range of vessels and accidents. The Safety Digest talks through each scenario and reveals the lessons that arise from each case.

Chief Inspector of Marine Accidents, Andrew Moll, writes in his welcome and introduction "At the MAIB, we try to keep our safety messages fresh. However, the articles in the Safety Digests are drawn from the cases reported, and all too often this means seeing the same sorts of accidents time and time again. Consequently, this edition contains accidents we have seen many times before involving safe means of access, suspended loads, noxious atmosphere and man overboard recovery. As mariners we take pride in our ability to get the job done, but many of the accidents reported here could have been avoided had those involved taken a little more time to assess the risks before getting on with the job. The old sailor's adage of 'one hand for yourself and the other for the ship' is still valid today: doing your job should not involve putting yourself in danger.

I have made the point before that accidents often come in batches. However, after a prolonged period during which there were no fatal accidents in the UK's commercial fishing sector, the spate of such accidents over the winter months is concerning. Small fishing vessels can be extremely vulnerable both to capsize and to being overwhelmed by heavy seas, and 5 of the 7 fishermen lost over the winter months were likely trapped when their vessels suddenly and without warning capsized. The MAIB's reports into these recent accidents will follow, but I make no apology for again asking owners and skippers of small fishing boats to make a proper assessment of their vessel's stability and of the loads it can safely carry.

For Northern hemisphere leisure boaters, Spring has arrived, better weather is expected, and for many there is a feeling of hope that the worst of the COVID restrictions are perhaps behind us and we can get on with some serious boating. In the autumn 2020 issue of the Safety Digest, I made the point that there had been some terrible tragedies over the summer, and I encouraged all leisure boaters to take advantage of the winter months to refresh their knowledge, carry out the inevitable maintenance tasks, and to plan how best to start the 2021 boating season.

When restrictions are eased and the sun is shining the temptation to get afloat will be immense. Please make the most of these last few weeks of enforced inactivity to properly plan and prepare for this year's boating. I am quite sure you will not regret it."

Access and download the Safety Digest at **https://bit.ly/3wXeO7t**.

REPORT bites

A total of 15 Japanese companies have come together to form a carbon-neutral liquefied natural gas buyer's alliance.

SPW GmbH, the German propeller manufacturer, has attained DNV-GL certification for its Variprofile and Variprop feathering propellers.

One of two reports on decarbonizing shipping published by the World Bank sees LNG as "likely to play a limited role" in decarbonizing the sector and recommends that countries should "avoid new public policy that supports LNG as a bunker fuel.

Canada is extending its ban on cruise ships until February 2022 because of COVID-19, effectively shutting down popular summer trips to Alaska for another year.

Monaco Marine is to invest over 6.5m to upgrade its shipyard in Antibes including a new 300-tonne travel lift.

Global yacht charter specialist Sunsail has picked up a 2021 Trusted Service Award for exceptional customer service from Feefo, one of the UKs biggest online review platforms.

Refit and repair yard STP Shipyard Palma has teamed up with Marina Ibiza to create the Ibiza Joysail Regatta, a new four-day competition for 24m-plus yachts in the Maxi and Superyacht classes.

Testing is getting underway to explore the use of biofuels and methanol on the currently available marine propulsion technologies.

Canal & River Trust has assembled a new cultural heritage advisory group to support the effective conservation and interpretation of the built and cultural heritage of the UK waterways.

Transport Malta has announced it is to begin work on a new marina for small craft in Xemxija, a suburb on the western part of St Paul's Bay in the north of the country.

Safety Briefings

FLOODING AND SINKING OF TRAWLER OCEAN QUEST REPORT PUBLISHED

MAIB have published their report on the flooding and sinking of trawler Ocean Quest.

On 18 August 2019 and about 70 miles north-east of Fraserburgh, the UK registered trawler Ocean Quest, sank as a result of an engine room flood. The source of the flood has not been determined; however, it was almost certainly a result of shell plating or hull weld failure. The crew tackled the flood with fixed and portable pumps but were not able to get the situation under control. The alarm was raised as soon as the flood was discovered, the crew were well prepared for the abandonment and all were rescued safely by a coastguard helicopter.

Safety Issues

Flooding presents an immediate threat, and every effort must be made to pump out the floodwater. In this case, the crew followed their onboard routine for bilge pumping, which meant that sea suction valves were left partly open. This potentially restricted the bilge pumps' effectiveness and, although this procedure may have been appropriate for bilge pumping, it was not appropriate during an emergency.

Training and drills help to prepare for emergencies. Ocean Quest's crew had conducted regular abandon ship drills so were well prepared for that phase of the emergency, and all rescued safely.

Ultrasonic hull thickness measurement is only a sampling process and does not provide 100% coverage, so is not guaranteed to detect all areas of erosion.

Read the report in full at **https://bit.ly/3a761WG**.

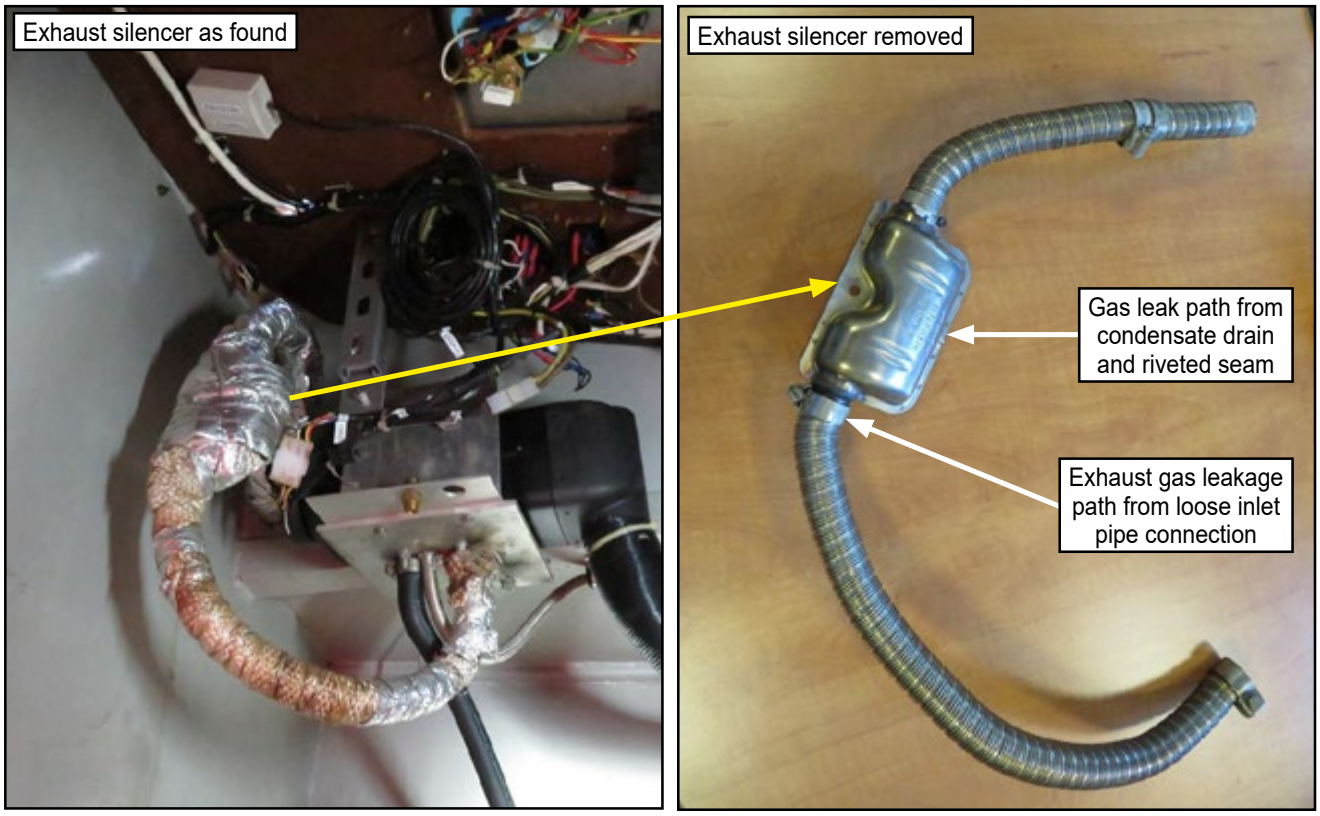
REPORT ISSUED INTO THE DEATH OF TWO MEN ONBOARD THE MOTOR VESSEL DIVERSION

The MAIB has released its report on the carbon monoxide poisoning aboard the motor cruiser Diversion that killed two men. At about 2000 on 4 December 2019, the bodies of two men were discovered in the cabin of the privately owned motor cruiser Diversion, which was moored to a quay in the centre of York, England. The bodies were those of the boat owner and his friend, who had spent the previous evening in the city centre socialising with former work colleagues and were spending the night on board.

Both men had died as a result of carbon monoxide poisoning. The carbon monoxide had leaked into the cabin from the boat's diesel-fuelled cabin heater exhaust.

Safety Issues

- the cabin heater's exhaust silencer was not designed for marine use: its connection to the exhaust pipe system was not gas tight, the installation had not been checked by a professional heater installer, and it had not been serviced;
- the cabin ventilation system did not meet the requirements of the Boat Safety Scheme and this might have increased the rate at which the carbon monoxide accumulated in the boat's cabin space;
- the owner and his friend were not alerted to the danger because a carbon monoxide alarm had not been fitted.



Statement from the IIMS Chief Executive Officer:
"Too often we have seen carbon monoxide as the cause of deaths onboard boats. Such incidents are avoidable, and the installation of an inexpensive carbon monoxide alarm would most likely save lives. I urge marine surveyors the world over to implement a duty of care and if, when surveying a vessel and no carbon monoxide alarm is installed, they make a recommendation to the owner to fit one as a matter of urgency."

Access the report at **https://bit.ly/3mQFiTu**.

REPORT bites

The Italian Coast Guard has taken delivery of what is claimed to be the longest self-righting and unsinkable boat ever built in Italy.

Sustainability and digitalisation must go hand in hand to boost the shipping industry, insists environmental management specialist Erle Kristin Wagle.

Cox Powertrain has received an additional £12 million in funding to help it increase production.

A cargo traffic jam on the world's roads, seas and air corridors could easily continue into 2022, according to Bob Biesterfeld, CEO of C.H. Robinson Worldwide Inc, one of the biggest US freight brokers.

ABB is to supply the all-electric power solution for ten 40-metre ferries being built by Spanish shipbuilder Astilleros Gondán under a EUR 52.4 million (about $62.5 million) contract from Portuguese ferry company Transtejo.

ONEX Peace, an Aframax tanker built by Hyundai Samho Heavy Industries and delivered to its owner ONEX, has become the world's first merchant ship to receive DNV's SILENT-E notation.

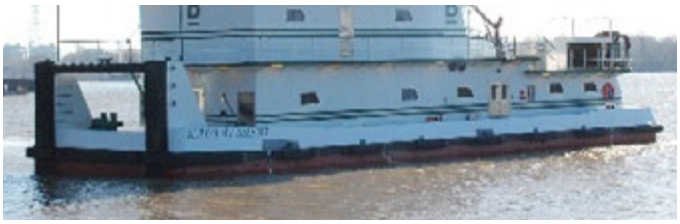
Singapore became the first nation to ratify the Convention on the International Organization for Marine Aids to Navigation.

Canal & River Trust is carrying out improvements to wildlife habitats along the Montgomery Canal thanks to funding secured from the Welsh Government's Sustainable Management Scheme.

Classification society Bureau Veritas reports it has certified and classed Singapore's first hybrid-powered vessel - a 15-meter, 12-passenger aluminium pilot boat.

Leeds Building Society has agreed to adopt a one-mile stretch of UK waterway in the centre of Leeds to help to maintain this vital green corridor and attract more wildlife.

Safety Briefings



FLOODING OF TOWING VESSEL CAUSED BY A LACK OF MONITORING

The National Transportation Safety Board (NTSB) has published an investigation report on the flooding of the towing vessel 'Alton St Amant' while moored in the Harvey Canal in New Orleans. The incident resulted in an oil discharge into the water. The investigation identified lack of pre-inspection and monitoring procedures for water transfer as a key cause of the incident.

On May 17, 2020, about 0530 local time, a shipyard worker reported that the towing vessel Alton St Amant was partially submerged while moored at a shipyard in the Harvey Canal in New Orleans, Louisiana. There were no crew members or shipyard workers aboard the vessel. Approximately five gallons of diesel fuel were released into the water. Damage to the vessel was estimated at $1.5 million. No injuries were reported.

Probable cause

NTSB has determined that the probable cause of the flooding of the towing vessel Alton St Amant was the absence of shipyard pre-inspection and monitoring procedures for water transfer, which resulted in potable water tanks overflowing through their open access hatches during an unmonitored transfer.

Having been filled for several hours, the potable water tanks reached capacity, resulting in an overflow through the open hatches in the rudder room (rather than the tank vents as planned). After the rudder room flooded, the water spilled over the open doorsill onto the main deck of the engine room and began flooding down into that space. With the bilge system inoperable due to planned maintenance during the shipyard period and no one aboard the vessel to monitor the water transfer, the potable water continued to fill the aft spaces undetected and submerged the vessel until it came to rest on the bottom of the canal.

Lessons learned

Precautions for Tank Filling

Crew and shipyard personnel designated to conduct liquid transfers must be aware of the status of a vessel's tanks, including their access hatches and associated piping systems, whether ashore or at sea.

When filling a tank, open access hatches create a risk of unintended flooding. Pre-inspection and monitoring of transfers provide the opportunity to identify and remedy any issues in order to ensure they are safely completed.

Read the full story and download the report at **https://bit.ly/2POaSV9**.

SWEDISH CLUB CASE STUDY FOLLOWING MULTIPLE EXPLOSIONS ONBOARD AFTER CARGO FUMIGATION

The Swedish Club describes a case of multiple explosions onboard a bulk carrier caused by cargo fumigation. A bulk carrier had loaded yellow corn in all cargo holds up to the hatch coamings. After the loading was complete fumigation technicians came onboard and fumigated the cargo with fumitoxin pellets. As per the cargo documentation, the fumigation pellets were required to be applied subsurface.

In this instance, the technicians poured the pellets from flasks while walking on the hatch coamings or hatch covers. This work took a little more than an hour and, afterwards, all the cargo hatches were closed and the vessel sailed. A couple of hours later, an explosion occurred in one of the holds. The crew noted that the hatch covers had moved slightly and blue gray smoke was seen coming from under the edges. About an hour later, another explosion occurred in a second hold, and a couple of minutes later an explosion occurred a third. There were explosions in the remaining holds shortly afterwards.

Probable cause

Fumitoxin pellets and similar fumigants are made up of around 55% aluminium phosphide which reacts with water to produce phosphine, an extremely toxic and effective fumigant. Phosphine gas will form an explosive mixture when mixed with air at a concentration exceeding around 1.8% to 2% by volume (the lower flammable limit).

Lessons learned

The manager should provide training to the crew to ensure that the crew is aware of the requirements and procedures for the fumigation operation. The crew need to ensure that the fumigation pellets are distributed as per the cargo documents.

Agricultural products in bulk may be fumigated in ships' holds to prevent insect infestation. Solid aluminium phosphide (or similar) is often used for fumigation. Aluminium phosphide reacts with water vapour (humidity) in air to produce phosphine, a toxic and flammable gas, which kills insects. Heat is also given off during the reaction. The solid fumigant may be applied in fabric 'socks' or as pellets on the surface, just before closing holds. Holds are then kept closed for a period before ventilating. People must keep out of holds that are being fumigated due to the toxic fumigant.

If there is an excessive amount of fumigant in one place, or if the fumigant is in contact with liquid water e.g. from sweating or condensation, then the fumigant can react too quickly. This can evolve excessive heat and lead to ignition of cargo and/or packaging such as bags or paper placed over the top of the cargo. Under certain conditions the fumigant gas itself may ignite, producing an explosion.

Read the story in full at **https://bit.ly/39nIct3**.

REPORT bites

A major 3 million pound repair project at Figure of Three Lock on the Calder & Hebble Navigation is nearing completion.

China has said it will construct a Polar Silk Road and actively participate in the development of Arctic and Antarctic regions.

DP World and partners have signed an agreement to start the construction of an international container port and industrial logistics park in Gresik, Indonesia.

The Cyprus Shipping Deputy Ministry has updated its ship registration policy with the introduction of technical standards for four types of vessels.

The draft amendments to the IMO's mandatory rules on reducing carbon emissions in all ships globally, if adopted, are likely to be implemented from October 2022 and will be applicable to the world's entire commercial fleet.

Scania Engines has been rebranded Scania Power Solutions to reflect the widening range of power options offered.

After a year of operating a car carrier in regular service using biofuel instead of conventional fuel, short-sea ro-ro operator UECC reports it was able to reduce carbon intensity by more than half.

American Bureau of Shipping is classing the first Jones Act compliant wind turbine installation vessel, the 472-foot Charybdis, that will service the US offshore wind sector.

The Australian Maritime Safety Authority announced that it has launched a focused inspection campaign on the maintenance and operation of livestock ships exporting animals from Australia.

Norway's Stad Ship Tunnel project, also known as the world's first full-scale ship tunnel, has received a green light to kick off the preparations for the construction.

Safety Briefings

REPORT PUBLISHED INTO CARGO EXPLOSION BY TRANSPORT MALTA

Transport Malta has published an investigation report into the cargo explosion onboard the container ship MV Croatia while underway in February 2020. The investigation established that flammable vapours had accumulated inside the container, which contained scrap metal and used car parts, resulting in an explosive atmosphere.

Whilst underway towards Singapore, a cargo explosion occurred in Croatia's cargo hold no. 7. A fire party was immediately mustered by the master to assess the situation inside the cargo hold. An inspection of the area revealed that an explosion had occurred inside one of the containers stowed in the cargo hold, damaging five other containers and several ship fittings.

Probable causes

Evidence submitted to Transport Malta revealed that the affected container had sustained substantial internal overpressure and one of its side walls and the door-leaves had been blown off. Reportedly, the container was loaded with used auto parts. An examination of the ejected debris revealed the presence of at least eight automotive metal fuel tanks, four of which had a ballooned appearance, consistent with the effects of internal over pressurization.

It is possible that fuel may have leaked from one or more of the tanks, which gradually led to an explosive atmosphere developing within the container causing the cargo explosion. Although no old or damaged batteries were sighted in the container, it was not discounted that an intermittent electrical spark could have been the likely source of ignition.

Actions taken

During the safety investigation, the company contacted the charterers to inquire about what steps would be taken to prevent reoccurrence of such accidents. The Charterers drew the attention of their shippers to their cargo policies, which addressed measures to be followed when classifying used auto parts commodities and components. Furthermore, it raised awareness of the importance of making a correct declaration for used auto parts, making specific reference to the accident involving Croatia.

Read the story in full and download the report: **https://bit.ly/31yEmsK**.

P&I CLUB GUIDANCE ON PROPER COAL CARGO CARRIAGE

According to the Britannia Club P&I Club, due to its origins as a carbonaceous sedimentary rock formed by geological processes applying pressure to the remains of plant material over time, coal comes in many different forms and the term covers a relatively wide range of cargoes. Therefore, its properties and the associated hazards also vary significantly depending on the specific form of coal being carried as cargo. However, all coal cargoes require certain precautions upon loading, and monitoring during voyage.

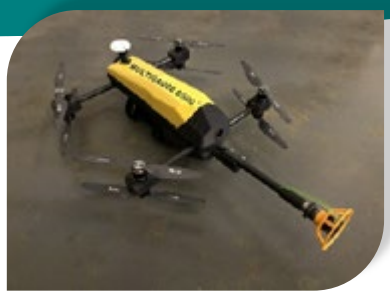
Coal regulation
As a potentially hazardous bulk cargo, Britannia says it is essential that coal is always loaded, carried and discharged in accordance with the requirements of the International Maritime Solid Bulk Cargoes (IMSBC) Code. These requirements should be closely followed by both ship and shore management.

Liquefaction
With the exception of coal cargoes classed as Group B only, the cargo declaration should be accompanied by documentation relevant to the moisture content (MC) of cargo and its TML, issued by an entity that is recognised by the competent authority of the port of loading.

The IMSBC Code stipulates that if a Group A cargo has been exposed to significant rain or snow between the time of testing and the date of completion of loading, the shipper is responsible to ensure that the MC of the cargo is still less than its TML, and that evidence of this is provided to the ship's Master as soon as practicable. If the cargo is loaded onto the ship from barges, the shipper should include procedures to protect the cargo on the barges from any precipitation and water ingress.

Cargo declaration
The shipper's cargo declaration must be provided in accordance with the requirements of the IMSBC Code, in particular with regard to the cargo properties and the associated hazards. The declaration must include a section clearly stating whether the cargo of coal is liable to emit methane, or self-heat. In such cases, the Special Precautions in the IMSBC Code for "coals emitting methane" and "self-heating coals," respectively, must be taken.

Tritex NDT Multiple Echo Ultrasonic Thickness Gauges



The Drone Thickness Gauge
Multigauge 6000

The Surface Thickness Gauge
Multigauge 5700

The Underwater Thickness Gauge
Multigauge 3000

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A Brief History of The International Institute of Marine Surveying

1991 2021

Capt Allen Brink
(Past President 2007-2010)
CMMar, Hon FIIMS, FNI, FRIN, FCMS
looks back over time...

The Seed is Sown

The first organised international gathering of marine surveyors was at a seminar entitled Marine Surveying – A Time for Self Appraisal, organised by the IBC Group, sponsored by the Institute of Marine Engineers and supported by the Nautical Institute.

This seminar was held aboard HQS Wellington, moored on the River Thames at Temple Stairs, Embankment in the City of London on Monday 22nd April 1991. The event was attended by 150 marine surveyors from over 30 countries.

Chairman, John Guy, who at that time was the Deputy Editor of Fairplay International and author of Marine Surveying & Consultancy, cleverly induced thought into the minds of delegates; and so, the seed was sown leading to the formation of an international professional body to represent marine surveyors.

How it started

Following on from the seminar and with the driving force of Capt Bill MacDonald, a formal meeting was arranged and held at the old Baltic Exchange in St. Marys Axe, London, during October 1991.

This meeting was attended by 31 marine surveyors from 18 countries. The International Institute of Marine Surveyors was born (the word Surveyors later changed to Surveying).

The Institute was established to instil professionalism into the marine surveying industry and would be:

- Independent
- Non-political
- Non-profit making
- And with open membership

First Base

The HQS Wellington (pictured above) was the first choice for a base and in 1992 an office was established onboard. It was manned once a week by the Institute's first Honourable Secretary, Commander Terry Lillie.

In 1997, it was decided to set up a full time Secretariat and a founder member, Capt Ian Wilkins, became the Institute's first full time Secretary. He was to become instrumental in the development of the Education Program.

The base and small office aboard HQS Wellington soon became inadequate. In 1998, the Administration Headquarters moved to Gosport, Hampshire and staff numbers increased to cope with the demands.

The distance learning Education Program was established in 2004. The Secretary's role evolved into that of a CEO and John Lawrence took over the reins allowing Capt Ian Wilkins to concentrate on the Education Program with two other Course Directors, one of whom was the President at the time, Capt Ian Biles.

New Headquarters 2010

In 2009, it became clear that the Gosport Headquarters could not handle the Institute's expansion. In February 2010, office space was rented at Murrills House in Porchester (pictured below). This facility also provided a venue for Board Meetings and training sessions.

Change of CEO 2014

Following the retirement of John Lawrence, Mike Schwarz was appointed as CEO in January 2014.

Modern Day IIMS

There is a Management Board, elected by the Membership and headed by the President, and an Administration team of eleven people.

The day-to-day running of the Institute is the responsibility of the Chief Executive Officer who reports to the President and Management Board.

Some members act as Chairmen of the Institute's various committees in the areas of:

- Administration
- Membership
- Education & Training
- Commercial Ship Surveying
- Small Craft Surveying
- UK MCA Certifying Authority
- Disciplinary

Conferences & Seminars

The Institute has held conferences and seminars at various locations around the world including Hamburg, Dubai, Auckland, Panama, Mumbai, Singapore, Brisbane, Lagos, Baltimore, Vancouver, Adelaide, Shanghai, Bali, Mallorca and London.

To mark the 25TH Anniversary a special conference was held in London in 2016 and a series of Awards for Excellence were presented by Sir Alan Massey, followed by a memorable Gala Dinner held at the Museum of London in Docklands.

Pictured left: Sir Alan Massey presents Capt Barry Thompson with his Outstanding Contribution to the Commercial Shipping Marine Surveying Industry Award.

International Representation

The Institute currently boasts round 1,000 Members in over 100 countries. In-Country representatives, local branches and Regional Directors support and enhance the activities of the Headquarters.

The Report Magazine

The Report Magazine is the quarterly publication for members and the wider marine world. An essential read, it contains technical features, findings of the latest accident reports, plus articles on marine surveying and related maritime matters.

The Report is available from the Institute's website in either downloadable pdf or eReader formats.

A monthly News Bulletin is issued by e-mail to all members and other interested parties. The News Bulletin deals with current affairs and provides a notice board for forthcoming events and training.

Handy Guides

The Institute, through its experienced membership, has published 26 Handy Guides under the 'What a Surveyor Needs to Know About' series which are available in paperback and/or electronic versions.

The Education Program

The distance learning education program has evolved over the years since its introduction in 2004.

IIMS is recognised as a leader in the area of marine surveyor education and training with hundreds of students enrolled. On 15th September 2017, IIMS was presented with an IMC Golden Shield Excellence Award for Excellence for its education program at a ceremony held at The Old Library, Lloyds of London.

The Institute is the only professional body of its kind to offer and award such qualifications in marine surveying. IIMS is dedicated to developing the next generation of marine surveyors by offering quality qualifications that are recognised throughout the maritime world.

Permanent Roots

The IIMS established a permanent Headquarters by purchasing Murrills House in 2020, a historic Grade II listed building that can trace its roots back 500 years.

In Conclusion

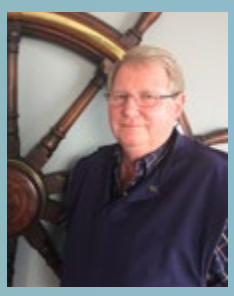
Marine surveyors are relied upon to provide an independent and factual report on what they have been instructed to survey.

They are tasked with the responsibility of dealing with situations that effect peoples' lives, up to multi-million-dollar financial insurance claims.

A marine surveyor is required to be a person of high calibre, have unquestionable integrity, be competent and confident in their field of expertise and to be clearly aware of their limitations in what remains an unregulated industry.

Training and education, coupled with Continued Professional Development, are essential to enhance the marine surveyor's confidence, integrity and experience to provide the marine industry with a professional service of the highest standard.

IIMS remains dedicated to excellence in marine surveying.



Capt Allen Brink

Capt Allen Brink is a Past President of IIMS and a marine surveyor of over 40-odd years standing. He attended that very first gathering of marine surveyors in London in April 1991 and was a driving force in the early days being one of those who worked behind the scenes to get the Institute off the ground 30 years ago. He has continued throughout as a Management Board Member & Director.

Views from Past Presidents
(and the current President)
as IIMS turns 30

IIMS went in search of comments and opinions from some of those who have held the position of President since the inception of the Institute in 1991.

From John Guy

Although not a marine surveyor, John Guy was instrumental in leading the surveying profession towards the foundation of an Institute back in the late 1980s, resulting in its formation in 1991.

Thirty-three years ago marine surveying was a lonely profession. Well, not really even a profession, just something old sailors drifted into. There were no formal qualifications, no training courses, no international recognised bodies and no platforms to share knowledge.

At that time, I wrote a text book for would-be surveyors and then ran a couple of conferences for marine surveyors, mostly to help sell my book. Fortunately marine surveyors more far-sighted than I came to those conferences, and they saw clearly that what was needed was not a book or a commercial conference once a year, but a way to co-operate together. In other words, an institute.

With hard work, selflessness, perseverance, and a lot of patience they and many who followed them have given of their time, knowledge, contacts and good-humour and slowly but surely built the IIMS. I salute them now as we celebrate the thirtieth birthday of the IIMS. It gives marine surveyors what they did not have, a place to gather, a forum, a platform to share experience, an identity, a voice and a structure. Most importantly, the IIMS has grown as a global organisation and is recognised the world over as a centre of excellence and as the access pathway to being a good marine surveyor, or, just as importantly, finding a good marine surveyor. I look forward to watching the IIMS grow from strength to strength and hope to be invited to the fiftieth birthday party.

From Capt WG MacDonald
(Past and Founding President 1991-1993)

As a Past and Founding President, I am delighted that the IIMS turns 30 in June of this year and is preparing to arrange a small, socially distanced, online celebration to record this milestone prior to the Annual General Meeting scheduled for 9 June 2021.

It seems like only yesterday when I was fighting the maritime world trying to get enough people to support me for getting this institute started. I had major opposition mainly from other marine organizations and many surveying companies also did not want an institute.

Time passes so quickly and so many things have happened over the last 30 years. The achievements of the IIMS are certainly very impressive having started from humble beginnings. IIMS has achieved recognition and respect internationally, thus enabling it to attract and offer membership to professional Marine Surveyors throughout the world.

It not only provides its members with prestige as established professionals, but also opportunities that were not available prior to its commencement, including networking globally, professional development opportunities and training to name but a few. It provides ship owners, insurance companies cargo owners international banks and all within marine logistics with assurance that the Marine Surveyors recommended by the IIMS are reliable professionals.

Moving forward, I believe the Institute should start to work closer with IMO and continue down the path of training. Not only training Marine Surveyors, but also training those who wish to go to sea as deck and engine ratings as well as officers and catering staff.

I wish the Institute my best wishes for the next 30 years and ask all those who go to sea and survey vessels to stay safe, to respect the sea and to practice safety at all times.

From Eur Ing Jeffrey Casciani-Wood
(Past President 1997-2000)

First of all, congratulations to IIMS and happy birthday! I think that membership at whatever level of an established and well-founded Technical Institution or Learned Society is invaluable, even in today's world. Quite apart from the right to use post nominal letters and to decorate your headed notepaper with an Institute's logo, it tells your client, be he/she a company, an individual or a court, that you work to a set of peer approved technical standards and ethics.

The marine surveyor of today operates in an ever-changing world with advances in technology, legislation, survey requirements, markets and customers as a continuing back drop to his/her work. That means that continuing professional development, which the marine surveyor needs to address in a coherent and pro-active way, is the means by which he/she maintains his/her knowledge and upgrades his/her experience; and its obligations are common to most professions. In that respect, the IIMS excels in arranging and holding around the world various technical meetings which can and should be attended either in person or online by zoom. I have long been of the opinion, perhaps controversially, that anyone taking the IIMS Professional Qualification and diploma should be required to achieve a certain number of proven CPD points and to attend and take part in an agreed number of such meetings before being allowed to upgrade to a higher level of membership.

In my opinion it is of the utmost importance for anyone offering professional services to the general public and other commercial entities to be known as a member of a Technical Institution, thereby showing that he/she is a peer recognised, competent person of that profession and not operating as a member of that much maligned other profession - the cowboy.

As one who has been a member of the IIMS from the earliest days, I am very proud of that fact and consider it to have been one of my most valuable "selling points". I am also very pleased to have been one of the moving lights in the establishment of the original diploma and education programme. As I approach final departure time (growl you may, go you must), I know that the IIMS is in safe hands and hope that it will remain so while men build ships and boats to face the unpredictable whims and fancies of "the old, grey widowmaker".

From Ian Biles
(Past President 2000-2003)

It has been my experience that marine surveyors tend to be fiercely independent of thought and, in some circumstances, this can lead to a degree of isolation from one's peers. When the first Marine Surveying Conference was held in 1990 the Chairman, John Guy, posed the question whether surveyors should co-operate to further the professionalism of the profession. From this simple idea the IIMS, together with the British Association of Cargo Surveyors (BACS), was born. What this showed was that despite the desire for independence there were some advantages, and a need for, interdependence. It is in the role of assisting interdependence that professional bodies provide a useful clearing house for information and ideas.

In our constantly changing and challenging world marine surveyors need to stay abreast of what is happening. Sometimes, the relevance of a particular event to one's business is not always immediately apparent. Whether, or not, it is new environmental requirements, or changes brought about by BREXIT there is a constant need to stay informed to provide a service that is relevant to our clients as well as to protect ourselves. Once again, it is the professional organisations that provide support and assistance to their members that are ideally placed to fill this role.

Whilst not a founding member of the IIMS I was fortunate enough to join early on and for many years was involved with the Institute's training activities. The IIMS (and specifically Ian Wilkins) was the first organisation to recognise that there was a better way to train surveyors rather than the old fashioned route of trial and error and this legacy lasts to this very day.

From Chris Spencer
(Past President 2003-2005)

Time moves on and these days seem to pick up speed every day. I am still switched on and staying busy but so pleased I do not have to operate in the current surveying market with ever faster technology. I am currently struggling to keep "One Drive" OFF my computer as it has destroyed a lot of my work largely because I did not know it was there and or that it was allowed to do anything without my knowledge!

Of course, I have not done the "course" and am finding more and more technology to be a hindrance rather than a help. I have moved photos around, copied them, labelled them and transmitted them all over the world as a surveyor and an Inspector of tanker safety; but I have now found that I cannot do that as the photos have to go to an interim location, so the recipient can go to that point and download them - and I finally have to approve that download so they can get them! I see it all as wasting my time, but also wonder where they go and what security they have....ho hum....

I suppose my message, if there is one, in celebration of the Institute's 30th anniversary, is that you too will suffer this when you retire or slow down and that is what this is about. Work is to keep you busy and to earn money for the family, the house and holidays, BUT do some planning for retirement. It is never too soon to start.

You will need things to do for the days are long and they will need filling. So far, I have written my memoirs, tidied up my files though many of the business files will be around for a few years yet, and am still working on the family history - that has been a fascinating effort through the Boer War, First World War, Russian campaigns and Second World War with relatives torpedoed in the Atlantic (survived), Indian Ocean near Madagascar (died) and a lot of life from UK, Denmark, South Africa and New Zealand.

I work as a volunteer for the Dartmoor Preservation Association on a variety of projects including bracken clearance, stone wall repairs, Bronze age hut circles, Second World War training and exercise areas (now abandoned) where we survey the area and plot the remaining features for mapping history, fundraising for the RNLI and the local Mountain Rescue team. I also walk guide dogs when I have time and have just taken on a retired black Labrador called Alfie.

It is a shock when you stop work and slow down - initially perhaps not a noticeable slowing down but, it creeps up on you so plan accordingly.

In the meantime, keep up the good work and congratulations to you all for an excellent Institute. You have done well.

From Adam Brancher
(Past President 2016-2018)

I was lucky enough to be President during our 25th anniversary - my goodness how quickly time passes! When I took over, I think I may have commented that I was the most remotely located President the IIMS had ever had - frankly with hindsight I think I got that wrong.

We are each only 'remote' if there is a never varying point to measure from and as a worldwide organisation I now am clear that we are in fact integral parts a web or network, and that is, I think where our strength lies. The server sits where IIMS was founded, but the work and much of the brainpower is in the hundred or so countries we are represented in. We are unique amongst surveyor associations in this regard.

This network has clear business advantages both across Australia and in the wider region IIMS members talk and share knowledge and co-work jobs. We each know that we have been tested and vetted and that we are all on the same page ethically and professionally. I'd be seen as naive if I said that everyone was at the same level or that no one had off days, but on the whole I respect and admire my IIMS peers and know that they can be relied on to honestly and professionally discharge their duties in this multifaceted industry.

So, if I were to sum up IIMS - to me it's a place where you can grow up as a surveying professional. To do so requires more than just a keen technical education and being street smart. You need decent supportive peers and the ability to educate and inform yourselves; and the courses, publications and seminars IIMS constantly produces are of the quality to do just that.

The relationships and links I have formed as a member have definitely got me to the point I am at today. I look forward to the next 30 years, though I'll then be 80+ and we will all be driving around in flying cars!

From Capt Zarir Irani
(Past President 2018-2020)

''IIMS and its Members and The Board of Directors have been my teachers for years.''

There was and is a lot to learn and to give back to IIMS. During my formative years with IIMS, it was considered that 'new blood' was the need of the hour, hence I was successfully elected as deputy Vice President and then in 2018 through 2020 had the good fortune of serving IIMS membership as their immediate Past President. This I see as the highlight of my career. IIMS has taught me the fundamentals of all I know with respect to the business. The seniors of the board have been my bouncing board to steer Constellation Marine into its diversification of Marine Surveying and Consultancy.

This has been my good fortune and I have been able to give back to the fraternity. I am thankful to the board of director, grateful to Mike Schwarz and all the past Presidents, mentors I have had, and the knowledge I gained from the institute.

I end with sincere good wishes to IIMS on its 30th birthday and its digitalized future to continue its path of spreading knowledge and leading the surveying world with new ideas and inducting fresh bright minds into our surveying fraternity.

Captain Zarir Irani being presented with his letter of appointment as Regional Director

From Geoff Waddington
(Current President)

As a relative newcomer to the IIMS having joined only 18 years ago, I became a member because the organisation represented a more vibrant and more professional institute than most. IIMS offered support and above all professional training for its members, both aspiring surveyors and also existing experienced surveyors who wished to expand their knowledge through continued professional development. The IIMS actively encouraged members to become involved and enjoy the benefits of regular meetings and training sessions. There ideas and experiences could be shared between like- minded people from a variety of marine industry backgrounds with a common aim to expand their knowledge and in the process improve their own professional profile. Surveyors who were by nature sole operators and as such were facing a somewhat solitary existence, now had somewhere to belong and above all somewhere where they could network with other surveyors, not just in the UK but from around the world.

Now in its 30th year the IIMS has proved to be the leading light in the world of surveying, striving to achieve surveyor accreditation in what has always been in the past an unregulated industry making the future of the IIMS equally as exciting at its past.

And some birthday wishes from members and others...

Happy Birthday IIMS. Well done on the 30 years, much respect all the way from Weipa, Australia.
- Daniel Wade

My Heartflet Wishes for the 30th Birthday Celebration of the Institute. Thank you for the Knowledge and Thank you for the friends and colleague of the Institute. More Power and More Blessings
- Ramon Tuburan

As a founder member and past president I am pleased and honoured to see the progress made over the last 30 years. Congratulations all round.
- Andrew Cross

Greetings to you all, I can see you have done well in the last few years, Safe surveying to all.
- Chris Spencer

Wishing IIMS a happy 30th anniversary! A big thank you to everyone for making this journey possible.
- Luc Verley

Happy birthday from Morocco - Abderraouf Chraiti

Good wishes - Tony

Congratulations to IIMS and everyone involved with Institute, on 30 years of valuable service to the marine industry!
- Peter Franklin

Proud to be part of the global marine surveying community through IIMS and gratitude to the IIMS head office staff for taking care of us.
- Zillur Bhuiyan

Once again I wish our great Institute my congradulations on reaching 30 years. It seems like yesterday when i was voted in as the first president.Let us look forward to the next 30 years
- William Macdonald

Happy 30th Birthday celebration, 30 years of impacting on the surveying profession and training for optimum service delivery with aim of maintaining standards and ethic in practice.
- Peter Enerichekor

I wish the IIMS the very best congratulations for excellent work, from a cool NZ.
- Stan Collett

Tritex NDT would like to congratulate the IIMS for 30 excellent years. You have gone from strength to strength and we look forward to continue working with you.
- Jon Sharland

Thirty years on and standards are more important than ever

IIMS CEO, Mike Schwarz, ponders and argues the importance and relevance of standards in a modern marine surveying world.

Is it me, or do others have the same impression that some people do not seem to understand, or even less care about doing the right thing in the right manner too often these days?

As IIMS celebrates its 30th birthday, I believe it is more important to have and to adhere to standards these days than ever, not least as marine surveying remains a largely unregulated profession; for without a standard, how do we benchmark our industry and performance? And with litigation increasingly prevalent, being able to support what you do and how you did it by means of reference to an acceptable standard is of key importance and could serve you well in times of crisis.

But who creates these standards and determines what they should be, especially in an unregulated profession such as marine surveying? Of course IIMS has a key role to play in that process, as do other membership organisations representing surveyors around the world along with other learned institutions operating in the wider marine world. The IIMS Professional Assessment Committee applies standards when considering the many new applications the Institute receives. The Institute also expects its members to abide by the Code of Conduct. Maritime regulators, IMO, Classification Societies and P&I Clubs all play key roles too in setting standards. There are other examples of longstanding standards, including those produced by ISO (International Standards Organization) and the BSI (British Standards) to name but two. And of course individual sectors impose their own sets of standards too, for example, in the superyacht coatings inspection arena or the auditing of offshore assets under the standards set by IMCA (International Marine Contractors Association).

But a word of caution. Do not confuse standards with regulation. There is a correlation between the two for certain, but a distinct point of difference. Standards are not the same as regulations and following a standard does not guarantee that you are operating within the relevant laws. In fact standards rarely cite the law. But governments and regulatory bodies often refer to standards when putting together legislation. Standards are used to establish the technical background and detail, allowing the resulting legislation to concentrate on long term policy objectives.

Increasingly it appears that there is a propensity by some to do things their way rather than following a standard method. It seems that it is more important to them to do things "their way," instead of following a standard method which delivers the defined results, and is repeatable across the majority of those performing similar tasks. This does not mean that you cannot be a memorable surveyor who has his/her specific methods and specialisations - or that all surveyors must do things in an identical manner - just as long as a recognized standard underpins the activity.

When we choose to follow standards, it allows us to establish, measure and assure a level of quality, service and predictability to our clients and to one another.

All businesses, from sole traders to larger surveying groups, can benefit from adopting standards. Recent research has shown that many businesses lack sufficient information to make effective use of standards. However standards can provide real societal benefits to both businesses and individuals. If your business is not using standards, I would urge serious consideration be given to adopting them, wherever feasible. And by the way, I am not advocating wrapping your business in unnecessary red tape for the sake of it. I am personally averse to red tape!

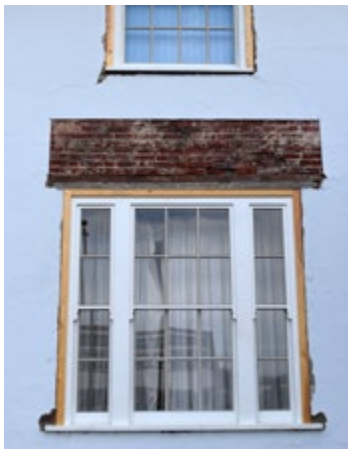
Some of the business benefits from developing standards are:

- Standards can provide best-practice guidance helping your business to assess and review your processes, allowing you to take steps to increase efficiency and increase profitability.
- Standards provide a reliable benchmark against which performance can be judged, both against your own and external standards, helping your business to retain existing clients and generate new ones.
- Being able to claim compliance with widely recognized and respected standards is an effective way of supporting the value of the services you provide. If you cannot demonstrate such compliance, customers only have your word for it. Membership of IIMS, or a similar body, is a great way to show compliance.
- Complying with recognized standards can provide a competitive advantage and could be a deciding factor when a buyer has to choose between two organisations.

If everyone knows, practices and adheres to a standard, then those who do not follow the standard can be singled out by their peers and others in their network, who can then distinguish between a required level of competence (which can be corrected), and 'special' behaviour (which is a choice).

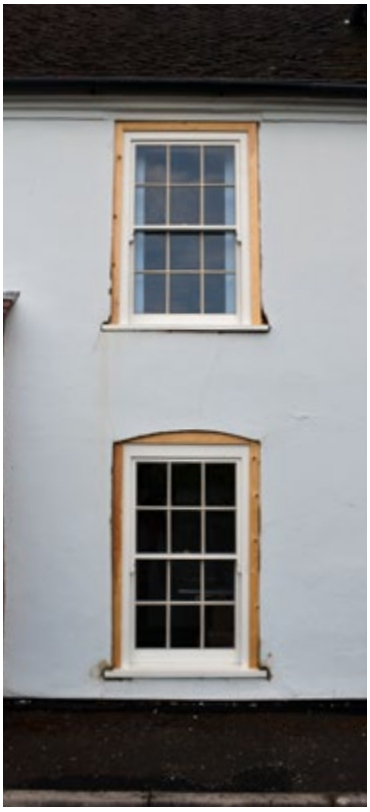
Over thirty years, IIMS has come a long way from its humble beginnings. The adoption and implementation of accepted standards is one reason why the Institute had grown and prospered. I raise a glass to the importance of standards and encourage you to do so too. As IIMS continues to develop, further achievements will inevitably be due to the adherence and acceptance of standards.

Mike Schwarz



MURRILLS HOUSE AS YOU HAVE NEVER SEEN IT BEFORE: UNDER RENOVATION

The purchase of Murrills House mid last year as the permanent headquarters of IIMS was horribly delayed, (partly due to the pandemic), but the deal was finally concluded in late July. It is an achievement that everyone should be proud of too and it is a valuable, appreciating asset. To become the next custodians of a building which can trace its roots back 500 years is a remarkable development. The necessary renovation work identified from the survey is well underway as the pictures show. New windows have been installed, but not yet completed. There is work to repair the front door and to replace some of the damaged render. Once that has been done, the exterior will be painted. A special 'Founders' board is soon to be situated in the Board Room to recognise the generous donations made by some members last year as part of the Murrills House funding appeal.



AGM 2021 & 30TH

JOIN THE ANNUAL GENERAL MEETING 2021 AND THE FUN OF THE IIMS 30TH ANNIVERSARY CELEBRATIONS

Notice is hereby given that the 2021 Annual General Meeting of the Institute will be held online via Zoom on Wednesday 9th June from 14.00. It will be preceded by some online birthday celebrations starting from 12.00 and you are encouraged to join in the fun at no charge. Anyone may attend the AGM, but only full members and higher, who are fully paid up may vote.

To reserve your place at the AGM and free entertainment, go to **https://bit.ly/3tvasCa**.

To view the AGM agenda and the reports (as they appear) go to: **https://bit.ly/3n1wHNL**.

Timings (GMT+01:00hrs) for the day are as follows:

12.00 Duncan Williams, Cyber Magician will entertain delegates with some spellbinding online magic tricks. Watch a short clip of his skills at **https://vimeo.com/424045767**.

12.30 The Portsmouth Shantymen will give a 30 minute performance of traditional songs associated with the sea. Listen to a sample of their work at **https://bit.ly/3ekQ14m**.

13.00 Lunch break

14.00 **Annual General Meeting**

16.00 Close

IIMS MEMBERS HONOURED

Details of new honours awarded to IIMS members have been released. Recognition and the presentation of these awards will formally take place at the IIMS online Annual General Meeting on 9th June 2021.

IIMS would like to congratulate the five members who have been recognised with an Award this year...

Capt Zarir Irani is awarded an Honorary Fellowship. Now a Past President, having held the post from 2018-2020, Zarir is formally recognised for his work on behalf of the Institute in this role. Additionally, he remains an active and enthusiastic Regional Director for the UAE branch and continues to play a significant role in maintaining a high presence in the territory for the Institute. As a prolific networker, Zarir is always keen to promote the organization to the wider marine world.

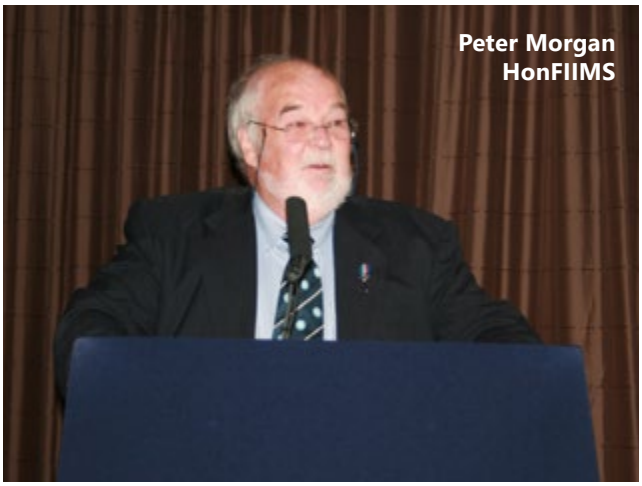
James Renn is awarded an Honorary Fellowship. James has been a member of the IIMS management board for several years. He developed and hosts the annual US two day seminar, constantly sourcing inspirational and relevant speakers on a range of topics – an event drawing an every increasing audience. He continues to represent IIMS in America, notably at the IBEX show each year. James has been responsible for driving a number of new membership applications from America.

David Pestridge is awarded a Fellowship. A relative newcomer to the IIMS management board, David is also a co-opted member of the education committee, which meets several times a year. A yacht and small craft surveyor, David is someone who has grown through the ranks of the organization since completing and passing the Diploma some years ago, proof of what can be achieved.

Mike Proudlove is awarded a Fellowship. He has been a member of the Institute for many years. Over that time, he has made a significant contribution to the IIMS, initially in developing the Diploma and education offering. More recently, he is a non-executive Director of the Marine Surveying Academy and continues to give freely of his time, sharing his knowledge and speaking at various conferences and seminars for the benefit of members.

Mike Marshall is awarded an Honorary Membership. Over the years, Mike has given a lot to both IIMS and its subsidiary, the Marine Surveying Academy. He has been recognised for his work as both a member of the Institute's Professional Assessment Committee and as an Assessor for the eCMID Accredited Vessel Inspector programme.

Obituary: **Peter G Morgan** *HonFIIMS* 1948 to 2021


Peter Morgan HonFIIMS

Peter's long-time friend and colleague, Gordon Bailey OBE, catalogues Peter's professional achievements.

Peter commenced a career in the merchant navy, but eventually left the sea behind him to go back to college in Cardiff to study English, Law and Economics.

After studying, Peter went to live in Germany for a period of 8 years during which he worked for a variety of firms primarily involved in the paint inspection field of shipbuilding and ship repair. He progressed into technical services, trouble shooting and failure analysis. Peter's areas of specialisation were marine coatings, tank linings, paint failures and inspection.

He returned to the UK to join Solas Schall and headed up their paint inspection and consultancy department, supporting 36 overseas offices, their 150 plus paint inspection personnel, together with their subsequent diverse paint and corrosion operations.

Peter was one of the founder trainers and peer of the internationally recognised NACE USA coating and certification programme. He subsequently joined Lithgow Associates in 1986 and became their Managing Partner. Lithgow Associates were independent corrosion consultants. Services offered by the firm included arbitration and litigation, condition monitoring, corrosion and chemical degradation, failure analysis and laboratory testing, materials selection and specification, paint and coating technology and project management.

Peter also administered on behalf of the UK Department of Trade and Industry *National Corrosion Advisory Service Helpline*.

During his long and successful career, Peter undertook work in 79 countries. He acted to give independent determination and adjudication on a US$ 300 superyacht coating dispute. He was heavily involved in the development of new ISO Standards as the UK expert, including ISO/CD11347/ISO-TC35/SCI and TC32 and SC8. He was also the IIMS representative on British Standards committees.

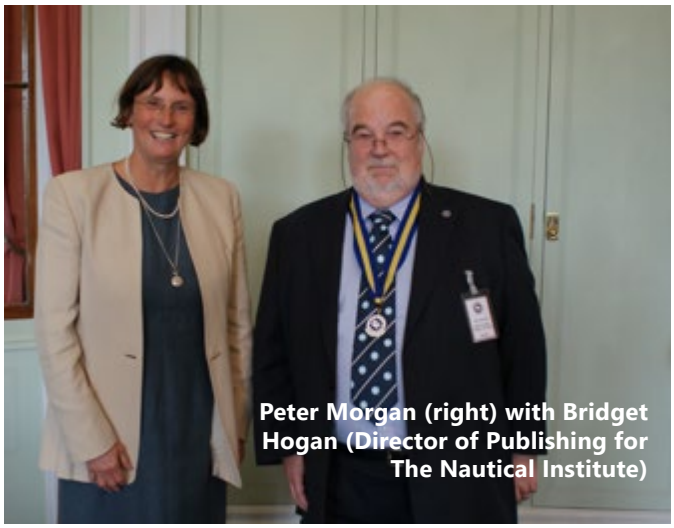
Peter co-authored several books in partnership with Roger Weatherhead - Fitz's Atlas of Coating Defects in 1999 being one and now out of print; and What A Marine Surveyor Needs to Know About Paint Failure, Corrosion and Rectification, published and available as part of the IIMS handy guide series, being another.

Awarded an Honorary Fellowship, Peter was elected as President of the International Institute of Marine Surveying from 2010 - 2012.


Peter Morgan (right) with the late Tony McGrail at the IIMS offices


Peter Morgan (left) with Capt Allen R Brink

Peter was fiercely proud of his Welsh roots.



Peter Morgan (right) with Bridget Hogan (Director of Publishing for The Nautical Institute)

Paul Homer, Peter and Satish Anand at the 2014 Conference

Peter Morgan (right) with Capt Zarir Irani

IIMS Chief Executive Officer, Mike Schwarz, writes:

Sad news reached IIMS that Peter Morgan HonFIIMS passed away on Easter Sunday, 4th April 2021. Those who knew Peter personally, or who had met him, will be aware of his fine technical reputation and skills going back years. He was a long-standing member of the Institute, had a seat on the management board for some time and was President from 2010 to 2012. Despite his diminutive stature, Peter was a larger-than-life character, optimistic in his outlook, a formidable individual and fiercely proud of his Welsh roots.

To me Peter was simply '*Mr Coatings and Corrosion*' and that is how I regarded him - someone to turn to with a technical query on coatings and corrosion. Frankly, what Peter did not know about paint failure was probably not worth knowing! It was a subject area he turned into a specialism and became known for and a space in which he operated successfully for many years. Indeed, Peter was heavily involved in the development and delivery of the Registered Marine Coatings Inspector (RMCI) qualification and standard. To date, more than 120 inspectors have achieved the qualification. Peter was lead tutor for the programme and ran the pilot course in September 2014 at Portchester Sailing Cub in Hampshire, before leading the first courses for real.

Peter survived a major health scare a few years ago and I still clearly remember that day when he called to inform me. He rang and sounded a bit flustered. I routinely asked how he was doing, and he replied, "not well". He then told me he was calling directly from his hospital bed having suffered a major heart attack, which required surgery to rectify. I told him to hang up immediately and let the medics get on with their essential work. But that was not Peter's way it seems. His direct concern was the presentation he was scheduled to give to delegates at the forthcoming *International Superyacht Coatings Conference* in Amsterdam. I told Peter not to fret over it and I would handle the presentation. At this point, he insisted he should supply me with some content and slides! Remarkable, yet crazy too, but the mark of the man.

My last conversation with Peter was just a couple of weeks before he died. I had called him to ask for his opinion on the *Marine Corrosion Prospectus* for the new professional qualification IIMS is poised to launch. He gave me his overwhelming support and a big *'thumbs up'* which counted for a great deal. No further words were necessary from him.

Peter leaves a sizeable legacy and will be sadly missed by those IIMS members who knew him and his colleagues in the wider marine world. The industry has lost a giant in this field and he will be fondly remembered by all who knew him.

Our thoughts are with his wife Sylvie and his family.

Rest in Peace
Peter Morgan.

Obituary:
John Adrian Excell
HonFIIMS
1969 to 2021


John Excell HonFIIMS

John Heath, John Excell's friend and mentor writes:

"Words cannot describe my feelings and the depth of emotion I experienced on hearing the news that John had passed away - and taken from us so young too. Although the news was not unexpected, my heart goes out to Hilary who I know will have been devastated.

I first met John when he joined IIMS in the early 2000s. He was as keen as mustard to learn and expand his already well-founded knowledge. His enthusiasm to learn made it a pleasure to mentor and work with him. He could be irritating when he had a point to put forward and forcefully discuss, as we learnt from his fulsome input at committee meetings, but this was just an indication of his passion for his profession. I was very pleased when he took over the Institute's small craft training responsibilities from me. John was a staunch supporter of IIMS and put an awful lot of time into the organisation voluntarily. He was a great believer in helping to improve the skills and knowledge of fellow surveyors and, to this end, he really made a mark.

John was always fun to work with and he joined me on my yacht racing excursions in Turkey and came 1st in class and 2nd overall.

I will sorely miss John who has departed this world far too early, but he will be remembered by me as a friend, a colleague and a 'bloody good' marine surveyor.

All will remember him as one of the good guys."

John Heath HonFIIMS

Fraser Noble, IIMS Director, Chairman of the Certifying Authority, friend and colleague writes:

"I first met John at an IIMS Small Craft Group seminar at ExCel, London in early 2003. We had both joined the Institute the previous year and were beginning to find out what this relatively new organisation was all about. I remember clearly that, in what was then quite a large group of 30 or more, John was the one very determinedly going round shaking hands and introducing himself.

Over the years of working together since then on an array of Institute matters, John became a friend as well as a close colleague and I began to recognise that determination was very much one of his strengths.

John lived and breathed boats, from qualifying at Southampton Solent University with an HND in Yacht Manufacturing Technology, through working at sea on commercial fishing boats, to sailing and racing in dinghies and offshore craft, his practical experience was immense, and provided a solid background for his surveying career.

I knew John best as a marine surveyor through his Certifying Authority work. He inspected craft ranging from inshore day-fishing boats to offshore charter yachts, Category 0 sailboats operating in the Arctic and trans-ocean; steel workboats too and even high-speed motorboats capable or 60 knots or more. His work in this area was meticulous. He had in-depth knowledge of the rules and an ability to work with his customers to ensure that their vessels complied fully without causing too many ripples.


John Excell (pictured centre) with John Heath (to his left) proudly displaying his trophies


Fraser Noble (left) with John Excell leading a Certifying Authority traing day in May 2015

His attitude to customer care was equally positive. I remember a phone call from him about 22:00 one night when he was sitting in his car on a cliff top looking out at a very stormy English Channel and worrying about a customer's boat that he knew was out in that weather with gearbox issues. He was trying to work out how he could help.

Apart from actual surveying John developed, from that early 2003 seminar, into a senior and respected contributor to the IIMS. He became chairman of the Small Craft Working Group and a member of the Management Board in 2007, joined the Certifying Authority Committee in 2010 and was on the Board of Directors by 2013 with responsibility for Large Yachts and Small Craft.

John was very much hands-on in these roles. He attended meetings and always contributed both with vision and pragmatism. His passion and enthusiasm sometimes led to heated debate, but he got things done through sheer personal energy - and if later he thought he may have been too forceful he was the first to come back with a smile or a friendly apology.

He also organised surveyor training. Under John's highly effective leadership the Large Yacht and Small Craft Group ran training events and seminars both in UK and overseas, Palma and Athens being notable. He developed the Institute's Tonnage Training Course, writing both a training manual and a supporting PowerPoint presentation. To date his IIMS Tonnage Training is the only programme approved by the UK Maritime & Coastguard Agency.

Apart from organising formal training events John was always ready to assist individual surveyors with specific issues, or career advice, and would regularly take time out of his own busy schedule to answer queries by telephone or email.

John was also fun! He would be entertaining over a pie and a pint whilst discussing Certifying Authority matters and he would also always communicate enthusiastically at Institute dinners with people who had very different backgrounds from all around the world.

He has gone far too young, and I will miss him."

Fraser Noble FIIMS

John doing what he loved and did best - surveying and...

...sailing.

John being 'hands on' at a training event in November 2017.

John and Hilary Excell in 2016

IIMS CEO, Mike Schwarz, was invited and honoured to give one of two eulogies at John's funeral covering his professional life. This is a transcript of what he said:

"Good afternoon. I first met John Excell soon after my appointment as CEO of the International Institute of Marine Surveying, in January 2014. It is fair to say that we did not quite hit it off immediately - two individuals from divergent backgrounds with entirely different skills sets being the main reason. But we developed a healthy respect for one another and an enduring friendship that only deepened over time. I was proud to call John a friend as well as a colleague.

John was one of the good guys and a competent marine surveyor. The word competent is bandied around far too loosely in the surveying profession, but John was right at the top of his game.

Looking back over John's early career, it seems he was destined to become a marine surveyor. He worked as a sailmaker and shipwright's assistant, before going to study at the Southampton Institute of Higher Education. He was awarded an HND in engineering, specialising in yacht manufacturing technology and marine industry management. Many of the modules he passed with merit.

On completion of his studies, John spent time working in various boatyards as he developed the experience and technical skills that would stand him in good stead in later years.

John in February 2016

John in May 2018

In January 2002, John established John Excell Marine Services and his career as a marine surveyor began in earnest. That May, he was accepted as an associate member of the Institute, before successfully upgrading in December 2004 to full membership. His close friend and mentor, John Heath, recently told me, that John was as keen as mustard when he joined the organisation, and it was a pleasure to take him under his wing and mentor him. In 2014 he was appointed as a Fellow member, recognition from his peers of his significant contribution to the Institute.

John held high office with the Institute, having worked his way up from the ground floor. As I looked back through his records, I was astonished at the amount of training courses he had attended. It is clear that John was keen to learn through a process of continuous professional development, but he also enjoyed passing on his knowledge to others. John was always generous with his time too for up-and-coming surveyors.

John's expertise lay in surveying small craft up to 24 meters, and he always knew when he was in danger of stepping outside his area of competence. Indeed, we discussed it many times.

John was an active and long-standing member of the Institute's management board. Indeed, fellow board members have asked me to mention their great respect for him and how highly he was regarded by them. He also performed a key role as part of the Institute's certifying authority committee, and he personally made sure that meetings were rarely dull affairs. But John's over exuberance just proved how passionate he was about his profession, and how much he cared about it; and he was always happy to argue his point of view. He had built up a sizeable fleet of 50 coded vessels and was rightly proud of his achievements.

Additionally, John developed the Tonnage Training Manual. He liked delivering this popular theoretical training face to face, followed by tutoring delegates on the practical aspects of calculating the tonnage of a boat.

It is fair to say that he took his role as director of yacht and small craft marine surveying seriously.

As news of John's passing reached members of the Institute, his clients, and the wider marine world, I was astonished to see so many people keen to pay their respects. I have lodged these messages of sympathy with Hilary for safe keeping. It seems that not only those who knew him well, but others who knew of his professional reputation had something to say. John was a popular, respected and much-loved man.

John and I spent a good amount of time in each other's company as we travelled to various locations to deliver training. I shall miss his presence and his humour. He has left us far too early. May he rest in peace."

Mike Schwarz

John Excell AWARD for Outstanding Achievement

JOHN EXCELL AWARD FOR OUTSTANDING ACHIEVEMENT IS ANNOUNCED

The International Institute of Marine Surveying (IIMS) has launched an award in memory of yacht and small craft marine surveyor, John Excell. The John Excell Award for Outstanding Achievement is open to all students enrolled on the distance learning diploma in marine surveying. It will be awarded on a periodical basis to deserving students - those who deliver not only outstanding academic achievements, but who also demonstrate first-class interpersonal skills. Suitable recommendations will be put to the IIMS Education Committee for review and acceptance.

John Excell, who was an Honorary Fellow member of the Institute, died in April 2021 following a long illness at the age of just fifty-one. He held high office within the Institute and was Director of Yacht & Small Craft Surveying, a member of the management board and an MCA coding examiner. John was passionate about training and sharing his knowledge with fellow surveyors and gave generously of his time to do so. It is, therefore, fitting that this award should be presented in his memory.

Speaking following the launch of this new award, IIMS Chief Executive Officer, Mike Schwarz, said, "John was a friend and a colleague. One of the good guys, he touched so many in the surveying and boating community and is sadly missed by fellow members and his clients. His life was cut tragically short. I can think of no finer way to keep his spirit alive than to have an education award that bears his name."

REPORT MAGAZINE ISSUE 96 FRONT COVER - "SAIL AGAIN" BY CRAIG HUNTER WILLIAMS

"'Sail Again' was created on 21 August 2019 when, at an art retreat that focused on the prophetic, I stood in front of a blank canvas and asked the Creator "What brush, colour and stroke should I use?". After painting bands of blue, I realised I had sky and sea. So, I asked what I should paint next, and a sailboat was the outcome without knowing why or who it was being created for.

Four days later at a meeting, a woman said she had a vision of a still ocean and a boat at rest, and then in her mind she saw the wind picking up and the boat beginning to race across the water. The following day when back at work, I received news of John Excell's terminal diagnosis. I then realised the purpose of this artwork and was able to give it its title - 'Sail Again'. I gave John and Hilary Excell the original which I believe went on to mean so much to them too."

CHWilliams

Craig is the Institute's in-house graphic designer, but he is also a visual artist - see more or his work at ***www.creativexpression.art***

RECENT NEW IIMS MEMBERS

Full members		
Dwight Organ	*MIIMS*	Canada
John Hamilton	*MIIMS*	UK
Sven Polter	*MIIMS*	UAE
Nanad Tvrdic	*MIIMS*	Croatia
David Matthews	*MIIMS*	Argentina
Mohammad Hossain	*MIIMS*	Bangledesh
Nigel Ling	*MIIMS*	UK
Technician members		
Edward Coombs	*TechIIMS*	Canada
Luigi Aiello	*TechIIMS*	Italy
Sean McGree	*TechIIMS*	France
Jaimes Richardson	*TechIIMS*	Spain
Associate members		
Gavin Sharp	*AssocIIMS*	UK
Tyler Lewis	*AssocIIMS*	Canada
Affiliate members		
T Alex Delaney	*AffilIIMS*	Spain
Thomas Schofield	*AffilIIMS*	UK
Joel Jenkins	*AffilIIMS*	USA
Javier Garcia Marquez	*AffilIIMS*	Jersey
Graduate members		
Tony Nother	*GradIIMS*	UK

IIMS congratulates Tony for completing his studies in the ***IIMS Professional Qualification in Yacht and Small Craft Marine Surveying***

Anays Berrocal	*GradIIMS*	UK
Sounak Chatterjee	*GradIIMS*	India

IIMS congratulates these students for completing their studies in the ***IIMS Professional Qualification in Commercial Ship Marine Surveying***

IIMS Canada Branch AGM and Seminar

IIMS Canada Branch held their 2021 Annual General Meeting online on 17th April. The event was run under the auspices of Chairman, Lachlan MacKenzie, and well attended. The meeting was followed by a seminar lasting several hours.

Mike Schwarz gave a brief update on head office matters. He was followed by a presentation from Ryan Greville, entitled Wrecked Abandoned and Hazardous Vessels Act. Ryan is the Regional Manager for the team responsible for administering legislation related to navigable waters, and irresponsible boat owners including the removal of abandoned or dilapidated boats. He talked through the challenges and mounting problem caused by end of life boats.

Next to speak was Cameron Berrington, FCIP, FRM. He is Senior Vice President with Marsh Canada Limited. He spoke about the role of the marine surveyor in insurance. In his presentation he reminded delegates that surveyors remain the eyes and ears for underwriters and insurers.

The recorded presentations are available to view on the IIMS YouTube channel at **https://bit.ly/3stQyGh**.

The IIMS proudly presents a brand new standalone **Professional Qualification in Marine Corrosion**, a new standard by which those who inspect corrosion can be judged against

PROFESSIONAL QUALIFICATION IN MARINE CORROSION

Marine corrosion and prevention in small vessels, ships and offshore structures

Download the detailed Prospectus at https://bit.ly/3az430w

IIMS CEO answers question about the new Professional Qualification in Marine Corrosion

We put some questions to Mike Schwarz, Chief Executive Officer of the International Institute of Marine Surveying (IIMS), about the new Marine Corrosion Professional Qualification which is launching in June 2021.

What prompted IIMS to develop this new qualification?

IIMS has a proud record of delivering training and education to marine surveyors going back 20 years and we were the first organisation to provide such opportunities to professionals working in this field. The award-winning IIMS diploma in marine surveying is highly regarded to this day and is constantly being updated and refreshed.

Whilst we have a core module in the main diploma dedicated to materials and corrosion, it does not go into anything like as much depth as the new standalone qualification will do. In my time with IIMS I have seen many surveyors struggle and scratch their heads when the subject of corrosion is mentioned. For some, I suspect it remains a bit of a dark art. And it is for that reason that the Institute has decided to invest, develop and launch a 'heavyweight' course. Corrosion is a complex and multifaceted subject and one that demands good knowledge. The new qualification will, through 10 modules, give delegates a thorough grounding in the subject of corrosion, testing their learning at each stage as the programme develops.

Who should study for this qualification and is it open to non IIMS members?

Anyone may study for the qualification. IIMS members are offered a discount, but my primary motivation is to give the opportunity to surveyors worldwide, (no matter what their allegiance), to upskill in the area of marine corrosion. Let's face it, most vessels of some age will be suffering from corrosion to one degree or another. Knowing how to inspect a vessel suffering from corrosion is just one aspect. Being able to accurately identify the type of corrosion and its cause is another. And finally, the ability to report the findings effectively in writing is vital. The aim of the course is to give surveyors the confidence through knowledge and learning to be able to do all three.

Who has developed the course content?

Mike Lewus is Director of Metal Metropol Ltd and boasts an impressive career record to date. He is the content producer and will deliver the live module lectures. A friend of the Institute, Mike has developed and delivered several seminars and a day-long course on corrosion for the benefit of members in recent years. I have personally seen the first few core modules and they are impressive and detailed. I am confident that those choosing to study will greatly enhance their corrosion knowledge and will gain new skills.

His career highlights include:

- Mike boasts over 25 years in coatings and steel-related R&D at USA and UK universities, including 20 years at Swinden Technology Centre (R&D labs of British Steel, Corus and Tata Steel).
- He was at the University of Sheffield and AMRC Training Centre for 4 years developing and building CPD materials related training courses.
- He has worked for 7 years as technical advisor at British Stainless Steel Association, including building and delivering training courses in stainless steel and corrosion.

When and how will the programme be delivered?

How to deliver the course content has been a big challenge for several reasons. Although IIMS has extensive experience in delivering distance learning education, this has historically been over a two-year period. The plan is to deliver the 10 module marine corrosion professional qualification lectures over a one month period. The first course will be delivered from mid-June 2021 and the second one in November 2021.

The Covid pandemic has meant IIMS has had to translate a number of face-to-face training and education situations into the online space, and we have mastered it well. And this one is no different.

We have settled on 10 online live tutorials, one for each module, with each lasting about three hours spread over a four-week period. Because there are students all over the world signed up to study, we have flexed the times and days of the week to give delegates the best chance of attending a good number of the lectures live. But it is not mandatory to take each lecture live as delegates will be sent a video recording made of each module lecture, meaning it can be studied at a time of their choosing. Similarly, there is no pressure to sit the online test for each module through the ClassMarker software in a month. The links to the module tests will remain open until a delegate is ready to take them. The pass mark for each module is 70% based on 25 multiple-choice questions. Resits are allowed if required. If the pass mark is achieved, a certificate to show a pass will be available to download by the delegate.

Delegates are required to pass 7 of the 10 modules to gain formal qualification. Four are core modules to be studied by all. There is an additional mandatory module for yacht and small craft surveyors and one for commercial ship surveyors too.

How will the qualification be awarded and recognised?

The course programme will be managed by the Institute's wholly-owned subsidiary, the Marine Surveying Academy. The professional qualification will be awarded and certificated by the IIMS and will be recognised by organisations internationally just as the existing diploma is.

What about the cost?

There are other existing marine corrosion-related courses on the market, but from what I have personally seen, they are not specific to marine surveyors. Many of those I have found whilst researching are considerably more expensive and seem to offer less. IIMS has priced the course favourably to represent excellent value for money. Members and IIMS students benefit from a discount, meaning a cost of £895. For non-members the cost is £950.

What should I do next?

Bookings for the June and November courses are open now. Those wishing to join the first course are advised all fees must be paid up in full by 17 June. To review the Prospectus with detailed descriptions about each module go to **https://bit.ly/3az430w**. For dates and times of the live lectures go to **https://bit.ly/3sHFNAI**. And if you would like to book your place on the course go to **https://bit.ly/3raWxQu**.

If you have questions about any aspect of the course and its delivery, please email Sharon Holland or call her on +44 23 9238 5223.

SURVEYING RIVETS AND RIVETING Part Two

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

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

Carrying on from Part One found in The Report, Issue 95, March 2021...

The Classification of Riveted Joints

The classification of riveted joints is designed according to the following factors:

- the joint's purpose.
- the position of the plates to be connected.
- the joint's purpose.
- the position of the plates to be connected.
- the arrangement of the rivets.

When classified according to purpose the riveted joints are subdivided as:

- *lap joints* where the edges of plates are simply laid one above the other.
- *strapped or stripped joints* where the butt edges of the plates are joined together with a narrow strap and the seam edges (rare) are joined with a narrow strip of plate.

The classification is arbitrary and unscientific, but it helps understand the basis of ship construction. If a pair of lapped plates are pulled apart by the application of tensile forces, the joint laps do not fall in the same line and hence the rivets and plates tend to bend. Equally if the plates are placed end to end and jointed through butt straps the joints are pulled apart by co-linear tensile forces which may still cause bending of rivets. Plate and rivet bending can be eliminated by the use of double butt straps, but such double straps are very rare in shipbuilding.

According to arrangement of rivets, the joints are called single riveted, Figures 8 and 9. It may be noted that

in a single riveted lap joint there is only one row of rivets passing through both plates while in a single riveted butt joint either of single or double strapped type one row of rivets will pass through each of the plates. Similarly, as shown in Figures 8 band 9 when two rows of rivets pass through both plates of a lap joint it is called double riveted lap joint and two rows of rivets pass through each of butting plates the joint is a double riveted single butt strapped joint. A section through a double riveted double strapped butt joint is shown in Figure 9 below. Several dimensions obviously become important in a riveted joint and the naval architect's design process will often require the calculation of many of them. The dimensions and their notations are described below:

Diagonal Pitch The smallest distance between centres of two rivet holes in adjacent rows of a zig-zag riveted joint is called the diagonal pitch, is denoted by p_d, and is shown in Figure 8.

Diameter The rivet hole diameter is denoted by d_h which diameter is normally large than the diameter of the rivet shank which is denoted by d.

Edge Set Sometimes, by boilermakers, called the *Margin*, it is the distance between the centre of a rivet hole and nearest edge of the plate. It is denoted by e as shown in Figure 8 and taken to be equal to one and a half times the rivet diameter d.

Pitch As seen from Figure 8, pitch, denoted by p, is the centre to centre distance between two adjacent rivet holes in a given row.

Plate Thickness The plates to be joined are usually of the same thickness and their common thickness is denoted by t. If, however, the thicknesses are different, the inner one will be denoted by t_i and the outer by t_o. The thickness of a butt strap (or seam strip) denoted by t_{bs} (or t_{ss}).

Spread Also called the *Back Pitch*. The central distance between two adjacent rows of rivets is defined as the spread (denoted by) is shown in Figure 8.

The naval architect's problem when designing riveted joints involves the determination of d, p, p_b, p_d, e, t, and t_c, depending upon the type and position of the joint.

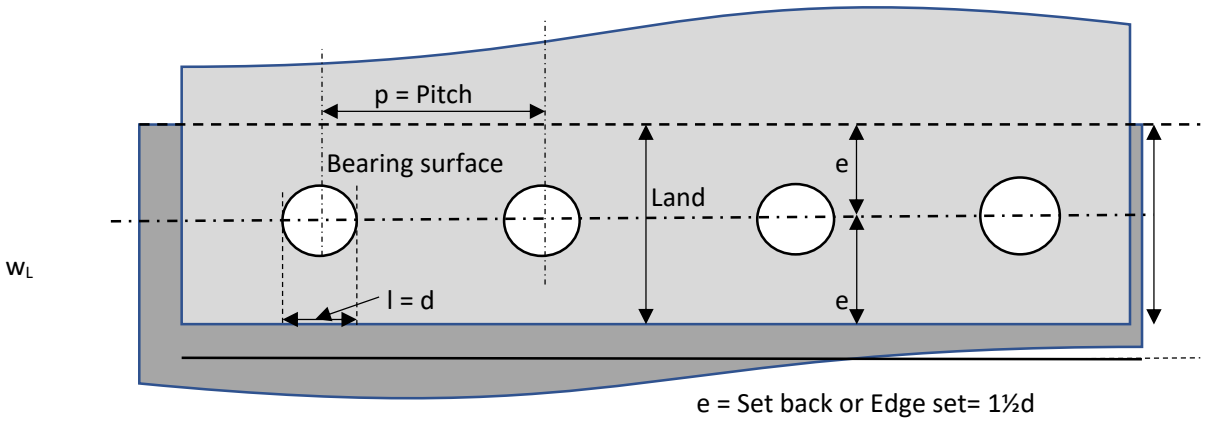
Rivet Arrangements

Rivets securing the shell plating to the frames and other items of primary and secondary supporting structure are usually fitted in line and are usually spaced from 5 to 7 diameters apart – the closer spacings being used on sea going vessels. Where the frame forms the boundary bar to a bulkhead the spacing is often reduced to three diameters for watertight work and even two and a half diameters for oil tight work. Lapped shell seams on small craft are usually single riveted with the pitch about 3½ diameters and the distance from the edge of the plate i.e. the set back about 1½ diameters. On ships over about 100 m length the shell seams at the quarter length positions may be double riveted at the quarter lengths and at half depth to take account of the higher shear forces at these points. With larger vessels and on lapped butts the riveting is usually of the double chain type with similar spacings. These rules are the same for seams and butts in bulkhead plating. On drawings, a single riveted seam would have the designation s.r. 12 – 30 standing for single riveted, twelve mm diameter, 30 mm pitch. The land width and distance of the centreline of the rivets would be specified in a separate note.

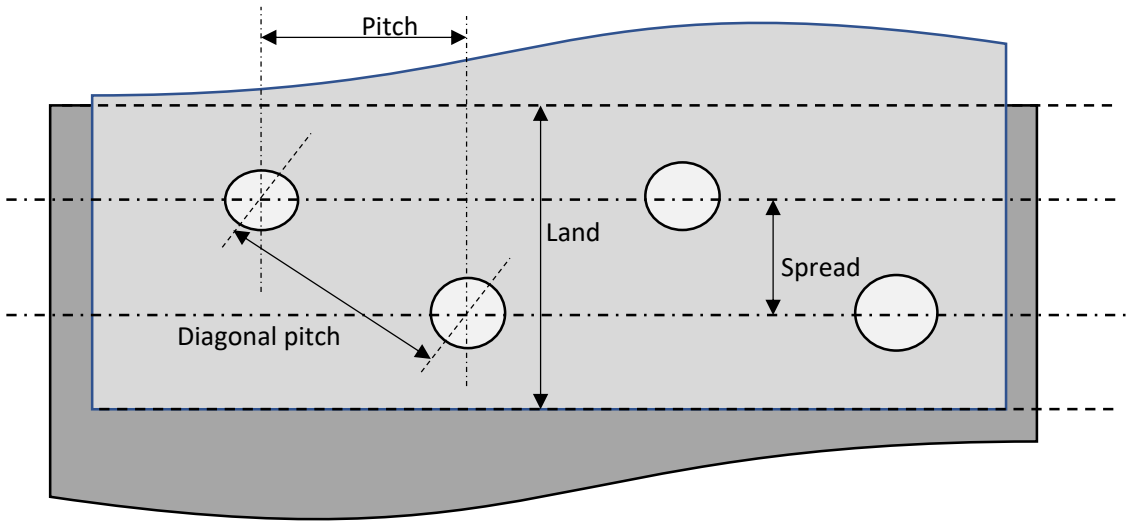
On small craft most shell, bulkhead and deck seams and the butts in the bulkheads and deck would always be single riveted whereas the butts in the shell plating may be single or double riveted. A double riveted zig-zag laid seam would be designated d.r. 12 – 30 zz standing for double riveted, 12 mm diameter, pitch 30 mm, laid zig-zag. That kind of riveted may be found at the boundary bars of watertight bulkheads and where the shell plating is attached to bar stems, keels and stern frames. Again, the land width, set back and distance apart or spread of the centrelines would be specified in a separate note. The chain style of riveting would be designated d.r. 12 – 30 ch standing for double riveted with 12 mm diameter rivets on 30 mm spacing, laid chain pattern. Chain riveting may be found on the boundary bars of oil tight bulkheads and on the straps of flush butted plating. On larger ships such riveting may be found as triple, quadruple and even quintuple laid riveting. Again, the land width and distance apart of the centrelines would be specified in a separate note. The land width is usually three diameters in single riveting and five in double riveting. Experience has shown that single riveted butts are not strong enough for ship structures and also that double chain riveting is stronger and better than zig-zag riveting in such places. Double and treble riveted shell seams would normally have a spacing of about three and a half diameters and should be chain riveted. Single riveted shell seams and butts although common in (unclassed) barges are forbidden for classed vessels. Butts whether of flush or lapped type will be similarly spaced. It is common practice in Dutch barges to have the plates of the sheer strake flush butted on butt straps and all other butts simply lapped. The reason for the lapping is that it is impossible to caulk butt straps unless the plate edges are left wide enough apart to be splined or to fit a caulking chisel between them - see Figure 12. Similar pieces of metal making the seams flush are called seam strips, but the modern marine surveyor is unlikely to see one of those. Strapped butts tend to develop crevice and jacking corrosion between the plates and the strap. Lapped butts will require the hidden plate to be cut with a jerrold. That is not necessary with a strapped butt. Jacking corrosion which is also-called oxide corrosion is the expansion of rust due to electronic forces that can lead to severe damage to the hull structure. It can be described as the displacement of elements due to steel products and iron expansion as metal undergoes rusting and turns to iron oxide. Corrosion of other metals such as aluminium alloy may also lead to jacking corrosion. In jacking corrosion or, as it is sometimes called, oxide jacking, rust forms when oxygen and iron react with each other in the presence of an electrolyte such as water within a confined space. Some of the factors that can influence rust jacking include:

• temperature, • quality of the paint process, • exposure to seawater.

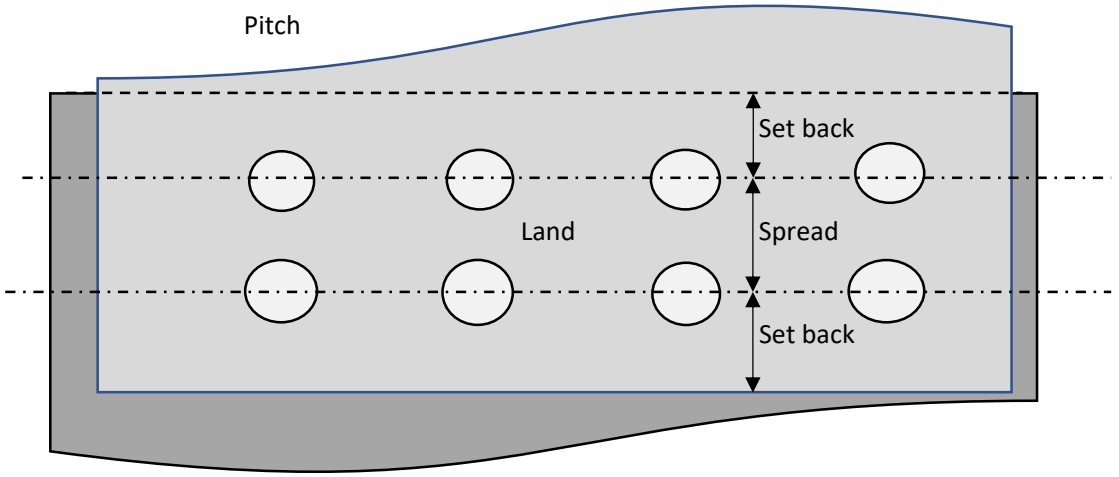
According to metallurgists, the process of oxidation is typically accompanied by a net expansion and when that happens within a confined space, stresses are produced in the metal, too much energy is released through oxidation, making the generated stresses powerful enough to fracture or deform the constraining metal. Jacking corrosion can be prevented through the implementation of certain measures such as the application of anticorrosion paint that offers the best level of oxidation protection. Typically, the surfaces and materials are dipped or sprayed with paint to promote higher durability and better adhesion. Unless they have adequate protection or coating, the bare material is exposed to various conditions and such situations can trigger oxidation that later leads to jacking rust formation that may even cause components to fracture. Frame or floor connections to the shell should be between four and five diameter spacing but in unclassed vessels built down to a price can often, over the topsides, have a spacing of up to nine or ten or even more diameters.



Single Riveted Seam Land Width -w_L = 3d



Double Riveted Zig-Zag Seam Land Width -w_L = 5d



Double Riveted Chain Seam Land Width w_L = 5d

Figure 8 Riveting Patterns

Watertight work, around bulkheads seams and boundary bars for example, should not exceed three and a half diameter spacing and, if the bulkhead is to be oil tight, that should be reduced to two and a half diameters only. As noted above and under class rules, ships over 100 m (300 feet) length would have the shell seams at the quarter lengths fitted with an extra row of rivets to take account of the high sheer forces at those points in the structure. Note: Seam lands hem, butt lands lap.

The points of rivets will often be found pitted and that is usually, but not necessarily, due to galvanic action between the rivet and the mild steel plate.

If the vessel is not built to classification society rules, the first point to consider when riveting the shell plates together is the diameter of the rivets which is fixed by two considerations:

1. the minimum diameter of a hole that can be punched into a plate of given thickness.

2. the equality of the shear strength of the rivet and that of the plate from edge of the rivet hole to the edge of the plate.

The first of those two points is not of great seriousness and the minimum diameter of a punched hole is usually taken as numerically equal to no more than twice the thickness of the plate. With regard to the second condition, consideration must always be given to the fact that the riveted seam must be caulked watertight. That cannot be done of the rivets are too far away from the plate edge and the usual practice is to make the outer line of rivets one and a half diameters from the edge of the plate which is the distance accepted by the classification societies.

Sometimes it may be necessary for the marine surveyor in preparing a structural report on a riveted boat to measure the diameter of a rivet that is part of an existing structure such as a shell seam or a frame to shell attachment. It is useless to measure the diameter of the point because, although it is approximately round in shape, that shape is very irregular due to the method of closing the rivet and the marine surveyor has no means of assessing the size of the countersink even if there is such.

The only place where a measurement is possible is the head. In shipbuilding, by far the majority of the rivets are of the cone or pan head type. The head, mathematically, is the frustum of a cone. The top of the head is usually badly deformed due to the riveting process but the bottom of the head where it fays against the inside of the shell plate retains its original diameter. That is partly due to the fact that it suffers no hammering and partly due to the friction between the underside of the head and the inside of the shell plate.

The dimension d_H in the Figure 9 should be measured with callipers or Vernier gauge and then multiplied by 5/8. The result will be the diameter of the rivet. When that diameter is multiplied by 1½ it will give the distance from the centre of the rivet to the plate edge known as the set back and when multiplied by 3½ will give the distance known as the pitch between the rivets centre to centre. It can be shown that for the rivet and plate to fail at the same shear stress, the diameter of the rivet should be twice the value of t the thickness of the plate. That fact can be used to check the value of the diameter obtained by the outlined method. For rivets of iron or mild steel and plates of mild steel, it is usually assumed that the following is applicable.

The frame spacing should be measured over the square body frames. The rivet through the plate land is called a seam rivet and the one through the frame only a frame rivet.

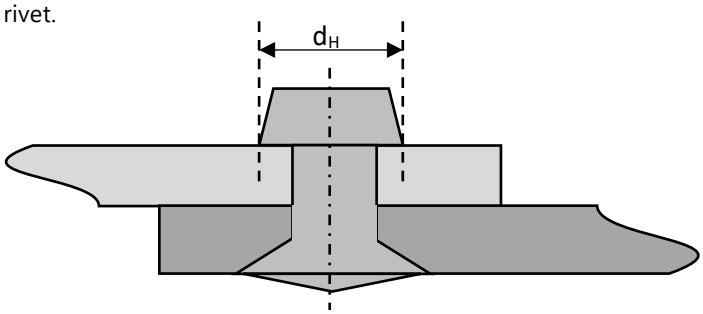


Figure 9 Detail of a Single Riveted Shell Seam Lap Joint

In the analyses the following symbols will be used:

A	=	area of the joint faying surface	mm^2
A_c	=	area of rivet resisting crushing	mm^2
A_{es}	=	the area resisting such shear	mm^2
A_s	=	area of the rivet in shear	mm^2
A_t	=	area of plate in tension	mm^2
F_l	=	friction load	N/mm^2
F_s	=	shear force on a rivet	N
F_p	=	shear force in plate	N
P	=	tensile load on a joint	N
P_s	=	shear load carrying capacity of the joint	N
P_t	=	tensile load carrying capacity of the joint	l/mm^2
R_c	=	the plate/rivet's resistance to crushing	N/mm^2
R_s	=	the plate/rivet's resistance to shearing	N/mm^2
R_t	-	the plate's resistance to tearing	N/mm^2
d	=	the diameter of the rivets	mm
d_h	=	diameter of the rivet hole	mm
e	=	the set back or edge set	mm
n	=	number of rivets in one line	-
p	=	the rivet longitudinal pitch	mm
t_{bs}	=	thickness of the butt strap	mm
t_p	=	thickness of the plate	mm
w_L	=	land width	mm
η_J	=	the joint's efficiency	%
σ_c	=	the compressive stress in or the bearing stress between the rivets and plates	N/mm^2
σ_t	=	the tensile stress in the plate	N/mm^2
τ_s	=	the shear stress in the rivets	N/mm^2

$$\sigma_s = 0.6\sigma_t \quad - \quad (1)$$

$$\sigma_c = 2\tau_s = 1.2\sigma_t \quad - \quad (2)$$

The marine surveyor should note that it is extremely difficult to assess the value of σ_c with any real degree of accuracy.

The Diameter and Pitch of Rivets

As for a single riveted seam, with the rivet in single shear, the shear strength at failure of a 20 mm diameter rivet is about 10 tonnes and, therefore, the shear strength of a rivet of any diameter is given by:

$$F_s = 10(d/20)^2 \quad \text{tonnes} \qquad (3)$$

If the shear strength of the steel plate is 0.028 t/mm^2, then, with the rivet's centreline 1.5 d from the plate's edge and the plate in double shear, the force required to shear the plate from the edge of the rivet hole to the plate's edge in the wake of the rivet (the bearing surface) is given by: -

$$F_p = 0.028 \times 2 \times dt_p \quad \text{tonnes} \qquad (4)$$

The two forces are assumed to be equal, therefore:

$$10(d/20)^2 = 0.028 \times 2 \times dt_p$$

$$d/t_p \approx 2 \qquad (4a)$$

That would mean that for a vessel plated in 6 mm thick mild steel, the rivets should be 12 mm in diameter and, when inspecting a riveted vessel, the marine surveyor should keep that fact in mind in those areas subject to the maximum shear forces. The length of the rivet before fitting is usually twice the diameter plus 30 if the hole is countersunk and 24 if not.

With double riveted seams the marine surveyor should consider a strip of a double zig-zag rivets shell plating butt as shown above in Figure 8 with a width equal to the rivet pitch p.

Then the resistance to tearing is:

$$R_t = (p - d)t_p\sigma_t \quad \text{kg/cm}^2 \qquad (5)$$

the resistance to shearing is:

$$R_s = 2\pi d2\sigma s/4 \quad \text{kg/cm}^2 \qquad (6)$$

and the resistance to crushing is: -

$$R_c = 2dt_p\sigma_c \quad \text{kg/cm}^2 \qquad (7)$$

If the lap joint has n rows of rivets, the factor 2 in Formulae 7 should be changed to n.

A little thought would suggest that the three resistances given above in a good joint should be as near as possible equal. Realistically, however, it is only possible to equate Formulae (6) and (7). By equating those two Formulae to each other a useful relation for the diameter of the rivet to be used is obtained and that is:

$$dtp\sigma c = \pi/4 \times d2\tau s \quad - \qquad (8)$$

Substituting the suggested relationships of σ_c and τ_s given above that reduces to:

in single shear

$$d = 1.274\sigma_c.t_p/\tau_s \quad \text{mm} \qquad (9a)$$

and, in double shear

$$d = 0.837\sigma_c.t_p/\tau_s \quad \text{mm} \qquad (9b)$$

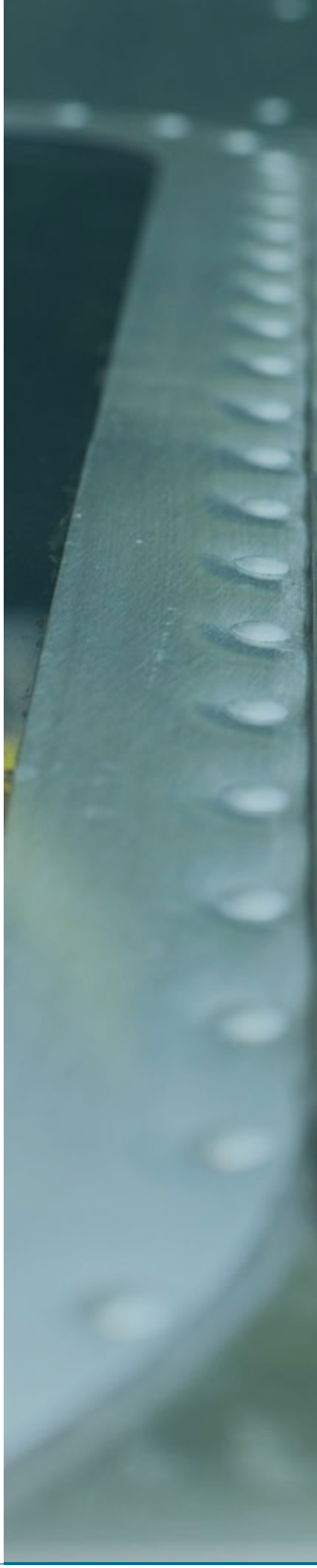
Generally, τ_s may be taken as 60 N/mm^2 and σ_c as 130 N/mm^2 giving:

$$d = 2.75t_p \text{ in single shear} \quad \text{mm} \qquad (10a)$$

$$\text{and} = 1.37t_p \text{ in double shear} \quad \text{mm} \qquad (10b)$$

As a common practice for plate thickness greater than 8 mm the diameter of rivet hole is often determined by Unwin's formula which gives: -

$$d = t_p^{1/2} \quad \text{mm} \qquad (11)$$



The spacing of the rivets is also important. Lloyd's Register of Shipping published the following minimum requirements for shell riveting:

- The distance from the edge of the plate to the centreline of the first row of rivets is to be one and a half times the diameter of the rivet shank regardless of the type of joint.
- In the case of butt laps the distance between the rows of rivets is to be three and a half diameters measured from centre to centre of the shanks.
- For a plate landing or seam the distance between the rows of rivets is to be three diameters centre to centre.
- For a butt strap the distance between the rows of rivets is to be two and a half diameters centre to centre.

By equating Formulae (6) and (7) above and substituting as before the pitch of the rivets should be:

$$p = 8.64t_p \quad \text{mm} \quad (12)$$

or

$$p = 3.40d \quad \text{mm} \quad (13)$$

Further, equating right hand sides of Formula (5) and (8), we obtain

$$(p - t_p)\sigma_t = \pi/4 \times d^2\tau_s \quad - \quad (14)$$

$$p = \frac{\pi d^2.\tau_s}{4t_p.\sigma_t} + d \quad \text{mm} \quad (15)$$

and substituting for τ_s = 60 MPa and for σ_t = 75 MPa and using the values in Formulae (9a) and (8b) we obtain:

$$p = 2.73\ d \text{ (in single shear)} \quad \text{mm} \quad (16a)$$

$$p = 1.86\ d \text{ (in double shear)} \quad \text{mm} \quad (16b)$$

The pitch of rivets in the row nearest to the edge must be as small as possible to avoid leakage. That pitch is called caulking pitch and helps the edges to be caulked effectively. The pitch is usually calculated from following empirical relationship:

$$p_c = d + 13.80t_p^{3/4}/\sigma_t^{1/4} \quad \text{mm} \quad (17)$$

The Edge Set in Riveted Joints

Equating the area of plate in the wake of the rivet hole times the allowable shear stress and Formula 14 we obtain:

$$2et_p\tau_s = dt_p.\sigma_t \quad - \quad (18)$$

and substituting τ_s - 60 MPa and σ_c a = 130 MPa

$$e = d.\sigma_c/2.\sigma_t \quad \text{mm} \quad (19)$$

$$e = 1.08d \quad \text{mm} \quad (20)$$

There are a number of practical considerations due to which the theoretical design dimensions are modified. The most important of those is the watertightness of the joint which is achieved by the caulking of the plate butt and seam edges.

The caulking becomes easier with shorter pitches and smaller rivets which also makes it desirable that the edge set should be 1.5 d but not greater. The results in this section are indicative of calculation procedure and by no means be treated as standard formulae. Those results are valid only for a particular case and the allowable stresses adopted.

The marine surveyor will find that the Formula (16a) for diameter will give reasonable results for shell and bulkhead plating and framing but the pitch suggested by Formulae (12) and (13) will prove to be too large and it is better to use the Lloyd's Register rules given above. Similar Formulae can be developed for single riveted and double or triple chain riveted seams.

The expressions for various load carrying capacities given above were derived by examining the geometry of the joint and the marine surveyor must see that in each problem he understands the geometry so that the expressions for the forces may be written.

The Failure of Riveted Joints

The above is fine where design is concerned, but the marine surveyor is usually more concerned with the failure of riveted joints in service rather than the design of new riveted structures. A riveted joint may fail in several ways but occurs as soon as failure takes place in any one mode. The following is a general discussion of the possible modes of failures of a riveted joint. These modes are described by considering a single riveted lap joint, which is subjected to tensile load of P newtons. In general, the description will be applicable to any other type of joint. The tensile and shear stresses in a rivet are analysed and calculated in the same way as a bolted joint. Despite their apparent inherent strength, marine surveyors should know that riveted joints can and do fail in any one of five ways and they are:

- shearing of the rivets.
- tearing of the plates between the rivets.
- crushing of the rivets or that part of the plate in contact with them.
- breaking of the plate between its edge and the nearest rivet hole by splitting.
- breaking of the plate between its edge and the nearest rivet hole by shearing.

Tearing of the plates between the rivet holes is sometimes called postage stamp failure. The two types of plate edge failure are sometimes found in combination. It is found with experience that, provided the rivets are at least one and a half shank diameters from the plate edge these types of failure, are rare. Because of that rarity it really is only necessary to investigate analytically the first three type of failure. With aluminium alloy plates, the rivets should be set back at least two shank diameters.

Failure Mode 1 – The Tearing of the Plate at the Section Weakened by the Holes

The plate at any other section other than that indicated in Figure 10 below is obviously stronger, and hence will not fail first. If an applied tensile force P is to cause tearing, it will occur along weakest section, which is that carrying the row of rivets. Such a failure is often called a *Postage Stamp* tear and is occasionally found in barges built of poor quality wrought iron. Considering one pitch length p it is weakened by one hole diameter dh and the area that resists the tensile force is:

$$A_t = (p - d_h)t_p \quad \text{mm}^2 \quad (21)$$

If the allowable stress for a plate in tension is σ_t in N/mm^2, then the tensile strength of the joint or tensile load carrying capacity of the joint is: -

$$P_t = \sigma_t(p - d_h)t_p \quad \text{N} \quad (22)$$

If P is the applied tensile force in newtons per pitch length, then the joint will not fail in this mode if P is less than the figure calculated from the Formula.

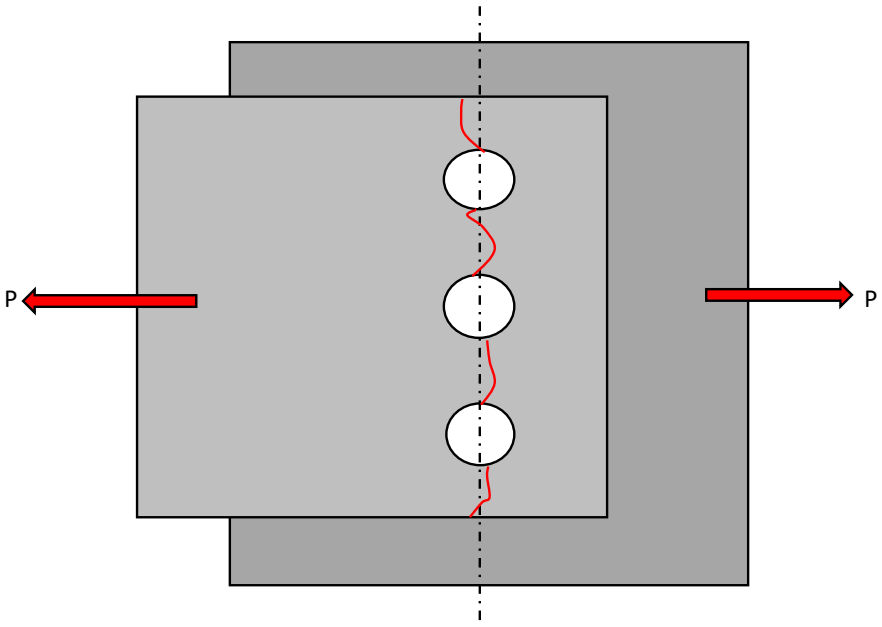


Figure 10 Rivet Failure Mode 1

Figure 10 shows how a plate can shear from hole to hole as indicated by the red line.

Failure Mode 2 – The Shearing of the Rivet

The failure will occur when all the rivets in a row shear off simultaneously. Considering the strength provided by the rivet against this mode of failure, it is necessary to think of the number of rivets in a pitch length which is obviously one. Further, in a lap joint failure due to shear may occur only along one section of rivet as shown in Figure 11 (a). However, in case of a double butt strap joint, failure may take place along two sections in the manner shown in the Figure 11 (b). So, in the case of single shear, the area resisting shearing of a rivet is:

$$A_s = \pi d_h^2/4 \quad \text{mm}^2 \quad (23)$$

[As the difference between the diameter of the hole and the diameter of the rivet is very small, the diameter of hole is used for the diameter of the rivet in Formula (5)].

If the allowable shearing stress in single shear of rivet is τs in newtons per mm^2, then the shearing strength or the shearing load carrying capacity of the joint is:

$$P_s = \tau_s \pi d_h^2/4 \quad N/mm^2 \quad (24)$$

We may also write if n is the number of rivets per pitch length:

$$P_s = n\tau_s \pi d_h^2/4 \quad N/mm^2 \quad (25)$$

If the rivet is in double shear as in Figure 11 (b) the effective area over which failure occurs is twice that as in Figure 11 (a) and the allowable stress in double shear is 1.75 times that in single shear. Hence in double shear:

$$P_s = 1.75\tau_s \pi d_h^2/4 \quad N/mm^2 \quad (26)$$

Failure will not occur in either case in this mode if:

$$P_s \geq P \quad N \quad (27)$$

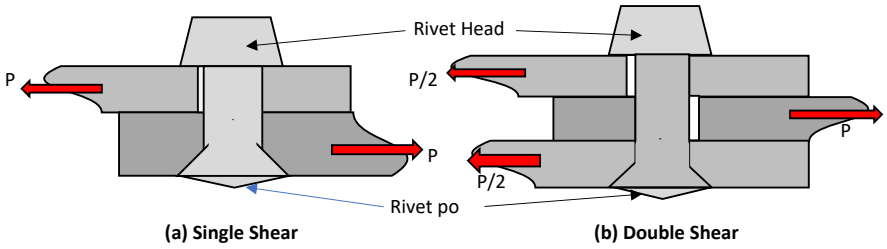


Figure 11 Rivet Failure in Mode 2

Failure Mode 3 - Crushing of Both Plate and Rivet

Due to the rivet being compressed against the inner surface of the hole, there is the possibility that either the rivet or surface of the hole may be crushed. The area, which resists this action, is the projected area of hole or rivet on a diametric plane. The area per rivet is:

$$A_c = d_h t_p \quad mm^2 \quad (28)$$

where

A_c = area of rivet resisting crushing

If the allowable crushing or bearing stress of rivet or plate is σc in tones per square mm the crushing strength of the joint or load carrying capacity of the joint against crushing is: -

$$P_c = \sigma_c d_h t_p \quad N \quad (29)$$

Then failure in this mode will not occur if:

$$P_c \geq P \quad (30)$$

where P is applied as a load per pitch length and there is one rivet per pitch. If the number of rivets in a pitch length is n then the right hand side in Formula (29) should be multiplied by n. Thus, this type of failure is sometimes found at the vessel's quarter lengths and at about half her moulded depth. It is found by tap testing the rivet heads on *both* sides of the vessel.

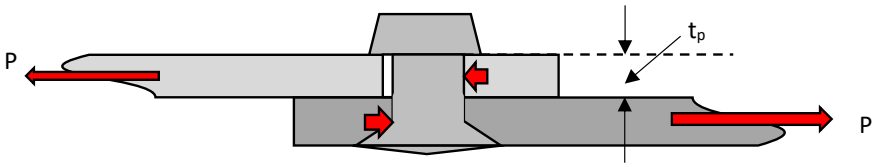


Figure 12 Rivet Failure Mode 3

Failure Mode 4 - Shearing of the Plate Edge near the Rivet Hole

Figure 13 shows this mode of failure which can take place in both either or both inner and outer plate and in which the plate edge can shear along planes marked in red. If the length of the edge set is e, then the area resisting this failure is:

$$A_{es} = 2et_p \quad mm^2 \quad (31)$$

where

A_{es} = the area resisting such shear

If the allowable shearing stress of the plate is τs in newtons per mm2 then the load carrying capacity of the joint against the shearing of the edge is:

$$P_{es} = 2et.\tau_s \quad N/mm^2 \quad (32)$$

Failure in this case will not occur if:

$$P_{es} \geq P$$

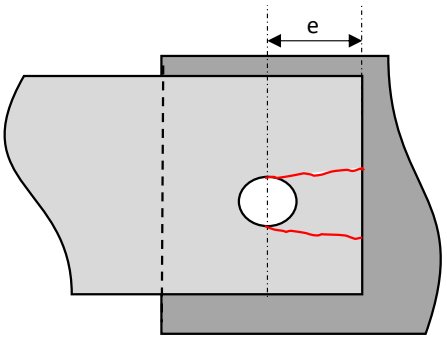


Figure 14 Rivet Failure Mode 4

The modes of failure discussed above are primary in nature and in certain cases they have to be considered uniquely. One such case is when rivets are arranged in lozenge or diamond shape. In writing down the above equations for strength of the joint certain assumptions have been made and it is worthwhile to know and remember them (see below). Most importantly it should be remembered that most direct stresses have been assumed to be induced in rivet and plate which may not be the case.

However, ignorance of the actual state of the stress and its replacement by the most direct stress is compensated for by lowering the allowable values of stresses σ_t, τ_s and σ_c, *i.e.* by increasing factor of safety or, as the more cynical call it, the factor of ignorance. As the rivets are driven hot, it is customary, when the holes are drilled to multiply the diameter used in the above calculation by 1.05 and, if the holes are punched by 1.06. A multiplier of 1.25 is also used to allow for the countersink. ...***Continued in Issue 97.***

Photo credit: Ulstein

X-Bow design could help solve air draft challenges for boxships of the future

By **Harry Valentine**

The X-Bow allows for possible lower level forward placement of the ship's control-bridge above and immediately behind the bow of future container ships. Such ships would carry containers to the rear of and stacked to higher elevation than the bridge, with telescopic air intakes that extend upward above the containers, located near the ship stern to supply air to the engine. The combination could offer greater operational versatility on select ship routes.

INTRODUCTION

Container ships carry most of the world's trade and despite the pandemic lockdowns being enforced in many countries and ongoing trade disputes with China, future trade moving aboard container ships is likely to increase. The closures of factories in China translates to factories producing consumer goods at competitive prices being opened in other nearby Asian nations, with major Asian container transhipment terminals processing greater numbers of containers within as little as a decade. In Egypt, the Suez Canal Commission has planned for a future where large container ships will sail along the canal.

Plans are underway to develop twin navigation channels at greater navigation depth to transit wider, deeper draft, slightly longer and slightly higher container ships built to 28,000 to 34,000-TEU capacity. Installing the ship control bridge above the bow allows for higher stacking of containers while installing telescopic air intakes at the stern area would allow for air to flow above the containers and into the air intakes. Upon approach to a bridge, the telescopic air intakes would briefly retract. The dynamics of the X-bow when sailing through waves enhances prospects for forward located control bridges on future container ships.

PORT BRIDGES

Ships sail below bridges on approach to many ports internationally. While some bridges can be rebuilt to greater height as was the case with the Bayonne Bridge on approach to the Port of New Orleans, bridge rebuilding is sometimes not a viable option for mainly cost reasons. The combination of redesigning or reconfiguring a ship and modifying its route operations and schedule offers a possible solution at several ports internationally. The X-bow

allows for a low-elevation bridge located above and slightly behind the bow, with containers stacked to well above the height of the bridge.

A ship built to such configuration could sail through severe wave conditions across the North Atlantic to a transhipment terminal such as Quebec City or Halifax, where the upper levels of containers would be removed for transhipment. The ship would rise in the water to shallower sailing draft and telescopic air intakes retracted to allow the vessel to sail under the Bayonne Bridge into Port of Newark, under the Arthur Ravenel Bridge at Port of Charleston, under the Dames Point Bridge at Port of Jacksonville (JaxPort) and under bridges located between Ports of Montreal and Quebec City.

SHIP STRESSES

Traditional ship bows built with the conventional bow configuration tend to pitch when sailing into waves. Comparison sailing in identical severe wave conditions involving a ship built with a conventional bow and the other with the X-bow revealed that the X-bow responds with less slamming while the deflector built high above the bow redirects water spray away from a forward bridge. A vessel built with the combination of X-stern and X-bow offers reduced pitching when sailing at near steady cruising speed through severe wave conditions, in turn potentially reducing wave induced structural stresses along the vessel hull.

Stress induced by vessel pitching motions when sailing through severe wave conditions is one of the factors that restricts ship length. Depending on the amount by which the combination of X-bow and X-stern reduces pitching induced structural stresses, there may be scope to slightly extend vessel length and slightly increase the number of containers that it could carry. Further research would be required to determine possible lengthening of future container ships built with the combination of X-bow and X-tern, compared to vessels built with conventional bow and stern.

MONTREAL CONFIGURATION

The maximum size of ship allowed to sail to Port of Montreal would measure 44-m beam by 294-m length. By comparison, the older generation Panamax ships that sailed to Montreal were built to 32-m beam. A container ship of 44-m beam by 294-m length and 10-m draft at part load may be built with combination X-bow and low level forward bridge, with upward extending telescopic air intakes at the stern area. When sailing on the ocean, it would sail at greater draft with containers stacked higher than the bridge, to be partially offloaded at Quebec City container terminal.

After being partially unloaded, sailing draft would decrease to 10-m with top level of bridge at same height as earlier generation Panamax ships. Air intakes would be retracted so as to allow vessel to sail to Montreal, carrying 17-container widths across its hull compared to 12-container widths of the earlier ship. A ship of such configuration could carry an additional 40 percent more containers to Port of Montreal compared to earlier Panamax ships.

SUEZ CONFIGURATION

The future navigation dimensions along Suez Canal parallel channels would likely allow for 1-TEU additional sailing draft, up to 3-TEU additional widths, 2-TEU additional height above water with forward bridge and 4-TEU additional length. The air draft restriction imposed by the bridge across the Suez Canal enhances future prospects for future mega-size container ships built with a low-level forward bridge, enhancing prospects to consider X-bow. The need to maximize container carrying capacity aboard future container ships enhances prospects to research whether combining X-bow with X-stern would sufficiently reduce pitch motion induced structural stresses to allow for ship lengthening.

Future trade between Asia and North America is likely to recover and increase, with larger container ships sailing via the Suez Canal and Western Mediterranean transhipments ports to North American east coast ports. The future operational success of container transfer technology at Halifax transhipment extended terminal would be essential for supersize container ships built with low-level forward control bridge to partially offload containers prior to sailing to Port of Newark. Interline ships would then carry the containers from Halifax to Boston, Portland, also Philadelphia and Baltimore via Delaware Bay along with ports located along the St. Lawrence Seaway.

SHORT SEA SHIP

Shipbuilder Ulstein of Norway has undertaken research into developing a short-sea X-bow container ship of under 10,000-TEU capacity. However, they have not yet undertaken any research into larger X-bow container ships. The forward placement of the bridge of the short-sea X-bow concept container ship allows for partial offloading of containers from the upper levels at one port, to allow the partially loaded vessel to sail through shallower water and under bridges to a second port, as would be the situation along the Lower St. Lawrence River between Montreal and Quebec City.

The short-sea X-bow container ship with its low-level forward bridge provides the basis by which to develop a future version of 7,000 to 9,000-TEU capable of sailing the trans-North Atlantic service between European transhipment terminals and container terminals located along the Lower St. Lawrence River. Successful development of a trans-North Atlantic version of the short-sea X-bow container ship would subsequently provide the basis by which to develop larger versions of the ship.

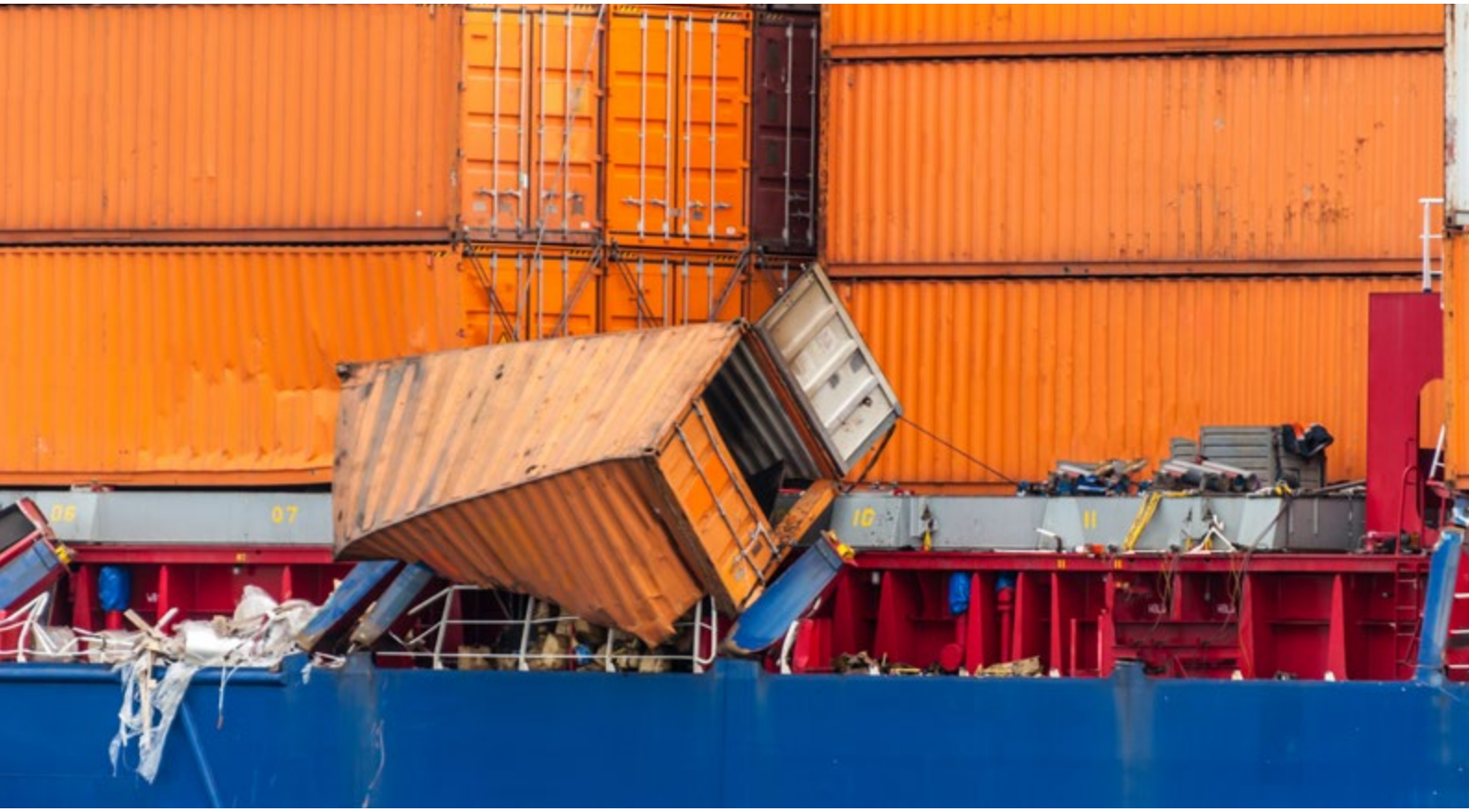
CONCLUSIONS

The premium route for an X-bow container ship with forward control bridge carrying under 10,000-TEU would be the future Europe – Montreal service and involve partial ship offloading at Port of Laurentia. Future supersize container ships built with forward bridge roof built below the top level of containers would sail along a future twin-channel, deeper-draft Suez Canal while carrying 28,000 to 34,000-TEU. The layout with forward low-level bridge makes the X-bow an option for future container ships that will sail via an enlarged Suez Canal. Future research would determine the suitability for the X-bow to supersize container ships.

Containers overboard – is theory overtaking practice?

With the number of major container losses at sea seemingly on the rise, International Marine and Cargo Surveyors Battermann + Tillery Group has provided this useful oversight and guide.

Battermann + Tillery Group



Spectacular pictures of containers floating in the sea and container ships with visible gaps in the container stacks in recent months have been featured repeatedly in media coverage. The financial losses resulting from such events are enormous. In addition to the damage to the container itself, in most cases, the cargo cannot be recovered. Furthermore, there are the costs of recovery operations, delays and so on. The long-term environmental damage caused by the container or the cargo is generally not taken into account, at least when these incidents take place in international waters.

No mention is made of the circumstances and consequences, not only in media coverage, but also in discussions among the experts. The transportation industry also tries to diminish the extent of the problem by stating that the number of containers actually lost is small compared to the container volume transported. In this respect, there is no consideration of what has been learned from the incidents which have occurred in the past years and how such incidents can be avoided in the future.

This article aims to shed some light on the known causes of container losses at sea and to initiate a discussion with the aim of understanding and improving the situation.

Severe weather?
When researching the causes of container losses at sea that do not occur as a result of collisions, it is noticeable that severe weather conditions are often given as the reason. In fact, however, at least some of the losses occurred in weather conditions that do not actually fall into the category of severe weather. A recent case exemplifies the aforementioned proposition: wind speed 6 bft, wave height 5 m-6 m. Such wind speeds and wave heights usually encountered at sea are not to be classified as "severe weather conditions" for a 400m long and 60m wide container vessel.

In this respect, other causes seem to contribute to the losses, and the following questions arise:

- Are the previous assumptions, calculation models and methods of securing the containers sufficient?
- Do situations occur in practice that are not covered by theory?
- Are the small crews too often left alone with the issues in the face of high economic and organisational pressure?
- How much of the responsibility lies with the shipping companies, who urge their employed captains to maintain the schedules, sometimes contrary to sound nautical judgement?

This article aims to present the facts as clearly as possible.

1 Why are there no international regulations for securing containers on board container ships that are based on state-of-the-art technology?

As can be seen, for example, from the investigation report (publicly available) into the MSC Zoe case, the cargo-securing measures must comply with the IMO Code of Safe Practice for Cargo Stowage and Securing (CSS Code), edition 2011.

The chapters of the CSS Code describing the fundamentals state that a vessel must be equipped in such a way that the cargo can be safely stowed and secured in order to weather all conditions which may be encountered during the voyage (Chapter 3 - Standardised Stowage and Securing System). (The author refers back to this point in Question 6).

In the further chapters in the CSS Code, it is stated that the Captain is responsible for the proper securing of the cargo. The methods in Annex 13 are provided as tools to perform the necessary calculations.

Annex 13 clearly states that these methods are based on a vessel of 100m in length. Corrective methods are provided for vessels of other sizes. However, it is also stated that a correction formula can be applied only to vessels of up to 300m in length.

The fact that there are no adequate regulations presented in the 2011 CSS Code (the most up-to-date edition) is incomprehensible, especially when one considers that, for example, a large Danish shipping line had the first 400m container vessel constructed as early as 2006, accompanied by considerable media attention.

2 Are cargo securing manuals or calculation programmes of the classification societies based on data that is not in line with current practice?

Using the example of the MSC Zoe, the published accident investigation report states that the calculations of the cargo securing calculator, based on the vessel's cargo securing manual, assume a GM ≤ 2.08m.

When requesting the vessel's command during loading operations to advise the vessel's GM at the port of departure or the GM to be expected on long voyages (the long overseas routes), figures of between 6m and 10m will often be given. In some cases, the figures will be even higher. In the case of the MSC Zoe, the GM was 10.23 m; in the case of loading operations on other large container ships, the author has been provided with GM values of up to 18.5 m.

Such discrepancies are extremely problematic! This is because the acceleration values to be expected are markedly increased by high GM values.

Only in the case of heavy-lift loading operations with qualified personnel, for example a supercargo or a heavy-lift surveyor, is there any possibility at all that such circumstances will be noticed and the cargo-securing measures adapted, if necessary, or the loading operations even aborted.

It could be argued that the vessel's command, or rather the ship planners, could plan the cargo in such a way as to take the GM of the ship into account. This objection may be justified in theory, but it does not correspond to common practice. Ultimately, in order to increase the weight towards the top with ballast water, the vessel would need "wing tanks". However, in most cases, modern ships are not equipped with these tanks. It would also be possible to increase the weight of the cargo towards the top. It should be noted here that one increasingly receives the impression that some planners do not understand their ships well enough! But it is also impractical to assume that the planners are able to position the cargo anywhere on the vessel. In some ports, this would also mean additional containers which would have to be restowed, which the ports generally try to avoid in an effort to be cost-effective.

Issues that exacerbate such problems are slot charter models and, of course, container bays that are stowed according to the port of destination and generally according to the principle of "last in - first out".

Thus, it seems easier to adapt the structure, manner of loading and cargo securing to the changing circumstances than vice versa.

3 Why is there such a large discrepancy between regulatory requirements?

Looking at the CSS Code and the CTU Code, there are a number of differences when considering the same issues. A simple example of this is the different assessment of friction coefficients. Further aspects of this issue will be discussed in Section 4.3.

It is important to consider that the classification societies calculate the acceleration parameters on a different basis than the other parties in the international transportation industry.

It is to be noted that classification societies are neither fully commercially-independent nor non-partisan bodies. They are ultimately service-providing market participants. In order to win a contract, they have to offer both their service itself and their requirements for compliance with regulatory requirements within an attractive cost framework.

One cost factor is certainly cargo securing which must always be designed in such a way that it offers more restraining force than the expected accelerations. If lower accelerations are applied, it is possible to compensate these lower values with less cargo securing equipment. Less material on the one hand means reduced costs for purchasing of the necessary material, but above all it saves time for the shipping company. The fitting of additional cargo securing material takes more time and results in higher labour costs and port fees. If the ship acceleration values are calculated according to the methods of a classification society, the acceleration values are generally lower than if they are calculated according to the values used in the CSS Code. As a result, some shipping companies prefer to have their ships certified with a classification society whose conditions of certification match the tight pre-calculated cost framework, or, in some cases, allow other standards of equipment, whereas others use other methods of calculation as a basis.

The definition of the regulatory requirements themselves provides the incentive for such deviations: The (not perfect, but nevertheless helpful) CSS Code has thus far always assumed a calculated worst case scenario. This does not result in an excessive level of safety, but at least one that covers a wide range of margins.

The analysis method propagated by some parties in this business sector is based on measured ship values or computer models. These, in turn, take into account a vessel's command that always acts befitting of the circumstances, i.e., avoids sailing into a storm at all if possible, or acts completely freely in the choice of course and speed of the vessel without time constraints or deadlines.

It is obvious, which of the two approaches is advantageous for the individual parties. However, the method which is ultimately the better approach from the point of view of the overall economy, the insurance industry or environmental protection is a different matter.

4 Can calculation models cover the situations that occur in practice with sufficient accuracy?

If we look at the theoretical calculation models, we come up against a number of restrictive marginal conditions:

4.1 Vertical accelerations (common approach so far)

The CSS Code states that vertical accelerations, for example, are only to be taken into account in combination with longitudinal accelerations. (The basic transverse acceleration parameters are already designed in such a way that they take into account the corresponding vertical accelerations).

From practical experience, however, it is known that there are sometimes considerable vertical accelerations with simultaneous strong roll angles. If these are not taken into account separately and included in other considerations, they can have considerable effects.

Additional vertical accelerations reduce the stability of components at risk of tipping. At the same time, frictional forces are reduced, which in turn means that other measures against slipping have to withstand stronger forces.

4.2 Vessel speeds

Vessel speeds undoubtedly have a considerable effect on the transverse acceleration of the vessel. In the formulas of some classification societies for calculating transverse acceleration, it is therefore a marginal condition that a certain ratio of speed to length of the vessel is maintained. Some calculation methods are only comprehensible to the extent that the calculated "minimum speeds" must be regarded as obligatory rather than as a marginal condition for the applicability of the calculation methods.

However, it may be questioned as to whether the vessel will consistently steam at the stated minimum speeds later on. For example, prior to the economic crisis from 2007 to 2010, ships sailed considerably faster. In the course of and after the economic crisis, the actual speed of the vessels was considerably reduced. According to the MSC Zoe investigation report, the ship was travelling at a speed of between 8kn and 10kn at the time of the most violent movements. According to press reports (www.gcaptain.com), the APL England was travelling at a speed of approximately 7kn at the time of a recent incident in which it lost containers. According to a maritime tracking service during a recent incident in the Pacific, a vessel was steaming at a speed of approximately 12kn.

It can be seen from these two examples that international shipping no longer occurs at speeds of more than 20 knots, as was the case before 2007. It begs the question as to whether the reduction in speed ought to lead to corrections to the calculation of the transverse acceleration of the vessel.

4.3 Transverse loading and overlapping effects

In many of these cases, experts were repeatedly able to detect unhooked automatic twist locks of various systems during the subsequent investigations of the cases. These systems are not fundamentally called into question here. Nevertheless, it is striking that it is evidently not possible for such systems which are responsible for the securing of container layers above the lashing bars to offer absolutely reliable protection against unintentional unlocking. Looking at such systems impartially, one can see that when a container is set down or removed, a certain rotation of the container around the vertical axis is necessary.

Of course, this is not to say that specific rotational movements impact only a single container. However, when a ship is rolling in the swell, other forces are also acting which place the connection between the containers under stress.

However, the assumption that a container must be twisted slightly in order to unlock it completely is too complex. The problem for the vessel's command does not begin when the containers are completely unlocked but rather it starts when only one side, i.e., the front or the rear of the container unlocks, and such cases can occur much more easily, namely when transverse and vertical forces act simultaneously.

For example, quite simply, static downhill forces act transversely on the inclined side of a tilted container stack. The transversal acceleration forces are also obviously acting. At the same time, however, vertical forces may also be impacting. If we consider these forces in combination on only one end of a container, the releasing of the twist locks is not only conceivable in practice, but also measurable.

Proof for this is provided by the practical cases.

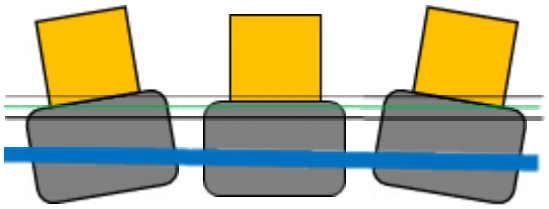
4.4 Additional vertical loads in combination with transverse accelerations

In many publications, vertical accelerations are not considered simultaneously with rolling movements. Historically, this is understandable, as the vessels had a small width and thus a vertical heave effect on the maximum width was negligible compared to the rolling movements.

However, with vessels becoming increasingly bigger, one could argue that this approach is outdated. As can be seen from diagram A, the difference in height is not particularly large for a narrow vessel. With a wider vessel, however, there is sometimes a considerable difference in height.

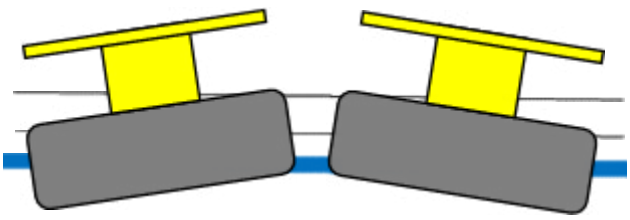
The difference in height illustrated in Diagram A below is now so great that it may no longer be considered insignificant or be ignored.

Actually, these circumstances are not surprising because today's large container vessels have a width that already exceeds the length of many small vessels.



As can be seen from the diagram on the left, the difference in height is not particularly large for a narrow vessel.

Diagram A



With a wider vessel, however, there is sometimes a considerable difference in height.

5 Are the high towers on deck which are basically standard still generally stable at all?

Overall, the development of containers stowed on deck is to be considered. Whereas in 2000 there were often only about 6 layers on deck, today there are stacks consisting of 11 container layers. In the case of the *ONE Aquila*, there were photographs in the press which showed that 7 layers were stowed above the lashing rods alone.

Considering a container stack (with 7 layers) independently of the situation on deck, one easily notices two things.

The stack on diagram B below consists of 7 layers:

The stack shown here consists of 7 layers:

The individual containers are standard containers, i.e. no high cubes.

The centre of gravity within each container is assumed to be only 25% within each container.

This "stack" of a given height would tip over at a certain angle of inclination. In this case, that is only 7.8°.

The only securing counteracting this is the securing of the base of the stack.

Diagram B

The individual containers are standard containers, i.e. no high cubes. The centre of gravity within each container is assumed to be only 25% within each container.

This "stack" of a given height would tip over at a certain angle of inclination. In this case, that is only 7.8°.

The only securing counteracting this is the securing of the base of the stack.

Or in Diagram C: An upright tower on which transverse lateral forces act would also tilt if the tilting moment is not counteracted by a sufficient retaining moment.

Tipping moment M_T = a_x x m x $height_{COG}$

Retaining moment M_R = a_z x m x half tower width

M_T < M_R

If the prevailing tipping moments exceed the effective retaining moments, then again only the securing at the base of the stack prevents the stack from tipping over.

When using a simple numerical example to calculate the forces during tilting in a curve without vertical acceleration by way of example, a very practical problem becomes clear:

The following parameters are assumed as the basis for the calculation:

$m_{Container}$ = 10mt

$Height_{COG}$ = 7.89m (2.43 m x 3.25; 3 standard DV containers, 8.0' high, plus a quarter container height)

Half width = 1.22m

a_x = 0.5 x g (comparable to the accelerations whilst negotiating a curve in a truck or a train)

a_z = 1 x g (no vertical acceleration, i.e. no consideration made for wave motion)

The tipping moment MT is calculated as follows:

M_T = 0.5 x 9.81 x 7 x 10 mt x·7.89 m = 2,709 kNm

This is compared to a retaining moment of:

M_R = 1.0 x 9.81 x 7 x 10 mt x 1.22 m = 837.7 kNm.

Based on the above calculation there is a difference (tipping moment surplus) of 1,871.3 kNm.

What does this mean for the lowest layer of the twist locks?

Diagram D: If we look at the situation at the base of a stack of 7 containers compared to other containers below, it becomes clear that the tilting motion results in the acting of a vertical pulling force on the twist locks.

Or in a second example:

An upright tower on which transverse lateral forces act would also tilt if the tilting moment is not counteracted by a sufficient retaining moment.

Tipping moment $M_T = a_x$ x m x $height_{COG}$

Retaining moment $M_R = a_z$ x m x half tower width

$M_T < M_R$

If the prevailing tipping moments exceed the effective retaining moments, then again only the securing at the base of the stack prevents the stack from tipping over.

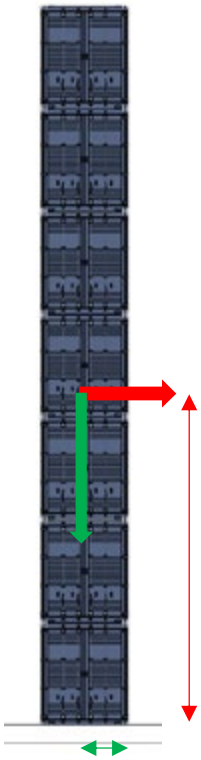


Diagram C

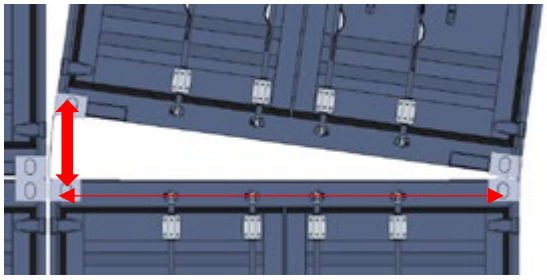
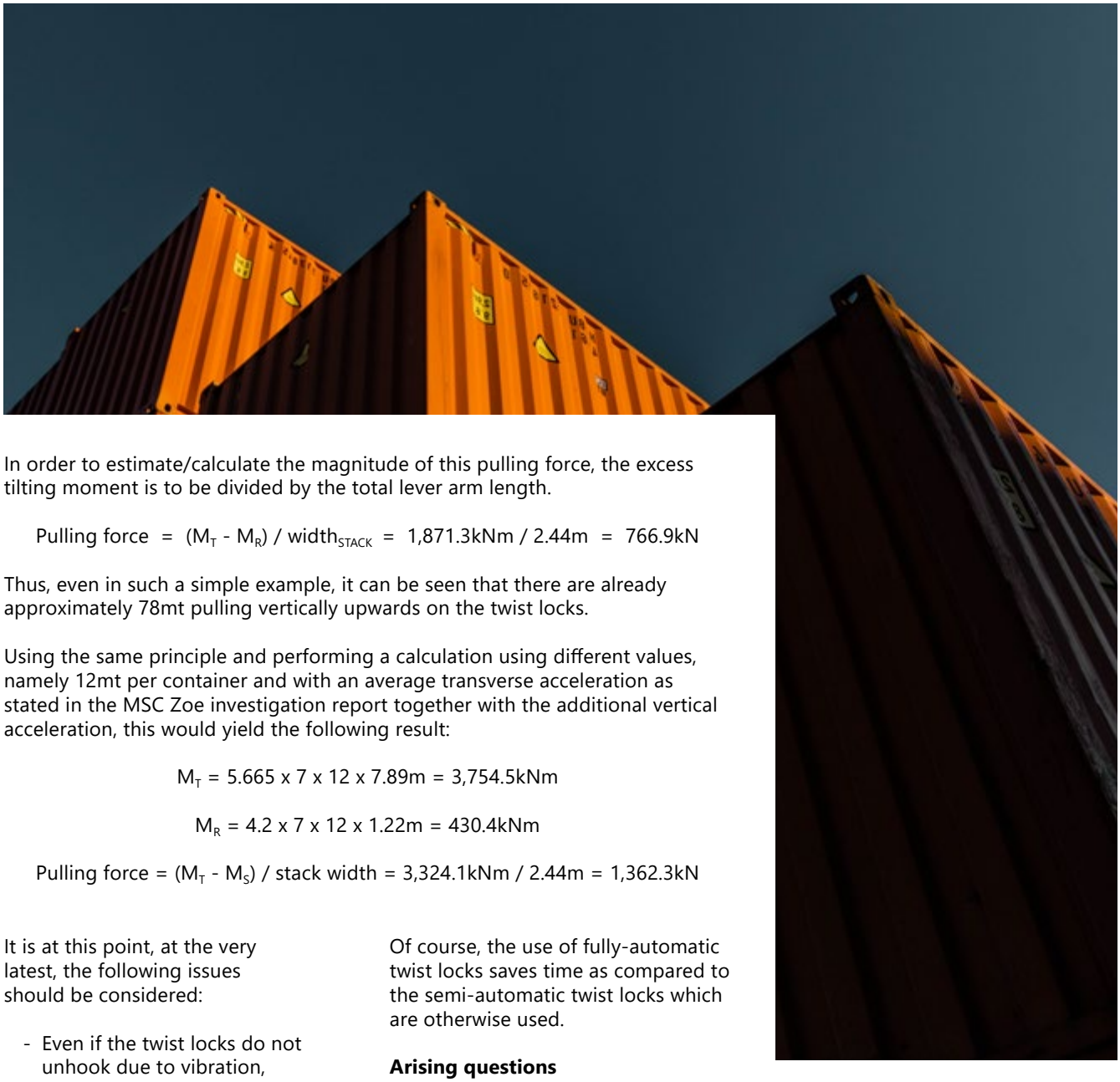


Diagram D

If we look at the situation at the base of a stack of 7 containers compared to other containers below, it becomes clear that the tilting motion results in the acting of a vertical pulling force on the twist locks.



In order to estimate/calculate the magnitude of this pulling force, the excess tilting moment is to be divided by the total lever arm length.

$$\text{Pulling force} = (M_T - M_R) / \text{width}_{STACK} = 1{,}871.3\text{kNm} / 2.44\text{m} = 766.9\text{kN}$$

Thus, even in such a simple example, it can be seen that there are already approximately 78mt pulling vertically upwards on the twist locks.

Using the same principle and performing a calculation using different values, namely 12mt per container and with an average transverse acceleration as stated in the MSC Zoe investigation report together with the additional vertical acceleration, this would yield the following result:

$$M_T = 5.665 \times 7 \times 12 \times 7.89\text{m} = 3{,}754.5\text{kNm}$$

$$M_R = 4.2 \times 7 \times 12 \times 1.22\text{m} = 430.4\text{kNm}$$

$$\text{Pulling force} = (M_T - M_S) / \text{stack width} = 3{,}324.1\text{kNm} / 2.44\text{m} = 1{,}362.3\text{kN}$$

It is at this point, at the very latest, the following issues should be considered:

- Even if the twist locks do not unhook due to vibration, transverse impacts or other factors, a maximum of two twist locks are counteracting the aforementioned pulling force. However, the twist locks of a well-known and certified manufacturer only have a rated tensile strength of 500kN. This means that even allowing for two twist locks, they are still both overloaded.

- Based on the documents of a classification society, the maximum vertical tensile strength of the corner castings is assumed as being 250kN. Accordingly, on the basis of the above calculation, these would also be overloaded.

- Is the use of fully-automatic twist locks sensible?

Of course, the use of fully-automatic twist locks saves time as compared to the semi-automatic twist locks which are otherwise used.

Arising questions

Nevertheless, the following questions arise:

- Can these savings in favour of a few companies justify the losses to the affected shippers, consignees and the entire insurance sector?

- Could these savings be perhaps used to mitigate the environmental damage caused? Is it at all possible to "mitigate" environmental damage?

- Possible solutions would be the use of fully automatic twist locks in bays where the above-mentioned tipping problems do not occur. Or one would have to counteract the tipping problem with bridge fitting and thus, so to speak, create a large block from several individual stacks. Ultimately, it begs the question: which effort is ultimately greater?

- What will be the developments in future international guidelines?

In December 2020, a revised version of Annex 13 in the CSS Code was published by the IMO.

Based on the new Annex 13, acceleration values are reduced by reduction factors for short voyages and/or voyages with easily foreseeable weather phenomena. This is not actually relevant, especially with regard to large container ships.

What is worse is that even the version published in 2020 still includes the restriction that certain factors can only be applied to ships up to 300 metres. One has to ask the question: How many years after the launch of the first 400m container ship in 2006 do we have to wait until regulations are adapted to these circumstances?

In order to solve a problem, it is important to not treat the symptoms but rather to determine and address the root cause.

Traceability measures

Accordingly, calls for "transponders" will not solve the problem. Apart from various technical difficulties and high costs, such transponders do not reduce the number of incidents. In fact, the traceability of containers can be expected to lead to additional costs, which have not yet been recognised and taken into account in the many discussions on this issue.

Any container that does not go overboard equally reduces the environmental problems for the coastal states and ultimately for all of humanity, and at the same time any loss that does not occur reduces the costs for the insurance industry and thus ultimately also for the total number of insured parties.

The unconditional cost-saving principle for shipments could be countered effectively by the port states, especially the few northern European port states as part of an association. Those involved/affected should not hope for international efforts.

A comparison with tanker accidents shows quite clearly: international efforts barely brought about any improvements. However, when the USA, as one of the largest oil importers, made shipbuilding changes a mandatory condition as a port state, the international tanker fleet adapted very quickly.

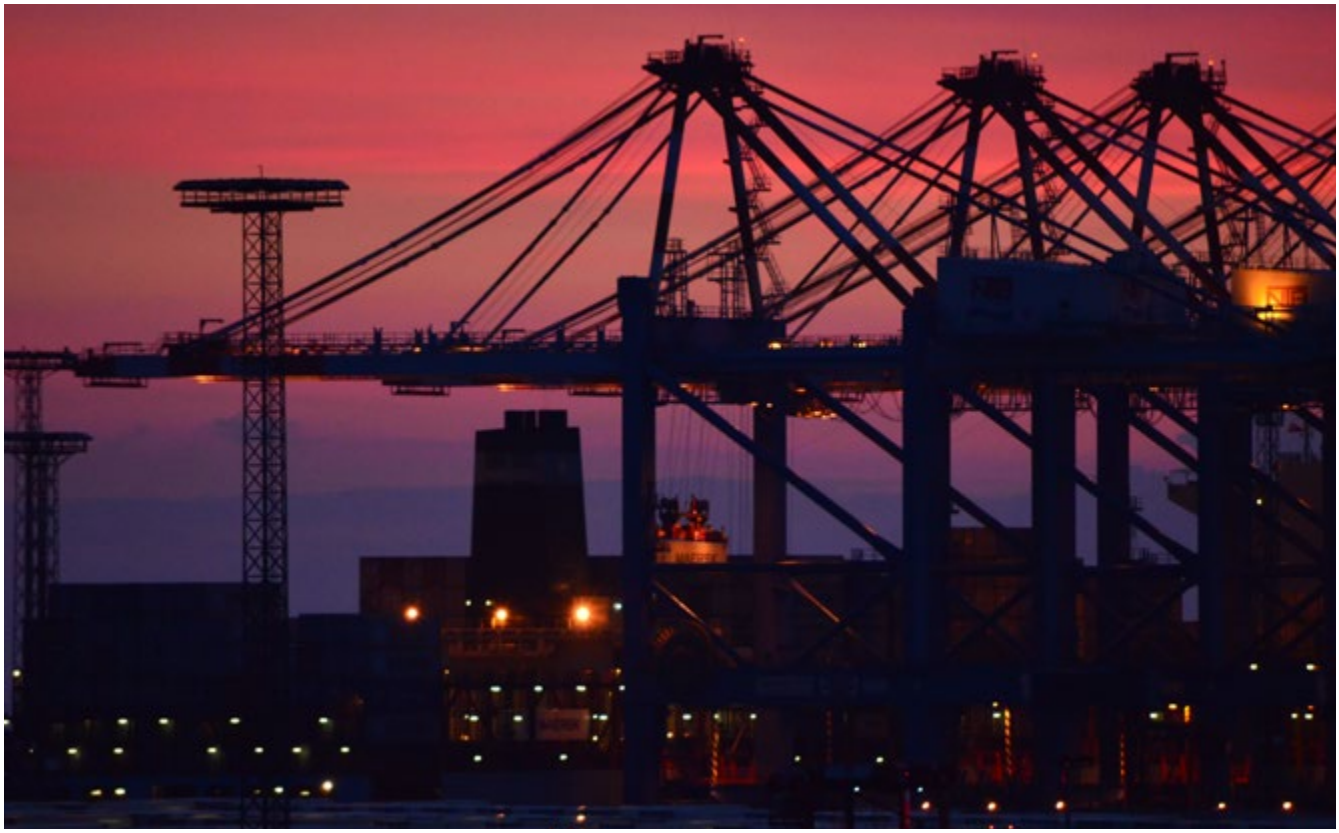
If one could imagine that only France, the Netherlands, Belgium and Germany imposed regulations regarding certain equipment as a condition for ships to dock, then these four states alone with the main import ports (Le Havre, Rotterdam, Antwerp, Bremerhaven and Hamburg) would generate such high economic pressure via northern European consumers that rapid changes are at least conceivable. If the main southern European ports of Greece, Italy and Spain were to be integrated, almost the entire European market could become unavoidable as a market power for the world's merchant fleets.

About the Battermann + Tillery Group

With 21 offices all over Germany and various subsidiaries abroad, the Battermann + Tillery Group is one of the largest companies of marine and cargo surveyors in Europe.

For more than 100 years, the group has been providing surveying services for global insurance markets and the transport industry, maintaining the tradition of independent surveyors.

The company's core operations lie in documenting and evaluating transport-related cargo damage, technical losses as well as in loss prevention. In its fourth generation, the family business continues to develop and boasts a record of steady growth over the past decades. The team of experts, mostly engineers from the fields of transportation, mechanical engineering and nautical science, provide a unique in-house pool of knowledge.



A PERSONAL ACCOUNT OF GENDER DIVERSITY AT SEA


Photo credit: Joanne Rawley

By **Joanne Rawley**

The following case study is a personal account by Joanne Rawley, a maritime professional based in the United Kingdom and a newly appointed Human Rights at Sea Advisory Board member. This is her perspective, in her own words, having been selected, trained and worked at sea.

Joanne started her maritime career in 2012 at the age of 30, considerably older than her classmates. She was also the only female on her cadet intake. Completing her cadetship through Clyde Marine and Vroon Offshore, she sailed on multi-role vessels in the North Sea. Since qualifying in 2014, she has sailed as both 2nd and Chief Officer with four other companies on yachts, tall ships and multi-role vessels. Joanne has recently completed a year ashore in QHSE as fleet DPA and CSO and will be returning to sea soon to complete her Master Mariner qualification.


Photo credit: Joanne Rawley/HRAS

Joanne takes up the story in her own words...

Having served in the Royal Air Force (RAF) and with a significant portion of life experience, I'm well used to working in a male-dominated environment and the prolific bad language or dirty jokes that are often told within earshot, rarely warrant a reaction from me. What does get a reaction is the assumption and judgement made of me purely because my chromosomes are XX and not XY.

"You'll need to work twice as hard to be considered half as good," advised one Captain with another Captain declaring (with many expletives included), "I told the **** crewing department to not send any more ***** female cadets to this ***** boat as they're nothing but ***** trouble." That introductory speech on my very first bridge at the commencement of my first six weeks at sea made a lasting impression and stayed with me till this day.

The awareness of gender bias in the industry started long before that day on the bridge when my Cadet Training Officer advised me that several of the sponsorship companies to apply through would not accept females, and a couple of the others on the list were deemed not suitable for female cadets after previous issues and incidents. Which raises the question, how seriously are complaints taken, if these companies are still ranked as 'Training Providers' with the Merchant Navy Training Board?

The International Maritime Organisation (IMO) quotes the figures of female seafarers being at two percent with 94 percent of them being on passenger vessels. Within the North Sea, a rough sampling of the major ERRV (Emergency Rescue & Recovery Vessels) and PSV (Platform Supply Vessels) employers in the UK sector show female seafarers make up less than one percent.

For most of the boats I've stepped foot on, I'm rarely off the gangway before being told by the crew that

they've never sailed with a female officer. Shortly after comes the question, "Why are you not at home with your husband and children?" On hearing I have no children, their next question is "Why not/when will you?". It isn't offensive, but it becomes tiring and is certainly not among the first questions asked of a male officer on board.

A male officer giving instructions/ raising their voice/objecting to the jokes and subject of discussion, is considered being a leader and his reactions are justified as part of the job. A female officer doing the same is considered bossy/emotional/ 'has a chip on her shoulder'/unable to take a joke and is overreacting. In my experience, if you fail to react substantially when appropriate, you are deemed weak and not in control of the situation. Attacks also become more personal; instead of just the generic name-calling there is the accusation that you're only there to improve diversity statistics or because of false/inappropriate favouritism.

Fitting in

Team dynamics and the ability to interact successfully with the crew is also under the microscope. Be professional and distant (but still maintain an open-door policy for grievances and discussion). If you don't, you're cold and not a team player. Being a good team player can result in a different interpretation with accusations of being unprofessional and flirting.

Achieving that successful balance with multiple different individuals is incredibly difficult, time consuming and needs a lot of personal and situational awareness – notice I use the term 'individuals', not the sweeping generalization of 'all male seafarers'. Get the balance wrong and the rumours can falsely follow you around the fleet faster than the relief boat.

Such pressure of perfecting this balance, among the other ongoing battles, can have a detrimental impact on a seafarer's mental health. Seafarers are more at risk as there is no real escape – once you join the vessel you are living and working in that environment for a few weeks or a few months. This is compounded (for some) by the impact of not being used to being away from home; not being used to being so outnumbered by the opposite sex; the constant judgement and criticism (in some cases bullying and harassment) and the lack of connectivity with the outside world. Yes, seafarers choose this lifestyle, but it doesn't mean it is an easy transition, every vessel or crew change can reset the cycle.

Consequences

Recipients of long-term negative attention are more likely to withdraw and internalize the criticism – believe that they are at fault or deserving of the abuse and are more susceptible to developing depression and anxiety. From a Chief Officer and QHSE perspective, the concerns are that the team then becomes fractured – crew are more distracted than usual, safety and situational awareness are no longer a priority and critical jobs may not be completed fully. If an individual does not feel comfortable in their working environment, they are less likely to draw attention to a problem or to ask for help – this increases the risk of accidents and injuries.

Mentoring and role models

Mentoring is a key way to support female seafarers. Allow them a safe space and be their point of contact to reach out for guidance and support if it is needed. Mentees I'm connected with have expressed that knowing there is someone there who has been through what they are going through is of comfort. Knowing they have a contact number and/or email address of someone that will respond if needed is of comfort. I wanted to be that point of contact for other women, so they didn't have to go through what I did alone, but I'm enraged at the frequency and severity that it is still occurring.

Examples of women within the industry that are well publicised include Captain Kate McCue, first American female cruise ship captain; Reshma Nilefer Nata, India's first female river pilot; UK Captain Belinda Bennett – WISTA UK who also has the added accolade of being the first black female cruise captain in history; and Captain Radhika Meron of IWSF, first Lady Master of India, to name just a few.


Captain Kate McCue | Captain Reshma Nilefer Nata | Captain Belinda Bennett | Captain Radhika Meron

Gender imbalance

It is disappointing that, as a society, we feel the need to highlight each time a woman successfully attains and performs in a traditionally male role, disappointing that women have not already completed these firsts many times over and disappointing that these roles were male dominated and previously thought to be out of the reach of women at all. The myths and legends of old always portrayed women to be bad luck at sea. Several studies over the years have disputed these myths and these examples are also both hopeful and inspirational – to show that women are still making progress and can have hugely successful careers at sea.

Men, as a gender, are not the enemy to the female seafarer. It is not an us-against-them situation. The fact I'm using the terminology 'female seafarer' reiterates the premise that all seafarers are predominantly male, unlike that of nursing where the opposite is true. 'Nurse' leads to an assumption of female and then, for clarity, 'male nurse' becomes a title but rarely is 'female nurse' used. The emphasis needs to be on teamwork and crew unity.

This career is not for everyone. One could argue that, if you want the career badly enough, you'll push through the barriers and prove yourself capable. I don't dispute this mindset and approach but, for the sake of team cohesion, safety and undisputed entitlement of human rights for all, gender division really should be eradicated. Everyone has a part to play in reducing the impact of the gender divide and ensuring human rights at sea are upheld.

Anyone reading this can make a significant difference. Remember, every female at sea is someone's daughter. If it was your son or daughter, brother or sister at sea, wouldn't you want them to be part of the crew, to feel safe and supported?

So why not make a conscious effort to show more compassion, patience and kindness to your crew and colleagues? Your actions on social media can also play a huge part. Captain Kate McCue recently posted a video after being trolled, "How can you be a Captain. Your only a woman [sic]". The resulting grammar clarification went viral and is still featured on the pages of Newsbreak, The Independent, Fox News5 and USA Today with millions of views and supporting comments.

Imagine the improvements we could make globally if we used that same power to uphold the basic human rights of our fellow seafarers – something they should already be entitled to.

Conclusion

I'm constantly amazed and inspired when I hear the stories of my fellow seafarers who have rallied against their cultural expectations and followed their dreams in the face of such adversity and bias. Sharing my personal story with you all makes me aware of the privileged experience at sea I've had so far. Originating and training in the UK, I had no fixed cultural barriers to overcome. I had no firsts to achieve – all the companies I (and my mentees and connections) sailed with have been MLC2006 compliant, pay a fair wage and provide adequate food, water and accommodation. They all also had female cadets before, as well as officers so, imagine our surprise when we are faced with so much opposition and continue to do so in 2021.

This article appears courtesy of Human Rights at Sea and is reproduced here in an abbreviated form. The full length version can be found at http://bit.ly/3b3Fd9a.

Lignum vitae material has been developed for shaft seals

Lignum vitae is well known as the maritime industry's original tailshaft bearing material. This high density wood has incredible compressive strength, self-healing properties and innate lubricity from a natural resin embedded in its structure. It is a proven solution for water-lubricated propeller shafts and other bearings on everything from aircraft carriers to tugs - and now, it can be used for sealing as well.

In partnership with engineering consultancy Hydro Tech, Inc., Lignum Vitae North America has developed a line of face seals to solve problems with premature failure of the standard resin-composite materials. The project was initiated for an Upstate New York-based utility, which had a horizontal water turbine that had seen numerous resin-composite seals fail prematurely due to overheating and wear. To solve these problems, Lignum Vitae North America manufacturered a drop-in replacement seal of about 33 inches in diameter with a brass backing, designed to fit right into the existing seal housing.

The previous seal material was failing within as little as three days and six stop/start cycles. With the new lignum vitae seal, a break-in period of 1400 hours of operation and 20 stop/start cycles caused very little wear (less than 0.08 inches), and the remaining thickness of the seal did not change after break-in.

With a service speed of 330 RPM and lubrication from river water, this hydropower-derived seal design is also eminently suitable for brown and blue-water shipping, where lignum vitae has been used for nearly 170 years as a durable bearing material for harsh marine conditions. Given the safety implications of a seal failure at sea, along with the downtime and cost required for replacement, it pays dividends to consider the most rugged and fault-tolerant material known when looking for a retrofit or newbuild seal option.

"Lignum vitae is an anomaly of nature and is the only known wood with no silica. It has an innate lubricity originating from guaiac resin imbued in every cell and a hardness like aluminum, based on its long-chain tenacious molecular cellulose structure. The mixture of the smooth resin bound up in an extremely dense cellulose structure yields a natural bearing material with a high lubricity and a massive compression strength," says Bob Shortridge, founder and president of Lignum Vitae North America. "Bearings made from lignum vitae, simply put, are self-lubricating in water and conform by self-healing. The nature of the material is inherently able to adapt to extreme and dynamic operating environments with less than perfect shafts. It is startlingly that simple."

Time-tested option for bearings
Lignum vitae has been in continuous service since the first rotating shafts replaced sailing vessels. In other words, lignum vitae has witnessed every single class of screw vessel from day one, and it continues in service today. Water-lubricated lignum vitae bearings were used aboard WWII warships, carriers and Liberty ships, and the material has even been used aboard nuclear submarines. It has recently been recertified by ABS to qualify for installation on future frigates, destroyers and icebreakers, and it is in service today in the Indian Navy.

No synthetic material can outcompete tried and true lignum vitae in real-world bearing performance. Lignum Vitae North America is proud to be leading the way with a sustainable supply of renewable lignum vitae that exceeds every environmental standard and solves EPA and Subchapter M compliance requirements.

Website: https://lignumvitaesolutions.com

Could our 'old friend', the wind, be the solution to reducing the fuel consumption of ships?

By **Simonetta Pegorari**

The new Wind Assisted Ship Propulsion (WASP) systems could play a key role in the future of the shipping industry. For years, alternative systems have been sought to reduce daily fuel consumption, saving money and reducing the carbon dioxide produced. Under optimal conditions, fuel consumption should be reduced by 50%.

Commercial shipping has for many years been resistant to the low-carbon revolution that has swept through other transport areas, but over the last decade, a lot has changed.

Many of the technologies behind this lively revival have been around for some time and mix innovative sails, deck-mounted wings, kites to futuristic designs like Flettner rotors, (discussed later in this article), which were invented over a century ago!

But faced with the combination of rising fuel prices and an industry-wide strategy to reduce greenhouse gas emissions by at least 50% over the next 30 years, the sector (held responsible for around 2.5% of global GHG emissions) is innovating like never before in an effort to increase fuel efficiency and reduce its environmental impact.

From the development of new hybrid electric propulsion systems to AI-driven operational efficiency improvements, much is being done to reduce emissions. But arguably some of the most intriguing advances have been made in a field that dates back to the early days of navigation - wind propulsion. The new super-technological materials have favoured the research and creation of various types of technological "sails" capable of partially replacing the engines.

Since 2014 there has been an international association, the International Windships Association (IWSA), which represents companies in this field clearly demonstrating that mixed propulsion ships are no longer a utopia.

Wind technologies are now generally recognized as credible energy-saving alternatives and could be applied to merchant shipping for certain types of ships and shipping routes. Although the technologies are now developed, there are still many doubts in the market, even if with the success of the completed projects they foreshadow a steady increase in the diffusion of the technology that become important to reduce CO2 emissions, particularly for transport ships, as required by the IMO (International Maritime Organization). It can be adopted to minimize the power used for propulsion onboard. Already, WASP can save on operating costs. Such savings must become even more significant in view of an increase in costs associated with alternative fuels and batteries, both at an operational and investment level. However, this type of propulsion is not good for all ships; it depends on the type, speed, wind, route and so on.

There are basically three types of sailing ships: Skysails, Dynaship and Flettner Rotors

The first type was invented by a Hamburg company, Skysails. It involves equipping merchant ships with huge kites attached to a bow mast. With the help of a computer, the kite, which hovers at a maximum height of 200 meters where the winds are very stable, provides an auxiliary thrust to that of the engine. The kite for sail traction is tied to a long cable capable of withstanding strong tensions. Even if it is not able to move the ship alone, the kite in highly resistant to marine wear fabric on this first trip and allows for a significantly reduction in the daily fuel consumption.

The first merchant ship in the world with sailing auxiliary drive in the form of a high-tech kite 10 t tonnage Mv Beluga Skysails of the Belgian Shipping shipowner, departed in 2008 from Bremerhaven, the port of Bremen, in northern Germany with a destination of Venezuela. Mv Beluga Skysails' kite measured 160 square meters of surface with the mast at the bow 15 meters high. On this first trip the fuel economy was estimated at between 10%-15%.

A more recent technology is Seawing, an autonomous system developed by Airseas, a French company that comes from the aeronautical sector that aims to find nautical applications thanks to the experience acquired in the aerospace sector. Once more it is a large sail that is straightened and rewound at the push of a button and can offer an average fuel saving of 20%. The components are the wing, a mast and a winch to retrieve the 500m long cable.

After opening, the wing rises to about 150 meters at an angle of 30 degrees in respect to the ship. A flight control pod positioned directly under the wing dynamically adjusts the trajectory, through a series of positions and continuing to drag it out of the "comfort zone" the movements of the wing itself as it tries to return to its "comfort zone" generate most of the traction of the device. The system has already passed tests on land and at sea and shortly, a wing will be installed on the RORO (roll-on / roll-off) Airbus transport vessel used to transport airplane parts. Studies are underway for a 1,000sqm sail.

For 30 years, the well-known French design studio VPLP has been designing catamarans that have won big offshore regattas and sailing yachts. Marc Van Peteghem, one of the founders of the studio, has always been very sensitive to environmental issues and has recently focused on the possibility of returning the commercial navy to the use of sails, given that ship transport involves the release of 2-3% of CO2; so he designed Canopée, a 121-meter RORO transport intended to bring components of the Ariane 6 rocket to Guinea. The RORO will be hybrid-powered because it will be armed with 4 fully automated "intelligent" wing sails, Oceanwings 30 meters high for a surface area total of 1,452 square meters. It is estimated to reduce fuel and CO2 emissions by 30%. The sails designed by the VPLP studio are built by Ayro, a company created especially for their development.

Image 1: Example of research / development project: Dykstra's WASP (Ecoliner) design Naval Architects (photo by Dykstra Naval architects)

Image 2: SkySail Yacht

Image 3 VPLP-RO-RO VESSEL

Despite all these evolutions and improvements in the soft wing sector, rigid wings are still preferred because they can incorporate aerodynamic structures or photovoltaic coatings. Research is currently underway in this area exploring the application of the technology to ships of various different sizes. In a recent development, Japanese companies Mitsui OSK and Oshima Shipbuilding received approval in principle from the ClassNK maritime classification body for the construction of a 100,000 DWT transport vessel equipped with a telescopic sail system that the group says it could reduce fuel consumption by up to 8%.

While the ability to automate, use new materials and data to optimize performance is attracting a lot of interest from both owners and designers, there are still many issues that need to be addressed as size increases:

1- the systems can take up large amounts of deck space;
2 - and they can also induce a significant amount of heeling (or tipping from side to side) in the ship.

One concept that potentially overcomes this problem is a vertical, deck-mounted foil called "suction wing" which is presented as capable of delivering considerably more power per square meter than a normal sail at a fraction of the height.

The Flettner Rotors, named after the aeronautical engineer Anton Flettner (1885-1961), are also used for wind navigation. They consist of a vertical axis cylinder with fixed or movable blades, which create a motor moment that rotates the cylinder around its vertical axis and a suction like around the supporting wing of an airplane. The first merchant ship propelled by two Flettner rotors was the Buckau which in 1926 sailed as far as New York. In the following years, however, the owners preferred ships powered by steam or diesel engines. Now, that the focus is very much on reducing fuel consumption, costs and sustainability, advocates of wind-powered transport are increasing and the Flettner rotor is being taken seriously by some of the major players in the naval sector.

The Flettner rotor operates by exploiting a curious aerodynamic phenomenon known as the magnus effect, the same force that causes a spinning tennis ball to swing. Resembling vertical cylinders mounted on the deck of a ship, these motorized devices rotate around their own axis. The rotation speed can be adjusted according to the wind speed and direction, and the interaction between the rotor surface and the wind creates a lifting force that generates additional thrust.

While a number of companies are actively working on developing the technology, the leader in terms of the number of installations is the Finnish company Norsepower. Its Rotor Sail technology, if applied to the entire global tanker fleet, would reduce annual emissions of CO2 by over 30 million tons.

In 2018, Rotor Sail was installed on Viking Grace, an LNG-powered passenger ferry. Last year Norsepower announced plans to install a 30-meter-high system aboard the M/V Copenhagen, a hybrid passenger ferry. The company also recently announced the results of a one-year installation of two 30 x 5 m rotor sails on the Maersk Pelican, a 109,000 DWT tanker. The results of this test were analyzed by the Lloyds Register, which stated that fuel savings in one year were 8.2%.

The current momentum of technology will undoubtedly lead to more applications in the years to come. But it is clear that the role of the new hybrid electric systems assisted by wind propulsion to reduce emissions will not stop only in the commercial transport sector, but will also affect the pleasure market.

The SKS-Y system
Hamburg-based SkySails is now launching the yacht version of its system consisting of three main components:

- A kite
- A launch and retrieval system
- A control system for automatic operation

As with commercial ships for propulsion, large kites made of high-tech, high-strength fabrics are used. Recreational SkySails also operate at altitudes between 100 and 300m. The launch and retrieval system manages the movement of the kite and is installed on the bow. During launch, a telescopic mast lifts the kite from its storage compartment. At a sufficient height the kite unfolds to its full size. A winch releases the tow rope until the operating altitude is reached. The recovery process is performed in reverse order.

The entire setup and recovery procedure takes between 10 and 20 minutes. The latest generation of products features a 400 m^2 fully automated kite capable of replacing up to 2 MW of the propulsion power of a ship's main engine.

Even the smallest kite can replace up to 250 kW of engine power in good wind conditions. Since the engine usually only runs between 0 and 5% of the time, the yacht owner is more independent and has the opportunity to sail where he wants while saving fuel. SkySails combines the advantages of sailing with those of motor sailing. Numerous customization options are available to meet the special needs of super yacht customers, for example logos and insignia can be printed on the towing kite and the mast can be adapted to the yacht design.

Images 4-5-6-7 Stena infinity

Last March, Stena Bulk, one of the world's leading tanker shipping companies, presented a very innovative concept of container ship: "Infinity Max" which revolutionizes the concept of future transport.

An electric vessel designed for transport in modular compartments designed to meet the demands of sustainable zero-carbon products for efficient and flexible maritime transport, InfinityMAX represents a paradigm shift in freight transport.

The ultra-flexible zero-emission design was created in response to the enormous challenges that the global maritime industry will have to overcome in the coming decades. The design envisions a world where shipping will play a crucial role in providing the world with renewable energy, chemicals and consumables for its endless needs. Stena Bulk's proposal consists of a series of modular load units, each designed to be totally self-sufficient in terms of energy, with wind turbines and solar panels that generate all the electricity needed for internal systems. For the same purpose, to increase the efficiency, collapsible wing sails and a shark skin hull are provided. The modular units have also been designed to be unloaded out of ports and collected by tugs. Each unit can carry loads of all kinds.

InfinityMAX will use hydrogen as fuel and wind turbines to generate additional energy. The ships will be manned, but Stena Bulk has designed the InfinityMAX to be semi-autonomous. Stena Bulk believes an InfinityMAX could enter service between 2030 and 2035.

And so research continues. The regulatory framework is also increasing pressure to significantly reduce greenhouse gas emissions. A combination of new regulations and an increase in the price of oil offer an incentive to adopt wind propulsion in shipping, potentially offering large savings on emissions, fuel and costs.

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SHIP PROPULSION: THE FUTURE FOR WIND IS POSITIVE

International Windship Association

With a lot of attention and investment going into alternative, low emission fuel development, how does the return of wind propulsion avoid becoming an 'also ran' technology segment?

Gavin Allwright, the Secretary General of the International Windship Association (IWSA) answers a series of questions facing the uptake of this technology and what is behind a spate of recent public announcements.

Allwright: To answer this headline question, I have to start with the fact that IWSA and its members welcome the developments in alternative fuels as they are vital to carbon neutral and ultimately zero-emissions vessels. The term 'also ran' is actually perfect, but in a positive sense. Wind propulsion systems are compatible with all other energy sources and all retrofit installations and new builds are 'hybrid' systems by their very nature. As retrofits they can deliver 5-20% of the propulsive energy to a ship with the potential to reach 30% (derived on a motorship operation profile without operational changes), whereas newbuilds can deliver 50% or more and be primary wind vessels with auxiliary engines. But it is obvious wind can't do the job alone, however the same can be said about these new fuels that we are asking to do some very heavy lifting in decarbonising the fleet.

Whether you are paying $350 a ton for HFO or $1000 for the equivalent in a green alternative fuel, you are still paying for fuel. With a wind propulsion component, it is possible to decouple a portion of your energy requirement from the fuel markets, with that zero-emissions energy delivered to the point of use at zero

cost, with zero need for storage on board and zero infrastructure required on shore and that energy predictably remains at zero cost for the lifetime of the vessel.

Your association has this year declared the 'Decade of Wind Propulsion', is that just a marketing ploy or is there real substance behind that?

Allwright: There is of course an element of informing the market in any announcement and the message there is that wind propulsion is a credible, robust and increasingly economically attractive solution. However, the 'Decade of Wind Propulsion' announcement is far more than that. It is a renewed commitment from our 130+ members to deliver on the potential of wind propulsion in this decade. We already have wind propulsion units in the market, with 11 large vessels with systems installed and over 20 rigs in operation from ferries to bulkers and a couple of tankers including a VLCC. There is another large 'wind-ready' bulker and three more installations pending in Q2 this year along with two newbuilds underway. These are alongside 20+ smaller cargo and cruise vessels. However, it is scaling these installations that is the challenge; more demonstrator vessels, mass production facilities and preparations for fleet installations that will be vital to deliver significant numbers by 2030 etc. The foundations for these are being laid now and we predict the numbers of demonstrators will double year on year up to 2024 without any further commercial orders. We are also seeing large industry players engaging with wind, the past few months have seen announcements from Oldendorff Carriers, Mitsui O.S.K. lines, Wallenius Wilhelmsen and Cargill among others.

There is also the need to 'optimise' the systems that will be increasingly common in the fleet over the next few years. This involves better integration into vessel EMS along with improved support systems such as weather-routing for wind, satellite forecasting as well as sensors on rigs to monitor performance and even LiDAR to identify wind patterns as they come into the ship in real time. All of these technical solutions will feed into the third-party validation and fleet evaluation that is also under development now to assist shipowners identifying the best solutions for their fleets. 'Facilitation' is the third key area and this is a wide one, covering everything from working with class to continually improve and adapt their wind-assist guidelines to the set up of an accelerator program to cluster together expertise to help deliver wind propulsion systems from concept to market to help ensure a robust R&D pipeline. This also extends to assisting with the roll out of low and zero-emissions fuels as mentioned before and integrating those in the design of new vessels.

On that point, you recently penned a piece suggesting that wind propulsion could actually fund not only the IMO205 decarbonisation target but also full decarbonisation. Can the industry really accept that as a credible assertion?

Allwright: Yes, I think the industry can. This was a thought piece entitled Could Wind Propulsion Deployment Fund the Full Decarbonisation of Shipping? It adopted some conservative assumptions on fuel price, no increase this decade and then a 35% increase each decade after that as carbon levies are introduced and higher cost alternatives enter the mix. It assumed that wind propulsion would be rolled out substantially this decade, securing 20% reductions in fuel and emissions across the fleet in the 2030s with some adjustments in speed and routing. Even using these conservative assumptions, this calculation would yield around $1 trillion in savings by 2050 with a price tag of roughly $300 billion, and also decrease the total cost of roll out by a margin of 10-20%. The total cost for decarbonisation has been estimated by UMAS and ETC at roughly $1 trillion to reach IMO2050, and $1.4-1.9 trillion for full decarbonisation, taking a fuel heavy approach, thus wind could in theory pick up the tab. This scenario is of course predicated on a decision to adopt wind propulsion systems at scale this decade, involving extensive retrofitting of the existing fleet and newbuilds being wind optimised as they enter the fleet.

Now that brings us to the most recent development, the Open letter released by IWSA a few days ago. This letter calls on industry decision makers to adopt a level-playing field for all energy sources and go beyond the current narrow 'fuel-centric' approach.

Why now? and How do you propose to make this happen?

Allwright: Firstly, I would like to make the point that the Open Letter is signed by 97 maritime companies from large shipowners through to small technology developers. Admittedly this is a big ask, however our industry is embarking on an unprecedented transition far greater in scale that the first wind to fossil fuel transition, and in a far shorter period, meaning at least 50% decarbonisation within the lifespan of a vessel launched today.

That means that we need to use all the tools in the energy toolbox and these need to be assessed side-by-side in a transparent way, taking in the full lifecycle and all external impacts and costs. Currently wind propulsion is under-represented in those assessments and thus we are calling for wind to be fully integrated into all industry reports and decarbonisation pathways going forward. We are calling for a multi-stakeholder working group to be established to ensure we fully understand the potential of wind propulsion and ensure that all policy and other regulations recognise wind as direct energy source.

The challenges facing the industry mean we need to make sure decision making is based on clear definitions, credible data and standardized assessment criteria and that is currently not the case. Thus, the letter goes onto to call for a strategic review of our decarbonisation efforts we are all pulling in the same direction. A review of this kind doesn't need to slow down the market development but run parallel, but it will ensure that we fully appreciate what a hybrid approach to decarbonisation means, and hopefully we can avoid any dead-ends or stranded assets in the future.

We stand ready to work with all stakeholders across the shipping spectrum to put these initiatives into action, and which will be able to draw on a lot of fantastic work already underway in silos across the industry, just in a more collective, transparent and urgent manner.

Key steps towards a high performing maritime industry

This article first appeared in The Maritime Executive and is published with our gratitude

By **Mikael Lind, Richard T. Watson, Wolfgag Lehmacher** (supported by others)

ABOUT THE AUTHORS

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Building the future

Achievement of an efficient, resilient, safe, and sustainable maritime ecosystem is a multi-year, multi-stage project that requires a sequence of interlocking actions. Attainment of the ultimate goals of any major project requires a series of intermediate steps where accomplishment of one step establishes the foundations for the achievement of subsequent steps. A number of different enablers support the application of Maritime Informatics [1] to create higher levels of maritime efficiency, safety, environmental sustainability, and resilience. [2] In this concise article we identify these enablers and map out how they link to each other in cause-effect relationships (see the following diagram). We also show with a dotted line how lessons learned during each of the phases shown in the diagram can inform improvements in the prior phase.

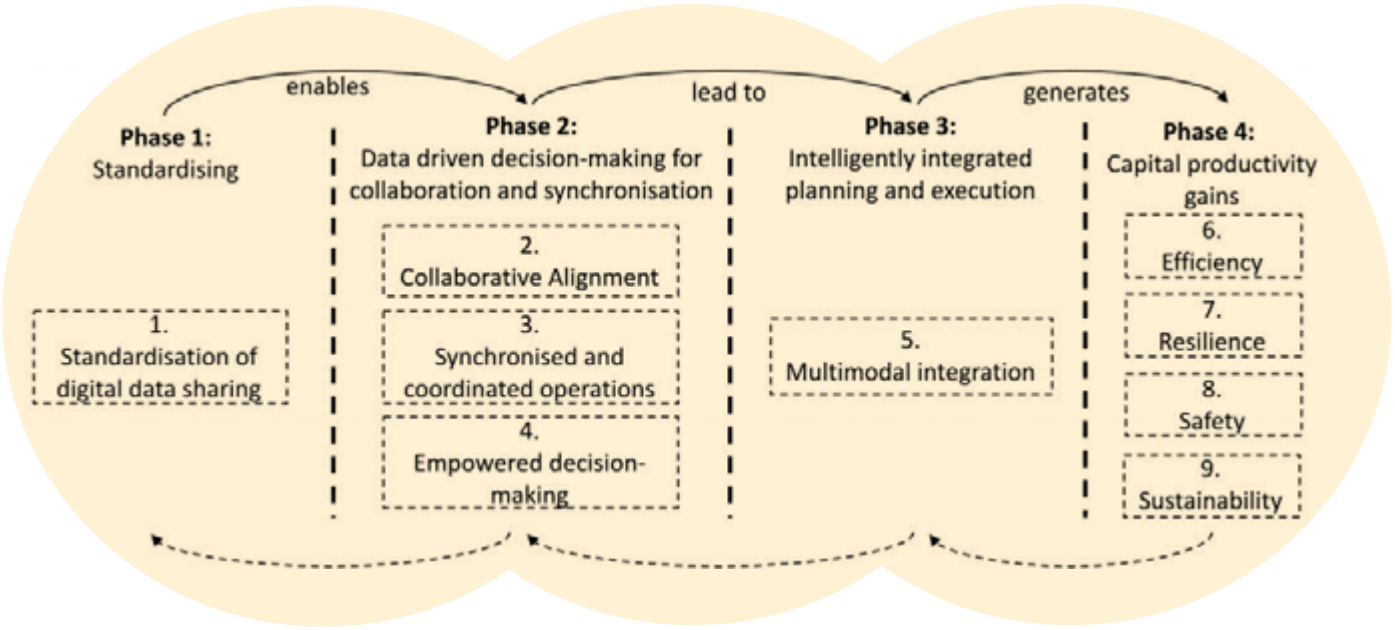


Figure 1: Maritime Informatics enablers and expected effects

A steady flow of benefits requires that the phases are chunked into specific concrete usable outcomes. For example, a digital standard for a discrete element of operations might be prioritised to enable achievement of its benefits in subsequent phases. It is expected that the four phases in the diagram will be continually iterated as new standards, models, and tools becoming available or existing ones are modified to meeting changing customer expectations as well as business, societal, and environmental needs.

PHASE 1: STANDARDISING

Standardisation of digital data sharing

Digital data sharing standards are a prerequisite for higher performance. As the economy moves ahead with its digitalisation efforts, every industry's players need to share data to coordinate and synchronise their activities and integrate into the overall ecosystem. Without industry standards this is unwieldy, given the international and self-organising nature of the fragmented shipping industry. No shipping company wants to deal with a different data exchange standard and set of data requirements for each port or terminal. But this is a current reality.

All objects (for example, containers), all interactions (for example, between ships and pilots), and all services (for example, customs clearance) need standard digital data descriptions and processes to grease the path towards interoperability. Digital standards will sit on the top of a global communications layer (for example, based on maritime satellites, 5G) to provide harmonised global communications within the maritime industry and between the industry and other transport providers. Universal standards, such as the metric system, reduce the friction of commerce, and the shipping industry can eliminate its current brake on profits by pursuing standardisation across the industry, starting with aligning all major ports.

Standards enable interoperability across systems and connectivity between systems. APIs and XML are frequently critical foundations for seamless integration. APIs enable authorised parties to extract relevant information from their partners' systems, and XML-based standards enable messages to be read and interpreted in a uniform manner within an ecosystem.

Currently, there are intergovernmental and industry driven initiatives engaged in securing standards for the maritime industry. [3] Standardisation enhances interoperability, which is an enabler of integrated multimodal operations as a basis for high performance in a self-organising ecosystem.

PHASE 2: DATA DRIVEN DECISION-MAKING FOR COLLABORATION AND SYNCHRONISATION

Collaborative Alignment

Standardised data sharing is a precondition for collaborative alignment as standardisation allows achievement of a common situational awareness among parties who need to coordinate their actions to transact a service. [4] For example, a ship berthing might require collaborative alignment among a ship's captain, tug masters, and linesmen. Such operations are often subject to continual re-planning due to disruptions, such as a ship's delayed departure from the immediate prior port or an unexpected change of weather.

Common situational awareness, which is critical to the many collaborative alignments in a port visit, requires real-time data sharing among the involved parties within the specific time-window spanning the necessary planning horizon before interaction.

Ports have to continuously deal with abrupt changes, such as those caused by late arrival of a vessel, unanticipated

shortages of labour and equipment, like chassis and containers, and highly volatile cargo volumes. Digital twinning [5] is one relatively inexpensive option for preparing to deal with abrupt change. Digital twinning assists in understanding complex business problems and identifying effective interventions and appropriate scenarios for action. Data are necessary to calibrate a digital twin, but there must first be an investment in human and organisational capital to create and maintain a digital twin.

Synchronised and coordinated operations

During a port call, there are many operations that need to be synchronised, such as:

- A pilot is at the pilot boarding station when a ship arrives
- Tugs and a ship meet up at the same geographical location at the same time
- Linesmen are stationed at the designed berth at the arrival time to secure berthing of a ship
- Sufficient stevedores are assigned to handle expeditiously a berthed ship's cargo.

Beyond the port, there are numerous situations where synchronisation and coordination are needed when resources are shared, such as a busy narrow waterway. Synchronisation failures can result in unnecessary waiting times, extended turn-around times, underutilisation of resources, and in the worst case a collision.

We envision the transfer of appointment economy principles to shipping in the area of berthing. We foresee general adoption of the booking of berths in advance of a port visit and a supporting infrastructure for berthing rights trading to cater for variations in arrival times. For example, when a ship recognises it will be a late arrival, there could be a marketplace where it can sell its 'right to berth' at the previously planned arrival time. A marketplace can improve planning and reliability by balancing a firm commitment to a berthing slot, and at the same time provide some flexibility to handle unanticipated disruptions. The ultimate goal is to raise the level of predictability for sea transport clients.

Successful synchronisation requires empowered decision-making to ensure the collaborative alignment of the necessary resources.

Empowered decision-making

Decision-making is the central activity of nearly every organisation, and data-driven organisations deliver higher quality decisions. Access to appropriate real-time digital data streams (DDS) and databases has become critical for both operational and strategic decision-making. However, if shared data are not in a standard or common industry format then decision-making is just as hampered as a conversation which involves parties that speak different languages.

The various forms of data analytics (descriptive, predictive, explanatory, diagnostics, and predictive) and machine learning all have the potential to empower decision-making. Perhaps the greatest opportunity for Maritime Informatics is in the area of resource allocation by applying prescriptive analytics to typical problems, such as cargo unloading, to minimise cost.

PHASE 3: EFFICIENCY GAINS FROM INTEGRATED PLANNING AND EXECUTION

Multimodal integration

While 90 percent of the goods transported globally spend days, weeks and months at sea or on a waterway, many shipments start and finish their journey by land. Coordination across and within sea transport is often inefficient, and some cargo owners institute time buffers to meet their clients' service expectations. The steps taken in phase 2 create the capacity for seamless integration between modes of transport by facilitating situational awareness across a cargo's entire journey from producer to consumer.

Multimodal integration requires a focus on the goods being transported rather than a sub-optimised leg by leg focus and transition between modes. Alignment of modes through coordination and synchronisation, as established by the prior phase, will support integration, enable tracking of shipment progress, and dynamic rescheduling as required.

PHASE 4: CAPITAL PRODUCTIVITY GAINS

The ultimate goal of all organisations is to raise their capital productivity. We now discuss the four main areas targeted by the shipping industry.

Efficiency

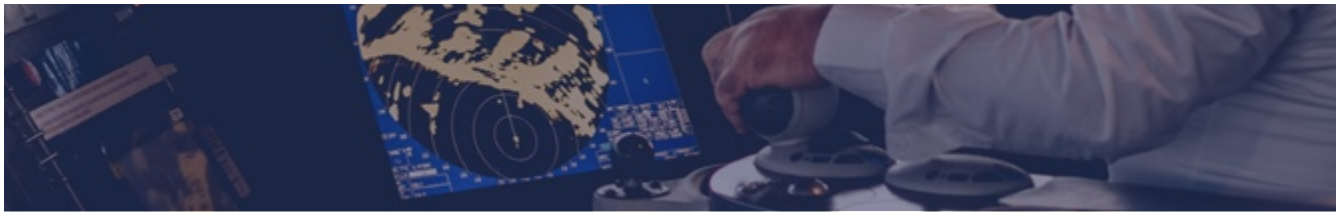
All executives are well aware of the need for efficiency in the use of economic and human capital. They are familiar with the use of information systems for efficient transaction processing and data collection.

Empowered decision-making and standardised digital data sharing are key to harvesting gains from autonomous and remotely supported operations. Automated operations, both at sea and onshore operations, such as for cargo operations and mooring, will require extensive digital innovation for their full realisation

Resilience

An increase in adverse weather is an acknowledged consequence of global climate change. Covid-19 has demonstrated the disruptive power of a pandemic. With increasing population and urbanisation, we should prepare for similar outbreaks in the future, as well as for a rising number of natural disasters. These perturbations have a tremendous impact on productivity, as we have seen with the global drop in economic growth following the Covid-19 outbreak.

A poorly handled disruption can destroy a business, but careful preparation and rehearsal can identify key factors and unknowns for consideration and will support a more resilient response by companies and governments.



Safety

A ship, its cargo, and its crew are major economic and human capital investments. The industry has long been concerned with partial or complete loss of any of these key resources. Increased safety is therefore a particularly important Maritime Informatics goal because it will help to preserve key capital, especially human life. The adoption of interoperable data standards for onboard equipment is essential for reducing accidents by improving the quality of alert signals and thus decision making. [6]

Sustainability

The shift to renewable energy source is often seen as the main pathway to a sustainable society, but it has important partners that are often overlooked – energy efficiency and capital productivity. [7] The data analytics component of Maritime Informatics is concerned with these two areas. It is aimed at doing more with less energy and less capital of all forms. For example, machine-learning based predictive maintenance can facilitate the shift from time-based to the less wasteful condition-based maintenance.

A circular economy includes sharing, reuse, remake and recycling, and these principles are another opportunity to raise capital productivity. For example, when ships are scrapped there are opportunities for the reuse of components, provided the ship has been designed for disassembly and all components are digitally identified and described in a database. Additionally, there needs to be a marketplace for these accurately described components to maximise their value. The same possibilities exist for port equipment. Digital standards for component identification and description and shared systems of record enable large-scale circular supply chains.

High on the maritime agenda is the transformation of shipping to fossil-free energy sources for both construction and operations. This conversion requires that fossil-free fuel is widely available at major ports throughout the world. This can be facilitated by a global digital marketplace to enable efficient balancing of supply and demand so ships can plan with certainty when and where to refuel.

Realising the path

All maps and their associated paths may look simple, but most journeys face a reality that is highly complex, which hinders creation of a more productive industry. The Maritime Informatics map presented in this article builds on the fundamental viewpoint that maritime transport does not exist in isolation. Cargo owners and transport coordinators desire seamless integration in the global transport chain. In this effort the core focus areas identified in phases 1-3 are necessary for this transition forming the basis for gaining capital productivity (phase 4).

However, and most importantly, digitalisation is just an enabler. It is probably the most important means of achieving the ultimate goal of increased capital productivity. All actions should be judged in terms of how they contribute to raising capital productivity. The framework presented in this concise article helps you to identify waypoints on the capital productivity quest. It can help organisations and the industry position project initiatives taken at an organisational, national, regional, and international level.

We are grateful for the invaluable input provided by Hanane Becha (UN/CEFACT), Jillian Carson-Jackson (The Nautical Institute), Xiuju Fu (A*Star/IHPC), Jan Hoffmann (UNCTAD), Michalis Michaelides (Cyprus University of Technology), André Simha (Mediterranean Shipping Company (MSC)), Sukhjit Singh (University of Trinidad and Tobago), Robert Ward, Secretary-General emeritus of the International Hydrographic Organisation, and Phanthian Zuesongdham (Hamburg Port Authority), in the development of this article.

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ELEVATORS ON SHIPS

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During 2018 and 2019, the Australian Maritime Safety Authority (AMSA) received notification of two separate accidents that involved crew members being trapped and crushed by a moving elevator. In both instances, the elevator moved while the crew members were working between the elevator casing and the cage, resulting in fatal crush injuries.

Incidents resulting in crush injuries caused by an elevator are not new, with a similar fatality investigated by the Australian Transport Safety Bureau (ATSB) in 2007. In this instance, a crew member was crushed in the elevator while conducting repairs. Elevator related fatalities have also been reported on multiple ships in other parts of the world.

AMSA believes that such incidents are avoidable through the application of simple and effective risk controls.

DESIGNED FOR A LIFE AT SEA

Marine elevators are designed and built to cope with the tough demands of a vessel at sea. Marine elevators should:

- Withstand rough weather conditions and ship movements, shocks, and vibrations;
- Perform reliably in heavy seas: up to ±10º rolling for a period of 10s, or up to ±5º pitching for a period of 7s;
- Have high-quality electrification and components that meet international marine safety standards;
- Include advanced control and monitoring systems'
- Feature cars and landing doors that are approved and certified by major classification bodies;
- Systemic failures related to fatal crushes in elevators on ships.

Similar systematic failures have been identified in all of these fatal accidents. The following were considered to be some of the key safety issues:

- Elevator instruction manuals lacked unambiguous and useable safety guidance;
- No proper risk assessments were in place for elevator maintenance as part of the safety management system;
- Risk assessments that did exist were not effectively implemented;
- Crew were not aware of—or did not consider—all of the hazards associated with working in the elevator. An example of this is the counterweights that moved down as the lift cage moved up, causing harm;
- Untrained personnel were used to carry out maintenance and repairs on the ship's elevators;
- No appropriate safeguards were in place—such as isolation lock-out—to ensure that the elevator cage did not inadvertently move while the crew were working in the elevator shaft.

EXPECTATION

An elevator shaft is a very hazardous environment in which to work. The potential dangers involve:

- height risk
- injury by falling object(s)
- noise
- electrocution from live electrical circuits
- unanticipated movement of the elevator cage.

AMSA stresses the importance of conducting a proper risk assessment and implementing relevant procedures, which are applied in practice to ensure the safety of crew working on a ship's elevator.

AMSA also recommends planning for elevator maintenance or deferring elevator maintenance work until the vessel is in port and utilizing a trained manufacturer's technician.

NOTES ON ELEVATOR SERVICE AND MAINTENANCE

Many vessel owners and operators often wonder about finding a reliable marine elevator service company. How does one determine quality? Who is qualified? Must one use an OEM-approved agent only? What does it take for a marine elevator service company to be certified? What are the rules and regulations governing the marine elevator industry?

All valid questions, but not so easy to answer. Let's try and clear up the confusion. The following report provides a guideline for owners of marine elevators worldwide.

ISO and EN

There are various norms for elevators on vessels (or "lifts on ships" as they are also referred to); most used are the ISO 8383 and the EN81/1 and 2 (traction and hydraulic elevators). These two norms give general guidelines on how to build marine elevators and how and by whom they should be inspected on a regular basis.

Owners often think that marine elevator companies can be ISO 8383 or EN81/1 approved, but such a thing just doesn't exist. The ISO and EN codes of practice only set out guidelines for marine elevator settings and how to perform inspections; there are no diplomas that can be obtained.

Clause 12.3 of ISO 8383 shown above contains an interesting but also confusing definition regarding safety inspections: "The maintenance operations shall be carried out by 'authorized lift maintenance personnel' "". What is the actual definition of "authorized lift maintenance personnel"? And how can one become "authorized"?

The person responsible for lifts at AFNOR, the French Standardization Association and its ISO institute for normalization (www.afnor.org) steers us in the right direction:

"The ISO 8383 standard has purposely been published since 1986 without that particular definition. Currently there is an ISO enquiry about possible revision of this standard."

AFNOR is preparing a proposal which might be integrated into future revised drafts of EN 81-1 under 3.1.2: authorized person (personne autorisée): "only a competent person with the permission of the owner of the lift may have access to restricted areas (machinery and pulley spaces, lift well, pit and car roof)".

If AFNOR does implement this amendment, it would finally be stated in writing who must authorize marine elevator service companies. It is the owner, not the OEM or an OEM-approved agent.

CLASS

Classes (Lloyds, DNV, BV, GL, etc.) only refer to the ISO 8383 and do not add further instructions or guidelines, except for RINA. In RINA's paragraph about elevators, the need for the owner to authorize the marine elevator service company is added. Quite interesting, this is exactly what AFNOR might be adding to the ISO 8383!

People sometimes think that marine elevator companies can be Class approved, but such approval does not exist. Classes do not have an approval system in place for marine elevator service companies.

FLAG ADMINISTRATIONS

Each flag state can have its own additional rulings. Examples: vessels under a Danish flag need to have a safety inspection performed every three months. The German Flag requires a safety inspection every 2½ years. China has no rules for third-party inspections at all.

For merchant vessels, our advice is to have a third-party safety inspection performed each year, and a load test every five years. For ferries, offshore platforms and cruise vessels more frequent inspections and service calls are recommended, because of high-frequency use (and possible abuse by passengers).

NATIONAL ELEVATOR INSTITUTES

National elevator institutes (many countries have one) often set out guidelines for elevator service companies (for instance for safety inspections). These guidelines do differ somewhat by country, but in general, they are set out as follows for marine elevator service companies:

- Business processes must be formalized;
- Liability insurance of sufficient coverage needs to be in place (€1 million+);
- Technicians need to have had formal elevator training, have a national recognized diploma, and/or have a substantial number of years of experience in the field;
- For marine elevators on offshore platforms, special certificates apply (NOGEPA, OPITO, HUET);
- A formalized plan for safe working and risk assessment needs to be in place;
- All technicians need to be trained and aware of safety.

INSURERS

It is advisable for owners to check with their liability insurer about marine elevator maintenance rules, just to be on the safe side. If a serious elevator accident does occur, they are the ones deciding on the coverage (or not) of all cost. “Negligence” is the keyword in general (having your elevator serviced by a local plumber for example).

"MAKER APPROVED" AGENTS

There are no rules or regulations for marine elevator service companies to be "maker approved". Some manufacturers imply the need for it though; they insist that only OEM-approved technicians are allowed to work on their marine elevators; an owner could be held liable in case of a possible incident.

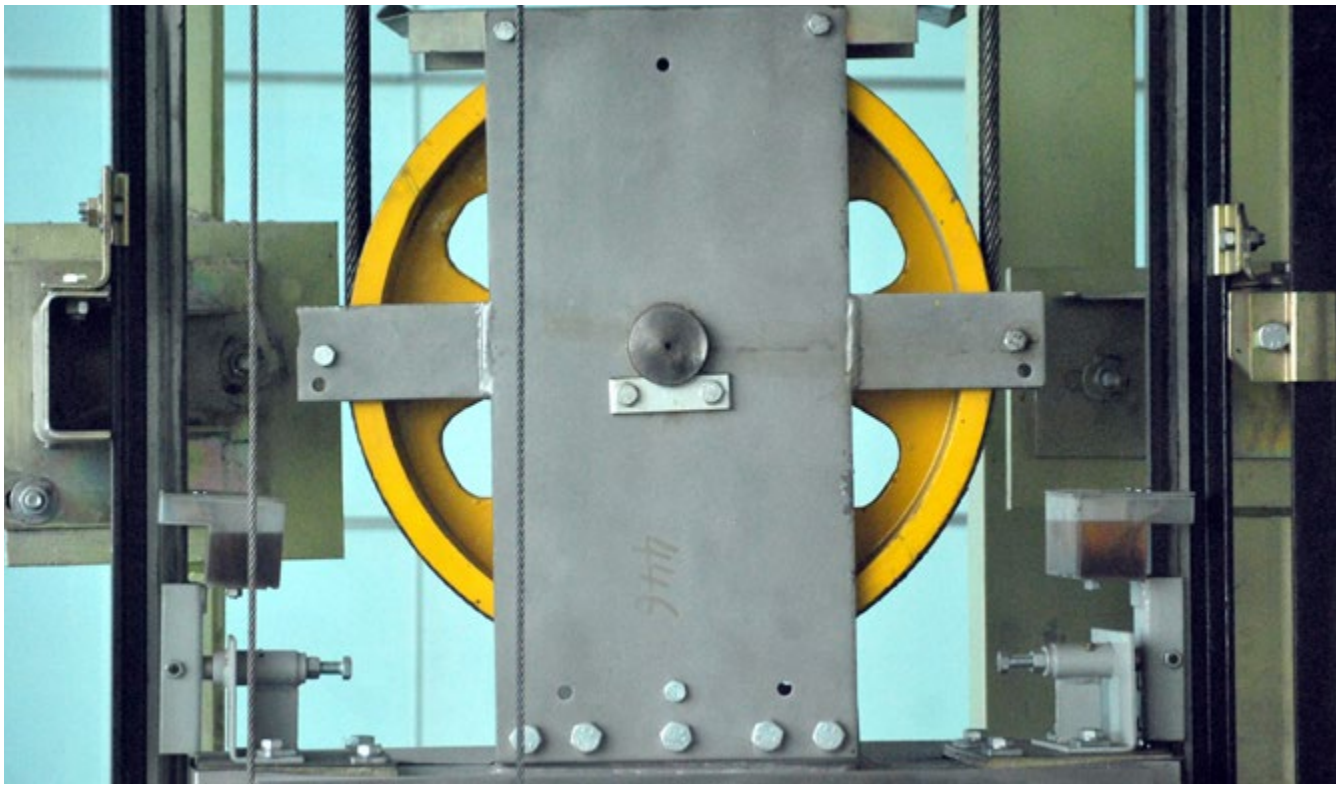
This point is understandable from a commercial point of view, but legally there is no basis for it and no liability insurer can force an owner to do so. In fact, it is forbidden within the EU to protect the market in such a way.

Often OEMs service other brands of marine elevators themselves, not following their own authorization rules they propagate. OEMs are also quite reluctant to hand out authorization letters to marine elevator service companies. Market protection of their own installed base can be a (silently) heard reason, but another excuse that is heard in the market is that "it's just too much hassle to manage an agent network". From Schindler KK: “Business style of this kind is very difficult for us to handle, so we decided not to have authorized companies”.

CONCLUSIONS

There is no such thing as an ISO or Class certified company.

Do not take risks: ask your marine elevator company (including OEM agents) how they guarantee top quality and safety.



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An expert's view on the carriage of soya bean cargoes from Brazil to China

By **Dr Stephanie Heard**

Stephanie joined the CWA Food and Agricultural Commodities Department as a consultant scientist in 2013 after completing a PhD in field and molecular plant pathology at Rothamsted Research. She has specific expertise in understanding the deterioration of crops, grains and feed ingredients as well as associated problems regarding mould growth and mycotoxin contamination. She is involved in the forensic investigation of damage causation and mitigation of claims made against agricultural commodities. She regularly attends on-site to undertake such investigation. Dr Heard provides advice for the care of agricultural cargoes during storage and carriage and has acted as an Expert Witness in Chinese courts.

Soya beans

are big business and Brazil has now become the world's leading producer, surpassing the United States. Dr Stephanie Heard worked in association with Gard P&I Club to produce this insight into carriage of soya beans in bulk between Brazil and China and some of the problems that may be encountered due to moisture content at loading.

Gard has seen many claims arising from soya bean cargos transported from Brazil to China for damage and alleged damage at discharge. The claims are made by receivers and/or cargo insurers under bills of lading against the vessel and often involve very large security demands. These claims are often passed to charterers, particularly when the Interclub agreement terms have been incorporated in the charterparty. We would like to understand more about the trade, the cause of the damage and some advice for mitigation of losses where damage is established.

Background to production of soya beans in Brazil?

The soya bean planting season begins as early as September in some of Brazil's central growing regions. Once the soya bean has flowered and set pods, growers will leave the plants to dry in the field. When 90 to 100% of the pods are brown in colour they are ready to be harvested. Most farmers aim to harvest soya beans with a moisture content of 13%; however, monitoring is usually assessed by pod colour which, as a subjective assessment, may not always be as accurate as using moisture meters. More sophisticated harvest operations use combine harvesters equipped with moisture meters which allow constant measuring of pod moisture content during harvest. If drying is required, it may occur either at the farm or at cooperatives where drying machinery is shared.

From the beginning of January, Brazilian growers start to harvest soya beans growing across an estimated 36.9 million hectares of land, a production area larger than Germany. Transporting the harvested beans from field to ports remains a challenge in Brazil where the transport and crop storage infrastructure has failed to keep pace with ever-increasing production. Soya beans are trucked hundreds of kilometres from the Mato Grosso de Sol and Cerrado savanna to major export ports in Santos, Paranaguá and Rio Grande.

These days a larger proportion of soya beans originating from Mato Grosso and expanding growing regions in the North are trucked along the BR 163 highway to Amazon river port cities. There, the beans are loaded onto river barges which travel along the Amazon and Tapajós rivers in convoys to ocean ports in Sanatrem, Bacarena and São Luis.

All routes may take multiple weeks depending on availability of transport and weather conditions which severely affect the condition of the roads. The laden trucks and barges may be regularly exposed to heavy rain showers.

Brazil overtakes the US

Brazil was the world's second largest producer of soya beans for many years, competing only with the US. The rivalry between US and Brazilian soya bean farmers has been driven by China's growing appetite for soya beans which are crushed to produce soya bean oil for cooking and soya bean meal to feed China's swine herd, which was 440 million strong in 2017. China imported just over 95 million tonnes of soya bean in 2017. It is estimated that the US supplied some 32.9 million tonnes of this trade, while Brazil supplied some 50.93 million tonnes.

As a result of the US-China trade war in 2018, when China imposed a retaliatory tariff on US soya beans, shipments from the US halved. During this time, Brazilian soya bean growing regions expanded further and exports increased in order to meet Chinese demand. An outbreak of African swine fever virus in August 2018 wiped out nearly half of the Chinese swine herd and resulted in reduced demand for soya bean meal in China. This was reflected in the Brazilian soya bean export figures. The trade has since started to recover and Chinese crushers are keen to make up the supply issues related to COVID-19 restrictions last year. As of May 2020, Brazil surpassed US soya bean annual production, harvesting an estimated 117 million tonnes. Brazil's soya bean exports this year to China have been described as a bonanza.

It is known and understood that soyabean cargoes can self-heat and in some cases the types of condition of some of these bulk cargos on discharge include mould, caking and discoloration. What is the process?

The cargo temperature and the availability of moisture within a soya bean cargo are the two key factors that determine whether mould growth can be supported in soya beans in bulk storage. Mould spores that are naturally present on the soya bean seed can germinate and grow when the relative humidity at the surface of the soya bean is above 65%. The relative humidity at the surface of the beans is determined by the soya bean moisture content and temperature. Once established, mould growth can cause the degradation of the bean through the breakdown of the soya bean and production of heat. This may further lead to the self-heating pockets of cargo within a bulk stow. Pockets of self-heating cargo tend to become caked and as heat progresses, over time, the soya beans may discolour from yellow to brown to black in the worst-case scenario. High temperatures may compromise the quality of the extracted oil and protein availability within soya bean meal products.

What can be done by producers to prevent deterioration and damage?

To minimise the risk of deterioration during a voyage, the moisture content of a soya bean cargo should be as close as reasonably possible to the safe transportable moisture content at the time of shipment. Nonetheless, a risk of deterioration persists since large consignments typically comprise smaller parcels of different inherent quality, specifically parcels with varying moisture contents and potentially different temperatures.

To evaluate whether soya beans will go mouldy during a long voyage, the moisture content and cargo temperature should be measured and reviewed for each lot prior to loading the trucks/ barges for transport to ports. The data obtained can then be reviewed against the ASAE Standard D245.6 (Oct 2007 Revised 2017) standard. This standard describes the Moisture Relationships of Plant-based Agricultural Products and can assist Shippers determine whether a parcel of cargo may be liable to mould growth and associated self-heating based on the temperature

and moisture content. According to this standard, soya bean temperatures above 25°C combined with moisture contents over 13% may create conditions suitable for mould growth and indicate that the parcel of soya beans should probably be dried further. This is contrary to the moisture content specified on most commercial contracts which specify a moisture content of 14% which is much too high a tolerance for soya beans being shipped over long distances.

Since there is potential for change in temperature and moisture content during the transport and storage chain, the soya bean temperature and moisture data should be monitored throughout the inland transport chain by experienced cargo superintendents. The industry also needs to invest to improve current infrastructure and storage facilities at the export ports. Adequate drying facilities should be available at the export port to allow drying of cargo parcels suspected of having a high moisture content on any barges or truckloads arriving at the port. Suspect cargo should be re-dried prior to storage in the export bulk warehouses/silos before final loading onto vessels. Alternatively, any lots of cargo suspected to be at risk should be redirected for shipping over a shorter distance rather than longer voyages to China.

What precautions pre-loading should be carried out for vessels chartered to carry soya beans from Brazil to China?

From a shipowner's perspective, the vessel should be fully sea-worthy with well-maintained hatch covers. A hose test/ or ultrasound test should be performed prior to loading to ensure the hatch covers are weatherproof and a record of the test must be retained. The holds should be clean and dry prior to loading and the bilges kept empty for the length of the voyage. Photographs of the loading operations and the cargo throughout loading obtained by the surveyor and the crew are an absolute must as these may provide invaluable evidence in the unfortunate event of a cargo claim.

Since P&I clubs insure cargo claims for both owners and charterers, is there anything clubs could do proactively to limit these types of claims?

If claims are high value and common, it might be prudent for the shipowners and their clubs to consider appointing experienced surveyors or cargo superintendent during loading. The superintendent can monitor truckloads/ barge loads of soya beans as they are loaded. This should ensure that obviously caked/ mouldy cargo is refused for loading. The superintendent should also monitor the cargo temperature and moisture content regularly. Temperature probes and moisture meters should be in good working order and regularly calibrated. If samples are to be obtained throughout loading, sampling should be performed in accordance with FOSFA sampling rules. This will ensure any samples collected are representative of the quantity sampled.

When there is a claim, Gard has found that many of the cases revolve around ventilation practices. What effects can ventilation have on the outcome of carriage?

There is the possibility that condensation will form on the underside of the hatch cover and drip onto the cargo surface resulting in mould growth on the surface during a voyage from Brazil to China. This is known as ship's sweat and occurs when the warm air rising from a warm cargo comes into contact with cooled steelwork. As the air is cooled upon contact, moisture condenses onto the steelwork. This typically occurs when vessels sail from warm to cooler climates, for example sailing around the Cape of Good Hope.

Crews are encouraged to practice ventilation in accordance with accepted industry methods. Proper ventilation aims to remove warm air within the head space to reduce the risk of ship's sweat formation.

The two ventilation methods commonly used are the Dew Point Rule and the Three Degree Rule. It is almost impossible to accurately measure the dew point within a hold headspace during a voyage. CWA therefore recommend that ventilation practice is performed in accordance with the Three Degree Rule. This involves ventilating the cargo holds when the ambient temperature is at least three degrees Celsius lower than the cargo temperature at loading when weather conditions permit.

This relies on the cargo temperature in each hold being obtained during or upon completion of loading and compared to the ambient dry temperature at every watch without the need to measure additional temperatures in the holds during the voyage. We recommend that multiple cargo temperatures are obtained during loading, particularly towards completion, in order to calculate the average cargo temperature per hold which can then be compared to the ambient dry temperature each watch.

This ventilation regime is easier and safer to carry out as no crew member is required to enter the hold. There is also less opportunity for error as dew point calculations are not required.

Ventilation may also be required at night when ambient temperatures are at their lowest. The likely changes in the ambient temperature during the voyage should be anticipated. The point when ambient temperatures are at their lowest in the voyage is when ventilation is most likely to be required, although the weather conditions may not be deemed suitable by the Master.

It is important to maintain detailed ventilation records which state when ventilation was undertaken and why. In the event that ventilation cannot be undertaken for any reason, i.e. poor weather conditions, this should be clearly noted in the ventilation records. Ventilation is incapable of preventing self-heating and does not reduce the temperature of the bulk cargo. By reducing the risk of Ship's sweat dripping onto the cargo surface, however, there is a reduced risk that mould will grow at the cargo surface.

What can be done to mitigate losses if some damage is seen when the hatches are opened?

In the event damage is observed on the cargo surface when the holds are initially opened, good quality photographs of the cargo surface for each hold must be obtained. Photographs should be obtained throughout discharge which details the pattern of damage and all photographs should have clear captions and time stamped.

Obvious mould damage at the cargo surface can usually be segregated either by hand or by grab. It is also essential for an experienced cargo superintendent/ surveyor to be appointed to obtain representative samples throughout discharge in accordance with FOSFA sampling rules. This will ensure that representative samples of the cargo can be obtained and analysed according to the appropriate standards in order to confirm whether the cargo quality has been compromised.

Excessive heat damage to the beans can cause a deterioration of the oil and protein content. This is not always the case and the extent of any damage can only be determined through the analysis of representative samples. In our experience, blending of caked/ discoloured cargo with visually sound cargo is usual practice at most Chinese crushing plants. Usually, the refinery will calculate the appropriate blend ratio in order to create a blended crude oil and soya bean meal product of acceptable quality.

This article was first published on the Gard P&I Club's website and is reprinted here with our thanks.

Sound cream coloured Brazilian soya beans

When sound cream coloured soya beans are heated the beans become darker, brown or even black.

Small lumps of heat damaged soya beans dispersed sporadically throughout the cargo is consistent with the soya beans having undergone self-heating prior to loading or 'bin-burn'.

Example of purple beans on plants affected by the Cercospora kikuchii fungus in the field

The Coldcut™ Cobra Cutting Extinguisher

A firefighting tool that combines firefighter safety and efficiency with minimal environmental impact.

By **Martin Orman**

"The Cobra Cold Cutting Extinguisher can assist us substantially in reducing losses due to fire and water damage when fighting fires on ships. Our first real incident showed that it was a very efficient tool in extinguishing fires in containers"

– Marco Mentink, Technical Support Manager for Smit Salvage B.V.

THE ISSUE

The growing hazards of the high concentration of containers containing undeclared or volatile goods is well known. In addition, ferries handling ever increasing numbers of electric vehicles present a new challenge that needs a new approach to find the safest, quickest, most effective, least asset damaging products to fight the fires. Ideally utilising products currently in the field with a proven track record, simplicity of use, low training requirement and reliability.

THE SOLUTION

The Cold Cut Cobra system is a proven tool-in-the-box for firefighting in such applications. Every day firefighters are trained to use Cobra on shipping containers

containing variable fire loads with ventilated and under ventilated scenarios. The possibility to quickly and effectively supress a fire from the outside without exposing the firefight to harmful fire gases, risks of flashover and backdraft is a clear benefit. The low water usage lowers asset damage and makes working conditions much easier. Now with the successful suppression results on large (500kg+) lithium-Ion car batteries it is clear that the investment on such systems is easily justified.

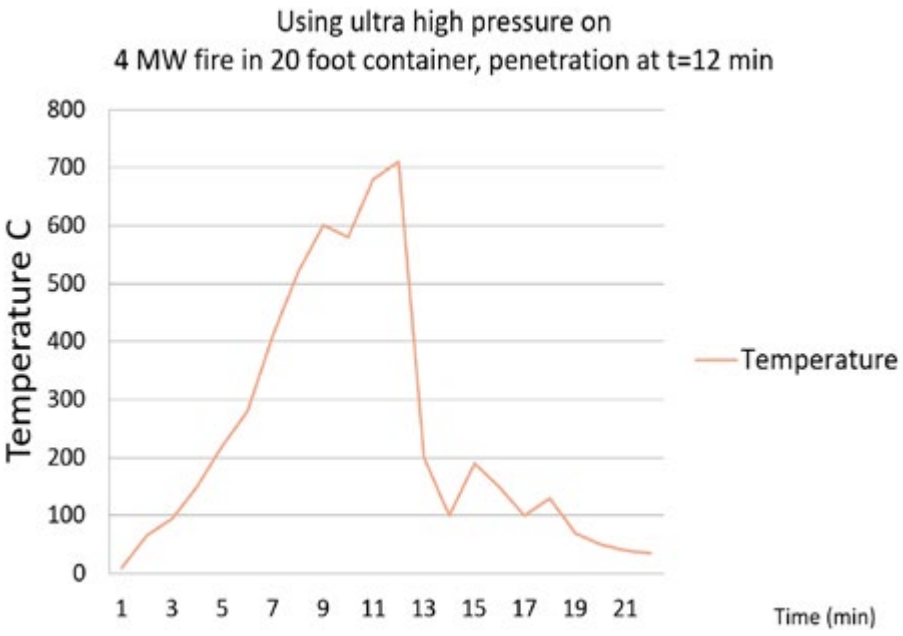


Figure 1 – 20 foot container at approx. 700°C with Cobra started at 12 minutes.

WHO

The cutting extinguisher Coldcut™ Cobra has contributed to safer firefighting for firefighters since 1997. Sea captain Lars G Larsson is the inventor and founder of the world leading cutting extinguisher Coldcut™ Cobra, that has been delivered to Fire and Rescue Services, Maritime, Industry and Airports all over the world.

It all started back in 1987 when Lars G Larsson with his own company MPAB, tried a new method for cutting in explosive environment. The first job assignments were cold cutting of refractors, cisterns and pipelines at refineries on the Swedish west coast. The system was further developed with fire and rescue services and backed up with extensive scientific studies to prove the efficacy of using such equipment.

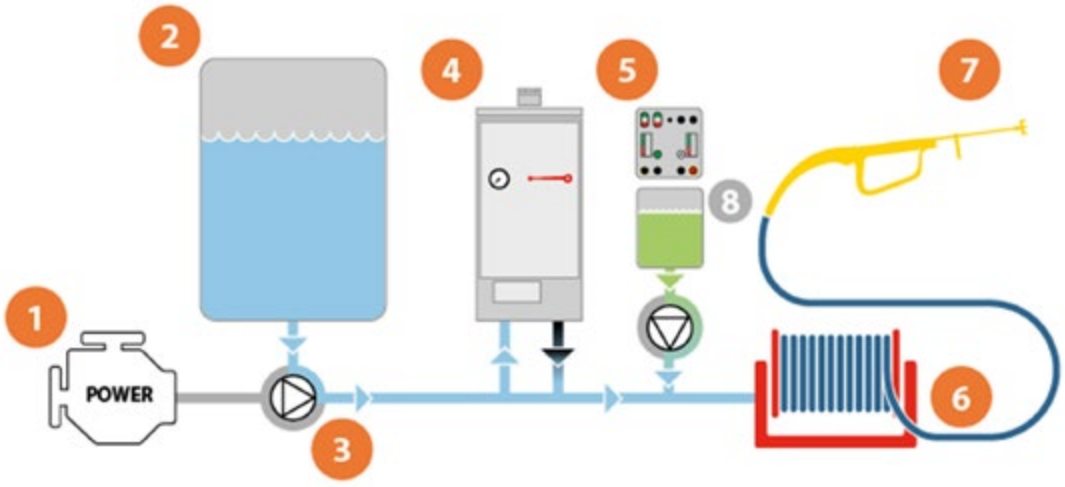
HOW IT WORKS

The management of the fire gases without having to ventilate the container or compartment provide a safe and efficient way of working. Let's take the example of a fire within a shipping container. When a fire is detected, the container is typically scanned with a thermal imaging camera to determine the location of the fire. A Cobra lance is then applied to the container wall and a 30-60 litre per minute / 300Bar water jet containing small abrasive particles is activated. This will pierce a 3mm hole through the steel wall and the water plume sent up to 15m within the container, all done from a safe working position. The jet is kept running, but now without the abrasive to act directly onto the fire gasses and generate a significant amount of steam. Typically, the temperature within the container will drop from 800 degrees C to 100 Degrees C in less than a minute (Fig. 1). It is then possible to safely ventilate the container and expel the steam. Any further firefighting can then be done with an optional Multi-Purpose Nozzle that runs from the same hose at 90Bar and 30 – 60 lpm.

The lance is specifically short in length to enable easy manoeuvrability within confined spaces, stairwells, and corridors.

The configuration of a Cobra unit is the drive to a high-pressure water pump, abrasive vessel to suspend the abrasive, the control system and the hand lance. The hand lance standard hose for the Cobra system is 80m that can be extended with additional hose lengths to >240m. Applications at heights of over 200m elevation have proven successful.

1. Power Source
2. Water Tank
3. Water Pump
4. Abrasive Vessel
5. Control Panel
6. Hose Reel
7. Hand Lance
8. (Optional) Additive Tank



Systems would be fully marinized for suitability at sea and use salt water for pumping. Drive systems can be electric, diesel or petrol depending on location.

Firefighters are protected from thermal heatwave improving firefighter welfare.

THE CAPABILITY

A Cobra system can pierce any shipbuilding material and will cut through 10mm steel in <40 seconds. As the hole is made by the water and abrasive combination no additional equipment is needed to get the water in to the fire area. It is also possible to cut a large hole with the Cobra should you wish to also add a traditional nozzle or monitor should a significant amount of water be needed.

The Royal Swedish Navy (Fig 2) developed a way to identify the optimum location of the Cobra to be applied by adding Cobra Access Points - visual indicators to give the fire fighter a preferred location of deployment. This can be important for server or electrical systems rooms, i.e. compartments where you don't want Cobra to pierce through a wall into important equipment or pipework. Typically, the Cobra will be used through a door. CAPS support faster and safer operations.

Research made by the Royal Swedish Navy and others has found that the cutting extinguisher and its methods

Figure 2 – On board a Visby Corvette and "S" indicating the Cobra Attack Point

provide or contribute extensively with the following:

- Safe and rapid re-entry procedure at shipboard firefighting through mitigation of backdraft and flash overs, as well as rapid cooling of fire gases.
- The method requires much less crew than standard firefighting procedures alone, which leaves more crew available for the mission/supplementary functions.
- Boundary cooling from inside the vessel or from adjacent decks.
- It is a complement to traditional firefighting equipment.
- In comparison with traditional boundary cooling, the cutting extinguisher concept uses a minimal amount of water – which decreases stability issues and collateral damage.
- The concept is easy to understand and is easy to train and practice onboard.
- Excellent system for redundancy on breach of fixed installed fire suppression systems.
- The cutting extinguisher can be used where fixed installed fire suppressive systems and other measures don't reach; void areas, trunking, cavities, ducting and containers for transportation.
- Retrofitting to comply as an equivalent to new classifications/ standards are possible and very cost effective.
- Increasing parallel method development in civil firefighting enhance possibilities to benchmark and cross-train.

LI-ION BATTERIES

Firefighting on car carrier vessels and other RORO vessels containing electric vehicles is still in development. This year Cold Cut Systems undertook a scientific study and trials with a large car manufacturer on their electric vehicle batteries and demonstrated a direct way of supressing fires in the battery modules. Direct impact was seen during thermal runaway and the limiting of propagation. The study also checked the state of the battery modules for a week afterwards to detect any potential for re-ignition and showed the application of Cobra to be effective. Skoda had completed their evaluation last year and determined that Cobra should be the preferred choice of firefighting equipment in the use of suppressing fires in their

Citigo and Superb electric vehicles. In the same principle as above, the firefighter will apply the Cobra system directly to the battery wall and cut through with water and abrasive mix. The Cobra is then kept running to the hot areas and can be safely moved from point to point as needed even if the battery contains a charge.

SHIP BUILDING SECTOR

Ship builders Babcock used two Cobra systems during construction of the Queen Elizabeth and Prince of Wales Aircraft Carriers. Babcock used two sets of Cobra units to de-risk operations whilst their fixed installations were being commissioned. These were also mobile Cobra units utilised.

RESILENCE

Redundancy/ Resilience. When fixed systems are turned off whilst vessels are in dock for service, Cobra can provide fire cover in strategic areas or kept alongside to be deployed wherever needed. For military fleets it offers resilience when fixed systems have failed as it is independent of the vessel's systems. As lean manning becomes more the norm, having reliable, safe and effective firefighting equipment becomes more critical.

BOUNDARY COOLING

Unlike traditional techniques of boundary cooling from the outside, the Cobra effectively cools on the inside of the compartment on fire so will lessen the need for cooling other adjacent boundaries making sure the integrity of the bulkheads and decks is maintained. Cooling bulkheads to enable door entry is also possible in addition to cutting manholes with the cold cutting capability. The use of Cobra reduces the need for Boundary Starvation.

LOW WATER USEAGE

Minimising damage. Cobra systems typically run at 30-6lpm, so water damage in compartments is minimised. This is especially important into areas that need to get back up and running quickly, or for the comfort of the crew. It also means that areas aren't flooded causing potential ballast issues even if multiple Cobra systems are used at the same time.

Figure 4 – Traditional boundary cooling vs. Cobra Method.

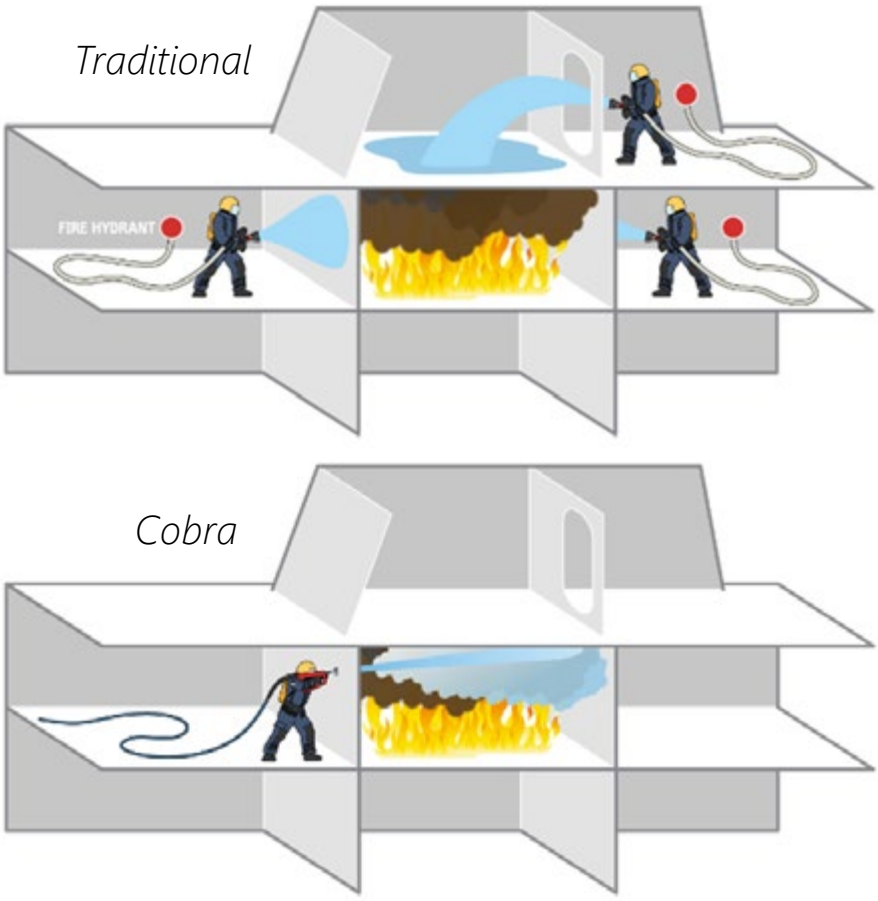
CASE STUDIES

M/V Charlotte Maersk, off Port Klang, Malaysia

In 2010, a fire broke out on the vessel. Some 160 containers on board took 11 days to bring under control and finally extinguish.

Figure 3 – HMS Queen Elizabeth - licensed under the Open Government Licence v1.0.

In the Marine Accident Report, The Danish Maritime Accident Investigation Board came to the conclusion that the fire most probably originated from a container with methyl ethyl ketone peroxide (MEKP) in bay 23. In the proximity were four other IMDG containers, three containers of calcium hypochlorite and one with Trichloroisocyanuric acid.



Firefighting teams from Switzer Salvage arrived and brought additional firefighting equipment, including a Cobra cutting extinguisher. The boundary cooling efforts were kept up for the coming week, while nearby containers were cooled and extinguished by various means.

"With the Cobra we could directly and efficiently cool down a number of containers with good result. Especially containers with goods stowed in a way that sufficient volumes of free space would be effectively cooled with the Cobra. For solidly packed containers with materials like textile, etc., giving no free space for gas cooling, the practice of drowning with vast amounts of water seems to be the most efficient method.", said Willem Nater.

Fishing trawler Johanna Maria, Scheveningen, The Netherlands

In 2014 a fire broke out a 6,500 ton, 120 metre trawler. The fire was caused by hot work onboard, while the vessel was alongside for maintenance and overhaul.

After briefing, the two Amsterdam cobra units were deployed on boat deck and a Rotterdam cobra unit.

Amsterdam crew used one cobra unit from the forward part of the superstructure, moving aft in steps of approximately 2 meters at the time, cooling off/extinguishing each compartment. When reaching the aft part of the superstructure at boat deck level, the Amsterdam team attacked the upper deck above in similar way, moving forward. The fire was extinguished.

Figure 5 – Cobra Cutting Extinguisher applied by Amsterdam Amstelland Brandweer from an aerial ladder

CONCLUSIONS

Following regulatory requirements from SOLAS, i.e. a water mist system is mandatory on container ships after 1st January 2016, implementation of water mist should be seen as a tool-in-the-box that allows joined up techniques when firefighting to use the most optimal approach to combat fires. Understanding the bigger picture as to where water mist can have best effect across a vessel and its cargo is imperative. As more vessels use such systems, case studies should be shared, and techniques and products developed. Also, looking back at historical events will enable systems integrators to second guess where issues may arise and set standard operating procedures to cover those eventualities.

We believe the Cobra method will have a significant impact in this market.

Thank you for taking the time to read this editorial, and please contact us should you wish to find out more.

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Seaman's Manslaughter:
An arcane US statute turned enforcement risk

By **Jeanne Grasso** and **Kierstan Carlson** of Blank Rome

Owners and operators of ships calling on the United States know well that criminal prosecutions are now a regular occurrence in the maritime industry. Most relate to environmental violations and post-incident conduct like false statements and obstruction of justice. Recently, however, prosecutors also have used the Seaman's Manslaughter Statute as an enforcement tool.

The statute allows for federal charges against vessel officers and corporate executives of the vessel owner or charterer if a death results from negligence aboard a vessel. Several high-profile casualties have clearly placed the statute back on the government's radar and it is now an enforcement risk for passenger and cargo vessels alike.

The Statute

The Seaman's Manslaughter Statute criminalizes negligence and inattention to duties by a captain, engineer, pilot, or other person employed on a vessel. Violations can result in up to 10 years' imprisonment, a fine, or both. The statute stems from 19th century laws aimed at preventing deaths from fires on steamboats, which were designed to punish ship's officers for negligent conduct. A similar focus exists today. Under the statute, vessel officers and shoreside employees may be liable for manslaughter if their negligent conduct causes a fatality. This is a "simple negligence" standard, meaning that the government need not prove the conduct was wilful, knowing, or reckless.

However, a heightened, "gross negligence" standard applies for cases against executives of corporate vessel owners or charterers. There, the government must prove that the individual corporate executive: (1) had "control and management of the operation, equipment, or navigation" of the vessel; and (2) "knowingly or wilfully caused or allowed" the negligent conduct that resulted in a death.

Prosecutions through the 2000s

Few Seaman's Manslaughter cases were brought before the 2000s. The most notable was the General Slocum disaster in 1904, where over 1,000 people died in a vessel fire in New York. The captain, corporate executives, and the vessel inspector

About the authors

Jeanne Grasso serves as the co-chair of Blank Rome's Maritime and International Trade Practice Group and a member of the firm's Maritime Emergency Response Team ("MERT"). She focuses her practice on maritime, international, and environmental law for clients worldwide. Jeanne counsels owners and operators of vessels, charterers, cargo owners, and facilities, including manufacturing facilities, both marine-side and inland.

Kierstan Carlson is a partner in Blank Rome's Maritime and International Trade Practice Group and works closely with the firm's White Collar Defense & Investigations practice. Kierstan defends clients in maritime criminal cases, as well as in enforcement actions involving the False Claims Act, the FCPA, customs fraud, and other regulatory violations. She also works closely with shipping clients to implement and audit compliance programs.

were indicted when the investigation revealed serious violations of safety standards and false records covering up the deficiencies. This incident lead to major regulatory change and reform of the predecessor agency to the U.S. Coast Guard.

In the early 2000s, several major casualties revived the statute, including the Staten Island Ferry incident in 2003, where a ferry veered off course and allided with a concrete maintenance pier, killing 11 people and injuring 73 others. The resulting investigation found that: the pilot was taking painkillers; the pilot's doctor knew about his condition and falsified medical records that were a prerequisite to the pilot's license; the director of ferry operations knew the ferry was operating in violation of a rule mandating two pilots in the wheelhouse; and the port captain lied to investigators about compliance with the rule. The pilot and director of ferry operations were convicted of manslaughter and the captain and doctor were convicted of making false statements and obstructing justice.

Recent Prosecutions

Recent Seaman's Manslaughter cases exemplify the statute's breadth and show that a casualty with fatalities will almost certainly result in a criminal investigation, along with a parallel investigation by the National Transportation Safety Board and civil lawsuits.

In the last few years, the government brought charges in two high-profile and tragic passenger vessel casualties: the Stretch Duck 7 duck boat disaster in the Ozarks in 2018, and the P/V Conception dive boat fire in California in 2019.

In the Stretch Duck incident, 17 people died when the vessel sank in a storm on Table Rock Lake in Missouri. The captain was charged with 17 counts of Seaman's Manslaughter and the indictment alleged that he failed to properly assess weather conditions, failed to act when the bilge alarm sounded, failed to instruct passengers to wear life jackets, and failed to prepare to abandon ship. Superseding indictments charged three corporate managers with the same 17 counts and added 13 counts against all defendants for grossly negligent operation of a vessel. The trial court dismissed the case in late 2020, finding that the lake on which the casualty occurred was not within the general admiralty jurisdiction or the "special maritime jurisdiction" of the United States, a jurisdictional prerequisite for a prosecution under the Seaman's Manslaughter Statute. The government appealed this decision to the Eighth Circuit Court of Appeals in December 2020, so the final outcome remains undetermined.

Comparably, in the P/V Conception case, 34 people died when the dive boat caught fire and sank in California. The captain was indicted on 34 counts of Seaman's Manslaughter in December 2020. The indictment alleged that he failed to have a night watch and conduct sufficient fire drills and crew training. The captain was released on $250,000 bail, but his case remains pending. Thus far, the owning company has not been charged, but it sold off the remainder of the fleet amidst multiple wrongful death lawsuits.

Beyond these passenger vessel cases, the government has brought Seaman's Manslaughter charges for casualties on other types of commercial vessels, such as fishing charters, parasailing operations, tugs/barges, and cargo ships. Two cases serve as interesting examples: U.S. v. Kaluza, which relates to the Deepwater Horizon incident involving an explosion, fire, and oil spill in the Gulf of Mexico in 2010, and U.S. v. Egan Marine Corp., which involved a large explosion on a slurry barge in Chicago in 2005. Although the charges in these cases ultimately were dismissed, the dismissals were based on legal technicalities and the threat of prosecution following such incidents remains very real.

In Kaluza, Deepwater Horizon well site leaders were indicted because their failure to conduct proper pressure testing led to the explosion that killed 11 people. The defendants appealed and the 5th Circuit Court of Appeals held that the Seaman's Manslaughter Statute did not apply because they were not involved in the marine operation of the vessel. Yet, similar conduct by a chief engineer or comparable shipboard officer would have resulted in criminal charges.

Egan Marine involved a slurry barge explosion that occurred because the master told a deckhand to warm a cargo pump with a propane torch even though open flames were prohibited. The master and the company were convicted of one count of Seaman's Manslaughter for the deckhand's death. They appealed and in 2016 the 7th Circuit Court of Appeals overturned the convictions because a prior civil suit relating to the same incident had determined that there was not proof that the deckhand was using a propane torch at the time of the explosion.

Conclusion

The government's increasing willingness to invoke the Seaman's Manslaughter Statute following maritime casualties should serve as a wakeup call for companies to avoid becoming a part of this trend. Today, a marine casualty resulting in a fatality will almost certainly prompt an investigation under the Seaman's Manslaughter Statute, in addition to any separate investigation by regulatory authorities and private civil lawsuits. This risk underscores the importance of implementing an effective, practical, and verifiable compliance program focused not only on the minimum regulatory requirements, but also the reduction of unnecessary risk.

Prosecutors brought Seaman's Manslaughter charges against the captain of the tour boat Stretch Duck 7 after its tragic sinking (USCG image)

How well does cathodic protection negate corrosion when used in seawater filtration?

Ballast water filters need to withstand the most challenging circumstances in seawater filtration. Why is cathodic protection considered the industry standard for corrosion prevention, and is it the most effective solution available?

A report made public by the U.S. Maritime Administration recently stipulates that, as of January 1st, 2015, there were 41,674 ocean freight merchant vessels (weighing in at 1,000 gross tons and over) registered with an International Maritime Organization number and sailing through waterways across the globe. Among the ships in this worldwide fleet are vessels ranging from container and general cargo ships to tanker ships.

While these ships run the gamut with respect to size and functionality, the vast majority of vessels must ensure they are compliant with the International Maritime Organization's (IMO) International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004. The regulation, which is commonly known as The Ballast Water Management Convention or BWM Convention, came into force globally on 8th September 2017 and requires ships in international traffic to manage their ballast water and sediments to a certain standard, according to a ship-specific ballast water management plan. There are two ballast water management standards, D-1 and the more stringent D-2. Eventually, most ships will have to conform to the D-2 standard, which specifies the maximum amount of viable organisms allowed to be discharged. For the majority of ships, this means a ballast water treatment system (BWTS) must be installed to neutralise organisms.

The most important foundation for an efficient BWTS is its filter, which must be able to remove large organisms. It is imperative that the filter does not clog, as this would limit or even prohibit water flow through the BTWS, ultimately impacting the overall effectiveness of the entire system and even causing it to fail commissioning testing.

All vessels installing BWTS must select their filter carefully, or they will run the risk of falling prey to corrosion-related degradation of their filters. Corrosion can be caused by various corrosion challenges within BWTS. Taking in seawater for ballast naturally invites a host of microorganisms that ballast water filters need to treat, such as Sulphate-reducing bacteria and phytoplankton, which stimulate microbiologically influenced corrosion (MIC). The filters not only need to protect the ballast water tanks from MIC, but they are also subject to rust themselves and need adequate protection against it.

In an ideal situation, to ensure uninterrupted operation and protect BWTS, the recommended practice of leaving the ballast water filters full at all times or emptying and drying them would help prevent corrosion and its subsequent degradation from taking root. However, the need to take on more ballast water to accommodate the absence of cargo during particular portions of a given voyage and unexpected rough operational conditions during loading and unloading procedures often makes it difficult to successfully and satisfactorily complete the process on a thorough and regular basis. The result: sedimentation accumulates on the ballast water filters, leading to reduced service life, the risk of failures, and high, short- and long-term maintenance costs.

To ensure uninterrupted operation regardless of varying water conditions and other unpredictable factors, ship owners need effective and dependable filtration systems that protect their entire ballast water management systems. The filters remove as much matter from the water as possible before it goes on to secondary treatment, reducing the amount of chemicals needed and time required to neutralize living organisms in the water. If the filters themselves are not adequately protected from corrosion, they might not filter water effectively, incurring frequent maintenance and replacement costs.

CATHODIC PROTECTION FOR BALLAST WATER FILTERS IN SEAWATER APPLICATIONS

Today, most ballast water filter screens in the world are made of 316L stainless steel. Cathodic protection is the most common corrosion protection method for this type of steel, making it widely used in vessels worldwide. Cathodic protection safeguards the metal against corrosion by connecting the at-risk steel to a highly active "sacrificial metal" acting as an anode. The anode introduces free electrons to the space and relinquishes its ions. In doing so, the formerly active 316L steel areas on the screen's metal surface become passive, and the new, more active metal coating ultimately and safely corrodes instead.

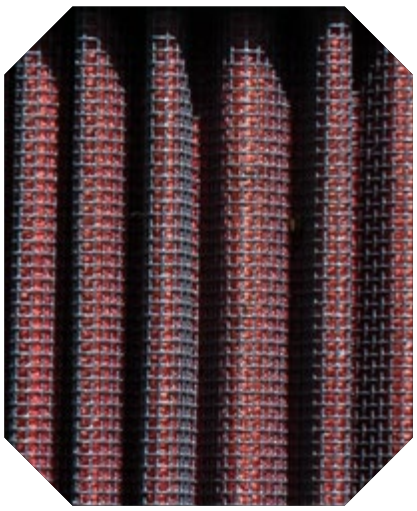
While Cathodic protection has long been recommended by filter and screen manufacturers to provide the necessary protection for ballast water screens made of 316L steel, this corrosion protection approach has some significant drawbacks.

A sacrificial anode can be used for protecting the filter's screen, but the anode is consumable, and its dissolving leads to the formation of a hard scale on the screen surface. This scale is caused by the build-up of calcium carbonate and results in clogging of the screen pores. In high consumption rates of the anode, this becomes a critical risk and requires regular cleaning of the screen. The economy of Cathodic protection is less-than-ideal. Although it is cheaper than other alternatives, installing Cathodic protection is complicated. Once it is up and running, ongoing electricity supply and periodic inspection and maintenance fees add to the cost.

While Cathodic protection is a viable solution, its durability may call its high investment requirements into question. In particular, the sacrificial anodes' limited available current and their vulnerability toward rapid corrosion lead to a shockingly limited lifespan.

Furthermore, sacrificial anodes need to be immersed in an electrolyte for a minimum of 24 hours before Cathodic protection can be applied. If filters are not regularly kept full as recommended by manufacturers, the sacrificial anodes need to be immersed for 25% of the voyage.

With such downsides to Cathodic protection, it would only be natural to ask: Are better options available?



ALTERNATIVES TO CATHODIC PROTECTION

One of the best alternatives to Cathodic protection is using a higher grade stainless steel for ballast water filtration. For example, 904L steel eliminates the need for Cathodic protection altogether. Traditionally used in the high-technology, aerospace, and chemical industries, 904L is also famously utilized in Rolex's luxury watches. It has been chosen by luxury watch manufacturers thanks to its higher polish and water-corrosion resistance, enabling wearers to go about their daily business wearing the high-ticket accessory worry-free.

Austenitic stainless steel 904L has a higher percentage of nickel and chromium than 316L steel, in addition to copper. Its composition provides it with superior corrosion resistance capabilities, rendering Cathodic protection unnecessary.

Indeed, 316L steel is the traditional staple coating historically relied on by the ballast water market, and as such, it is regularly produced and widely available. But while 904L is less common, it is still relatively available, and can be supplied with excellent lead time.

Though the initial cost of 904L steel is higher than that of 316L steel, due diligence processes have found that the benefits of applying 904L steel for ship ballast filters in seawater applications far outweigh the costs.

The higher durability requires less maintenance and extends the lifespan of screens and filters, ultimately saving the industry precious stakeholders' time and money in the long-term.

If better corrosion resistance can be obtained by upgrading the steel, the traditional choice of 316L steel for ballast water screens, which necessitates Cathodic protection, needs to be re-evaluated.

BOTTOM LINE

Using Cathodic protection to prevent corrosion of ballast water filter screens made of 316L steel requires more frequent maintenance and part replacements, leading to increasing costs over time. The sacrificial anodes used in Cathodic protection stimulate the formation of scale, which clogs the screens. Installation of Cathodic protection is complicated, and the anodes need to be immersed in an electrolyte for a significant portion of the voyage. Overall, Cathodic protection is complicated to install and is a less durable corrosion prevention approach than other existing solutions available in the market today, such as using a higher grade stainless steel.

Several parameters have been used to evaluate corrosion prevention approaches for ballast water filtration systems, including Pitting Resistance Equivalent Number (PREN), Pitting Resistance Accelerated Test, corrosion rates in acidic conditions, and natural seawater tests. A new comparative analysis of corrosion resistance approaches is now available for download in a special free white paper.

Filtersafe® products filter 25% of the world's ballast water. It is a world leader in automatic water filtration, specializing in self-cleaning, high-capacity fine-mesh filters. Using patented and leading-edge technologies, Filtersafe's seawater filters for ballast water bring unrivalled value and environmental responsibility to numerous industries. The company's filters' tailored designs and simple modularity enable supplies from 10 microns upwards, with flow rates from 50-6840m^3/hr in a single unit and limitless capacity in a modular configuration. To optimize ballast water filters' protection, Filtersafe has shifted its focus to 904L steel due to its exceptional durability.

Source: Filtersafe

For more information, visit https://filtersafe.net/

THE IMPLICATIONS ON THE LEGAL AND INSURANCE SECTORS AFTER THE EVER GIVEN INCIDENT

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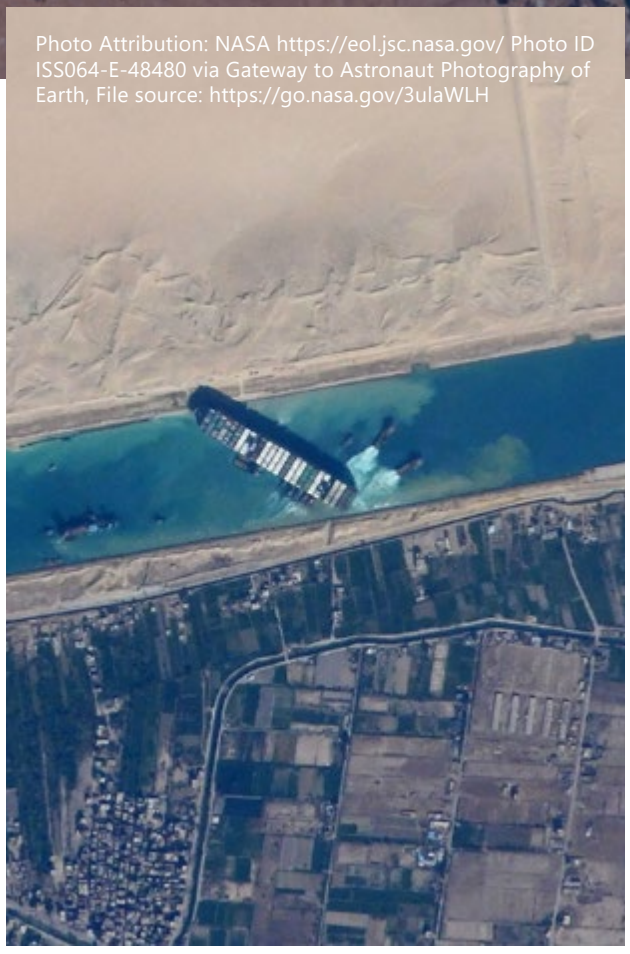

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By **Philip Theo**

The longer term effects following the incident in the Suez Canal when the Ever Given completely blocked the passage through this busy waterway bear examining. The fragility of trade routes - which have been sorely tested by disruptions caused by COVID-19 and a shortage of containers - were once again exposed when the large container ship Ever Given ran aground while transiting the Suez Canal on March 23, lodging herself against both banks...

The ship is about 400 meters in length, roughly equal to the height of the Empire State Building, and she is capable of carrying about 20,000 TEU. Ever Given is owned by Shoei Kisen Kaisha (a subsidiary of Imabari Shipbuilding) and time chartered and operated by Taiwanese container line Evergreen Marine. Ever Given is registered in Panama and technically managed by the German ship management company Bernhard Schulte Shipmanagement.

The ship's large size covered the entire width of the canal, holding up vessel traffic for days. This has caused knock-on effects on the movement of cargoes globally, as 12 percent of global trade is carried on board ships using the canal. The blockage forced vessels to back up in the Mediterranean to the north and the Red Sea to the south. It is estimated that the costs to global trade was about $400 million per hour, based on the approximate value of goods that move through every day, according to Lloyd's List.

The effect on the global supply chain due to the incident will also result in insurance claims. The claims will not come only from cargo on board the Ever Given, but from cargoes on ships delayed due to inability to transit the canal. Many of these ships faced a difficult decision over whether to wait or to divert around the Cape of Good Hope, which is a longer and costlier voyage.

Cargo insurance

The availability of recourse against marine cargo insurance policies is not a given as most marine cargo insurance does not cover losses due to delays. Delay will have arises for vessels already near the entrances to the canal where the ships decided to wait for the blockage to clear. Vessels that decided to divert from their planned voyage to take the longer route through the Cape of Good Hope will have arrived later than their planned schedules.

Most cargo insurance policies adopt the Institute Cargo Clauses issued by the Institute of London Underwriters Wordings. These wordings adopt the choice of English law and practice. This means that the terms of the UK Marine Insurance Act 1906 apply. Most of these policies are of the all risks type, and delay is excluded, per Cls 4.5:

4.5: loss damage or expense caused by delay, even though the delay be caused by a risk insured against

This would apply unless the policy is amended by endorsement to remove this exclusion, which would be the reasonable and prudent action for the assureds to take.

Salvage and General Average

The Ever Given can carry up to 20,000 TEU of cargo on board. At the time of writing it is unclear still if the ship can be freed so that the container cargoes can safely proceed to its final port in Rotterdam. The efforts to refloat the ship and to undertake any repairs form part of general average.

General average is part of the law of the sea founded on equity. It formed part of the Rhodian law, was based in earlier custom and existed many centuries before the existence of marine insurance. Rhodian law provided that, when cargo was thrown overboard to lighten a vessel, that which had been given for all had to be replaced by the contribution of all.

The most often cited legal definition of "general average" is "all loss which arises in consequence of extraordinary sacrifices made or expenses incurred for the preservation of the ship and cargo losses within general average, and must be borne proportionately by all who are interested."

The cargo insurance of these container cargoes on board is covered by the marine insurance cover using the English Forms, as above. See Clause:

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2. This insurance covers general average and salvage charges, adjusted or determined according to the contract of carriage and/or the governing law and practice, incurred to avoid or in connection with the avoidance of loss from any cause except those excluded in Clauses 4, 5, 6 and 7 below.

Lessons can be learned from the Malaysian Federal Court decision of Fordeco Sdn Bhd v PK Fertilizers Sdn Bhd. The Court held that four elements are essential to establish a contract of salvage (as opposed to a contract for the provision of towage, pilotage or the carriage of goods):

(i) there should be a recognised subject matter; (ii) the object of salvage should be in danger at sea; (iii) the salvors must be volunteers; and (iv) there must be success by either preserving or contributing to preserving the property in danger.

In the case, the vessel was on a voyage from Ain Sukhna, Egypt to Lahad Datu, Sabah, carrying a cargo of about 22,000 metric tonnes of rock phosphate in bulk. The vessel grounded on coral rocks, and both the vessel and the cargo were in peril. The cargo was owned by PK Fertilizers Sdn Bhd ('the cargo owner') who was the plaintiff in the High Court and the respondent in the Court of Appeal and before this Court.

The mode of rescuing the stranded vessel was to lighten it, so that it could be refloated and continue on its journey. The lightening of the vessel in turn meant that cargo had to be offloaded. It could not simply be jettisoned because that would give rise to marine pollution. The cargo had to be offloaded onto other vessels in order to lighten the load on the vessel.

The master could not refloat the vessel without assistance. He notified the vessel owners, and the owners declared general average and took steps to refloat the vessel. This was done by discharging a part of the cargo on board the vessel onto two other vessels - one of which belonged to the defendant - until the vessel could be refloated. In order to procure the lightening of the load on board the vessel, the owners' agents sought the assistance of a tug boat operator.

When the cargo was unloaded at a port in Sabah, a portion of the cargo was found to be wet and contaminated with debris. The plaintiff brought a claim in bailment and/or negligence against the defendant. The plaintiff contended that the defendant was a sub-bailee of the cargo and thus the defendant had a duty to deliver the cargo in the same condition as the defendant had received the cargo - rather than wet and contaminated with debris. The defendant, on the other hand, contended that the operation was one of salvage and not a contract of carriage of goods - thus, it was not in breach of any obligation to the plaintiff.

The questions of law which the federal court following the leave to appeal which had been obtained included:

Where a vessel had run aground on the high seas and the owners of the vessel had declared general average in respect of the cargo, whether the rescue operation to save so much of the cargo as possible by other vessels hired for that purpose would in maritime law be classified as a salvage operation?

The court held there was no dispute that general average was declared, accepted and that the cargo owner voluntarily contributed towards general average. It follows therefore that the cargo owners agreed and accepted that there was a common jeopardy or misadventure that affected the common interest of the parties involved, warranting the incurring of expenditure beyond the agreed contractual duties.

The next issue that falls for consideration is whether, general average having been declared, it would follow definitively that the contract for the rescue and refloatation of the vessel through the discharge and transport of the cargo on the vessel carrying the cargo, was one of salvage, rather than towage or carriage of goods

The adjustment of general average will proceed under the procedures set out in the York Antwerp Rules, which will apply through incorporation in the bills of lading of the carrier. As the efforts are still continuing, the legal and claim issues will come to fore later, after the ship is freed. It is clear that the saga of Ever Given will continue long after the canal is cleared.

Philip Teoh has been in legal practice in Singapore and Malaysia for the past 31 years, handling both contentious and non-contentious areas. He is the partner heading the Shipping, International Trade, Insurance Practice in Azmi & Associates Malaysia. He is an arbitrator with the key International Arbitration Centres of LMAA, SCMA, EMAC, ICC, LCIA, AIAC and KCAB, among others.

OPINION ARTICLE

Seafarers "N" EVER GIVEN respect.

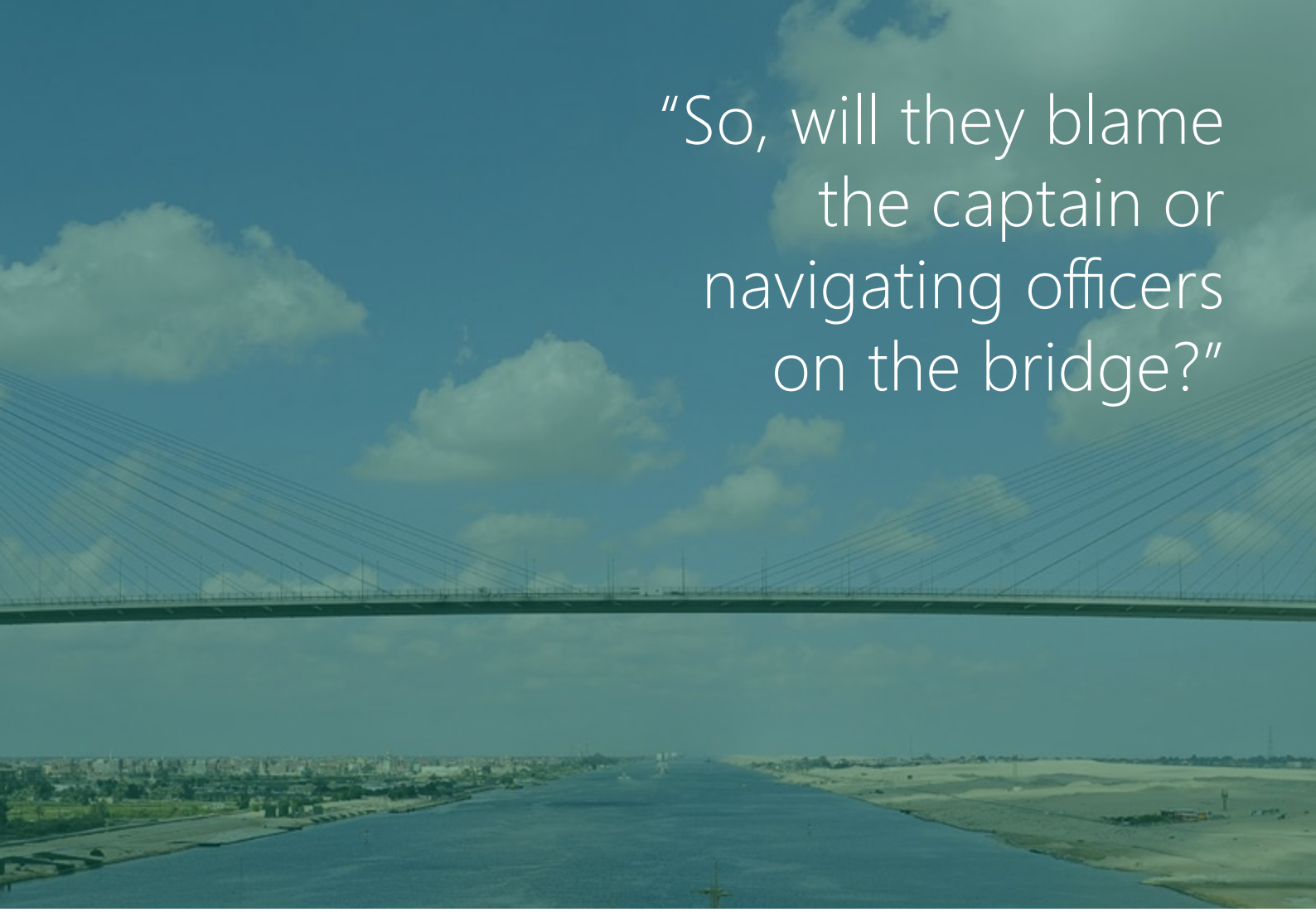
What will we do this time so that history is not repeated?

By **Capt. Zarir S. Irani**, MBA, FICS, HonFIIMS, AFNI, HCMM. AVI, CII

The prime mover of the world trade, shipping and the man on the wheel, the "seafarer", is often seen with sympathy for his helplessness in supporting an unwell parent, sibling, missing family births, funerals, weddings and other important events in life; and the world silently and sheepishly calls it "part of the job". Sailors have learnt to take that on the chin and move on with their trade and silently continue with their dedication without much grumble.

The silent suffering, ignorance and the pain, hurts below the belt when a seafarer, or a Master, or his fellow seafarer is seen in tears, being imprisoned for threat of pollution, or potential of detention and so on due to public pressure, or for quelling hue and cry to save public image. Such events make you wonder. Does he deserve to be treated like this? What was his fault? Does minor negligence or error deserve him to be branded a criminal? Sometimes in a state of depression due to loss of life on board or a serious incident, some would say ''it's a hard life at sea and we have to cope with it all''. It is not the best scenario but on the edge of extreme limits of tolerance, as I have first-hand witnessed and experienced.

However, when you are met with uncertainties, threats of arrest or delayed sign off, hostile environments, detention of your vessel or arrest due to a commercial dispute, it comes down to a relevant question being asked: ''Why do I have to be the Scape Goat and do I deserve this? What kind of justice is this? Where are the "big talking



"So, will they blame the captain or navigating officers on the bridge?"

stalwarts" preaching the Universal Directive of Human Rights when it is happening in their developed state? And at the end of it, despite the BIMCO study on the Shortage of Manpower in shipping, is it worthwhile for new lads to join, or me to continue with this profession?''

Despite the best statistics and safety culture among all transport Industries, based on tons/miles/time or cost effectiveness ratio and minimal loss of life, pollution, no damage to property, the fear psychosis of arrest, criminalisation is hounding sailors. Numerous studies have confirmed this over two decades and the author does not wish to narrate a single particular incident. It is also accepted that there are "black sheep" in the industry, who deserve to be punished; but branding the seafarer for every incident or accident, whether at sea, shore or even in canals, does not give any confidence to the seafarer or shipping business. Let's not forget that had there been no shipping, half the world would have perished of cold and the other half of hunger. The seafarer is also a human being just like people ashore and deserves to be protected in accordance with the basic tenants of the 30 articles as enshrined in the Universal Declaration of Human rights. While the world expects the Seafarer to move the ship North to South or East to West, he has to be given his due and the **"Criminalisation of Seafarers must stop"**.

While the world is still combating the Coronavirus pandemic and the turmoil caused by it, in the maritime sector one of the world's mega container ships remained stranded for 6 days during her routine transit through the Suez Canal on 23rd March 2021. The mega carrier carrying over 20,000 containers and under pilotage grounded and blocked the canal passage. This caused a blockage resulting in delays of unimaginable proportions. Hundreds of ships had their transits blocked on both sides, reported and estimated at this stage to be causing worldwide industry billions of dollars.

Putting some numbers into perspective, the closure of the canal has been estimated to cost 9 billion dollars every day.[1]

The Suez Canal authorities fear 9 billion of dollars in loss of revenue and other considerable indirect expenses to get the canal in an operational state again. ''The amount includes a USD $300 million claim for salvage bonus and a US $ 300 million claim for loss of reputation and so on''.

The incident has brought in many thinkers, including policy makers to think of alternatives in future, such as another canal through Israel, or alternatives Arctic routes by Russia. However, such is the depth of the scope of churning through this issue besides the immediate cause from industry experts with respect to CLAIMS, ERROR OF NAVIGATION, PILOT/MASTER ERROR, ACT OF GOD, WEATHER CONDITION - and

1 | Reported via **https://www.bbc.com/news/business-56533250**

even questioning the prudence of allowing such a size of vessel into the canal in view of restrictive bends. There are several questions raised by industry experts and lessons to be learnt from the six gruelling days 'Ever Given' remained aground. Many rational comments and questions have already been made such as; what exactly caused the ship to become grounded? How was it re-floated? Apportionment of blame for the crisis lies where? What will emerge as the proximate cause for insurance to consider?

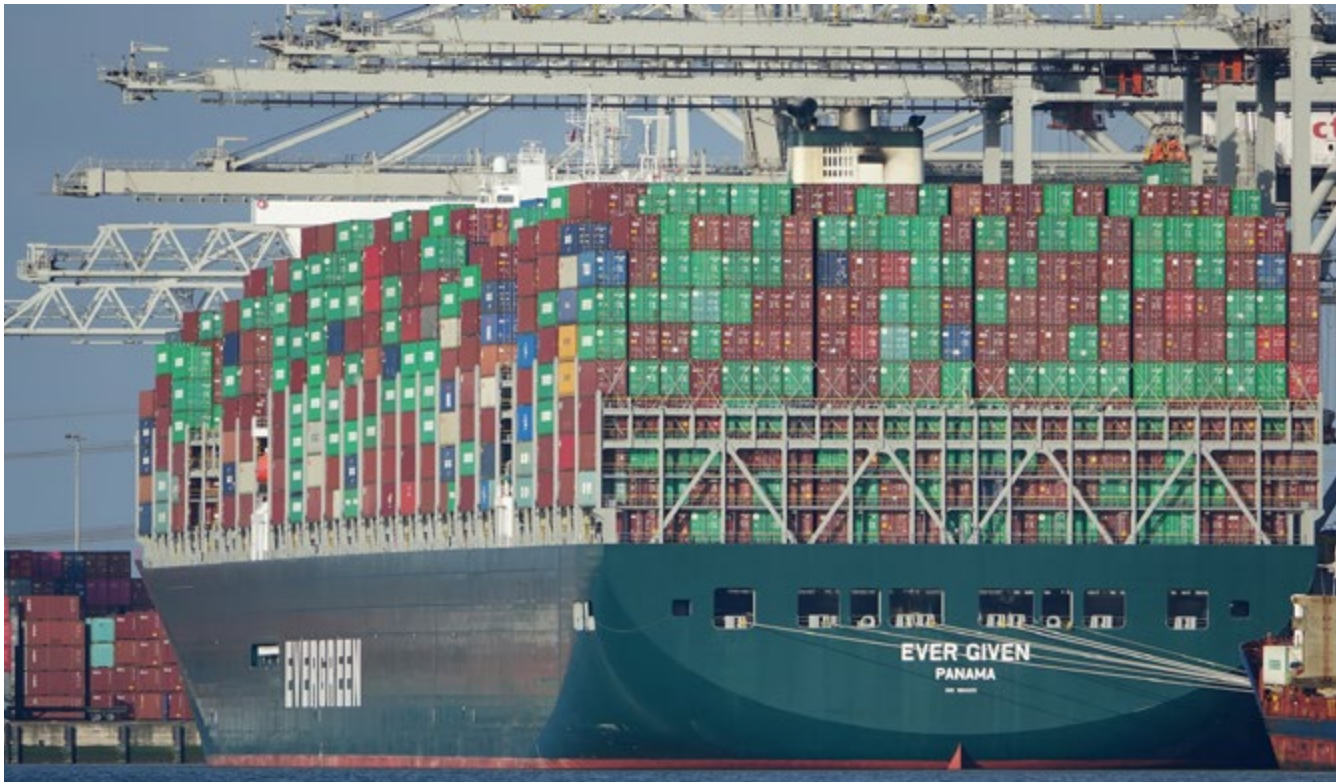
These are some of the questions, which maritime experts representing respective stakeholders are still debating. Some of these will be litigated over to establish apportionment of blame or to agree upon compensation amounts. What steps will the Suez authorities take? What compensation or financial guarantee would they like the owner to provide before releasing the vessel and will the owner agree to such directives? Whatever it may be, the ship owner in particular and the maritime industry as such would like the "business as usual'' attitude to prevail while the insurers, owners and lawyers come to settlement either through arbitration, or prolonged judiciary process.

So, before we react to the incident that may escalate to a point of no return, let's put some thoughts together to understand how and why one should not fall back to causa-proxima attitude and blame the ship on the age-old principle that the ship was "under the Master's order and Pilots' advice"; and it was the wrong handling, manoeuvring by the Master that caused the grounding. A simple judgement based on an age-old trend. Blame the Master, criminalise and crucify him. This is not the first time, and I am sure will not be the last time, when the verdict is out against the ship's staff before any investigation is done, whether by the state, or in accordance with the IMOs Casualty investigation Code to which well over 170 countries (including Egypt) have agreed. It is a different issue to agree and another to apply when it impacts your interests. I do not wish to dwell on the matter since it may go under sub-judice status if it has not already done so.

So, will they blame the captain or navigating officers on the bridge?

Noting the fact that the Master is an Indian citizen, and the trend was meandering towards the Master's ineffective action, wrong ship handling, incompetency and so on, I sought views on the subject immediately from Capt. L.K. Panda, who was the Chief Examiner and Nautical Adviser to the Government of India.

Being an ex-Government servant and very cautious by nature, he gave his generic thoughts and said ***"Every seafarer, including the Master, is trained and certified in accordance with the provisions under the STCW Convention 1978 as amended. The Convention in its preamble states 'The Parties to this Convention, desiring to promote safety of life at sea and the protection of the marine environment by establishing in common agreement international standards of training, certification and watch keeping for seafarers making it amply clear that the standards set in the Convention are primarily related to sea, and the training does not envisage bringing in expertise for transit through canals, nor inland waters, therefore the coastal states, ports, canals have specialists, known to be Pilots and Harbour Masters to ensure safe transit of the vessel. The Pilots undergo special training for the purpose. To expect the seafarer to be trained and certified under the STCW Convention to match the competency of the Pilot is not***



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correct. It is also true that even if the Pilot is on board, as of now, the legal stance is that all actions or commands given by the Pilot are deemed to be advice. Every port and canal or inland authority where there is mandatory pilotage has his or her own set of legislation and the same applies during the time of the vessel's transit.

In the absence of any concrete investigation as per IMOs casualty code, there has been much speculation. Initial inconclusive investigations suggest that the vessel while navigating in the Suez Canal veered off due to a gusty sandstorm, The strong gust caused the bow to veer off and thereafter the excessive speed, windage area coupled with bank cushion effect caused a zig-zag movement for some time prior to running aground hard from the bow and the stern swinging thereafter causing the total blockage of the channel.

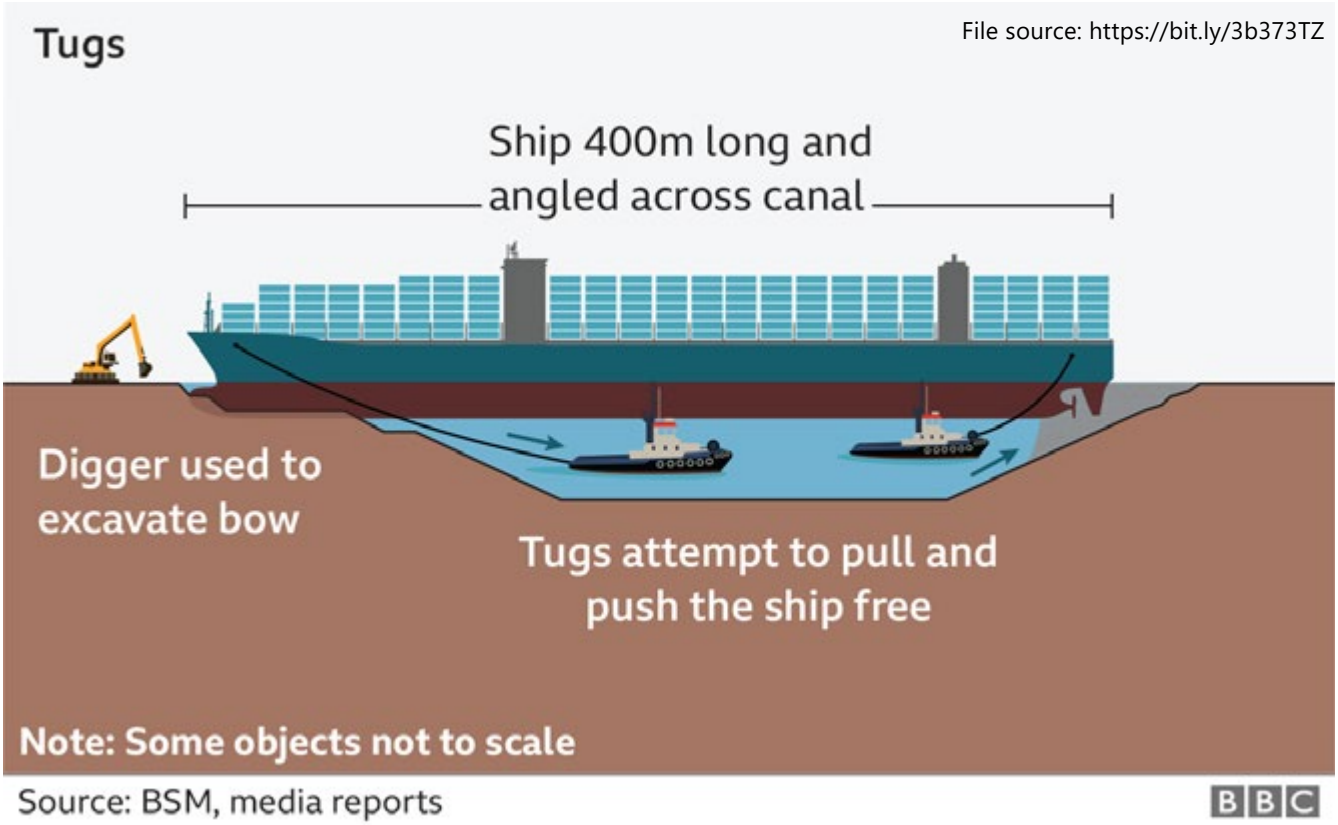
There have been no reports of human injury, pollution nor cargo damage, and initial investigation has ruled out mechanical or engine failure. Hence, the primary cause can be attributed to a manoeuvring error. This leads to the usual question of what were the Master and Pilot doing?

Was there a breakdown of Pilot/ Master interaction? It has come to light that the Master and Pilot were not on the same wavelength and the discussion on the bridge covered various different subjects. The bridge data recorder will reveal any such discussion, which may have been the major, or prime contributing factor leading to grounding of the vessel.

Here Captain L.K. Panda raised a valid question from his decades of experience in analysing findings of similar cases on behalf of the Marine Mercantile Department of India (MMD): ***"How can the Master be blamed for maneuvering errors when he has virtually no control and no dedicated training for such restricted passages" and that the local rules mandate a compulsory Pilot. One needs to ask rationally and not go by the archaic insurance rules or the so-called time-tested procedures where the Master is in total command and is the owner's representative at all times. There has been a paradigm shift in maritime trade, the management process through the ISM principles, and the role of Master. Sadly, the role of the Master, though legally and theoretically remains as in charge of vessel and the owner's representative, but the age-old principle is challenged now as in reality the control has shifted more and more to shore. Within these practical realties, we have observed Masters being penalised for consequences over which they had no control, nor were they trained and made competent to execute such actions. There have numerous instances when the Master or ships staff trained and certified under the STCW Convention have been penalised for actions, which had no linkage to the safety Conventions. The port, costal or the canal authorities, while making pilotage mandatory, cannot absolve themselves from any responsibility and carry out the function with no liability while making mandatory pilotage.***

There has to be a paradigm shift in thinking and the responsibility has to be shared by all who deem to make shipping safer and not leave it to the Master or ship's staff to fend for themselves.

We have many landmark cases around the world where Pilots have had to share responsibility and apportionment of blame, but they have been pronounced after prolonged judiciary process unlike those Masters or ship's staff who have been taken into custody like a criminal or kept on ships under some kind of "house-arrest".



So, what are the contributing causes to this particular incident? The debate among industry experts continues depending on who wants to know the answers; the underwriters, lawyers, health and safety professionals, or those who suffered from commercial and/or reputational loss. The unprecedented slow down and bottlenecking of maritime trade has raised concerns and worry around the world about legitimate and quick recovery of their respective losses. We request professionals involved in this case to spare a thought for the Master and crew of the vessel.

The Indian Seafarer's Association has expressed their concerns and solidarity for the seafarers. They have written to the Director General of Shipping urging him to look into the matter and ensure their safety.[2]

To put forth simply the quantum of responsibility on the Master's shoulders is unimaginable. Try to think of any other professional position where a single act (or lack of) by a single person has the potential to bring the world's supply chain to a grinding halt.

Make no mistake, even prematurely, the entire responsibility of any maritime incident now remains within the Master's domain, irrespective of whether he/she is at fault, or otherwise. This is further compounded by the possibilities of prosecution, persecution and likely arrest, or at the least necessitating the Master to be away from his family and familiar surroundings for extended periods of time in foreign and often alien places, sometimes stretching to years as we have seen in the recent past of similar 'commercial' losses.

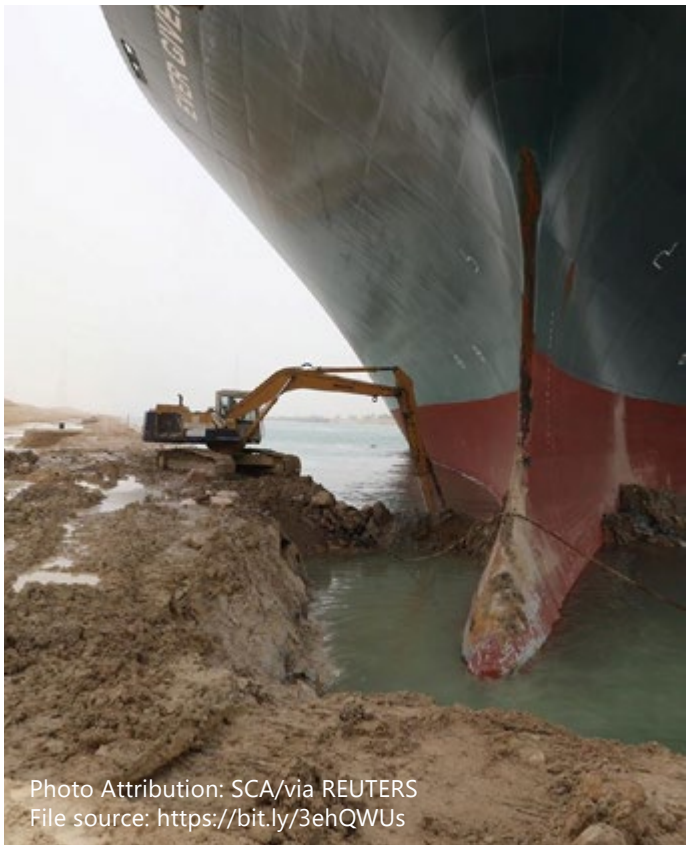
Historically, the international maritime community has approached maritime safety and investigation from a predominantly factual and technical perspective, with conventional wisdom applied to engineering and technological solutions to promote an outcome. However, in recent years maritime casualty investigations have evolved in their approach to recognize and address the role of human factors to a large degree, and to address their contributions to maritime casualties. Some question the fairness of this, as we do. But the legal minds amongst us have their own argument about due diligence and ultimate responsibility.

Most cases are won considering the major factor being "human error" leaving the door wide open for corrective measures. This methodology encompasses aspects of competence, culture, experience, fatigue, health, situation awareness, stress and working conditions being assessed, and often provides objective and productive outcomes from maritime incident investigations. This then ends up in the apportionment of blame.

Having said that, the counterproductive factor in this, broadly speaking, categorizes human factors as acts of omission, intentional malefice or otherwise, negligence and errors in judgements. These categorizations greatly affect the Master's morale and can result in judgements being made and passed on his and the navigating officer's competence and to a large extent, the safety culture.

Captain L.K. Panda, having had the privilege of being the Chief Examiner and Nautical Adviser to the Government of India says as his concluding comments, ***"I am of***

2 | Reported via **www.marineinsight.com**



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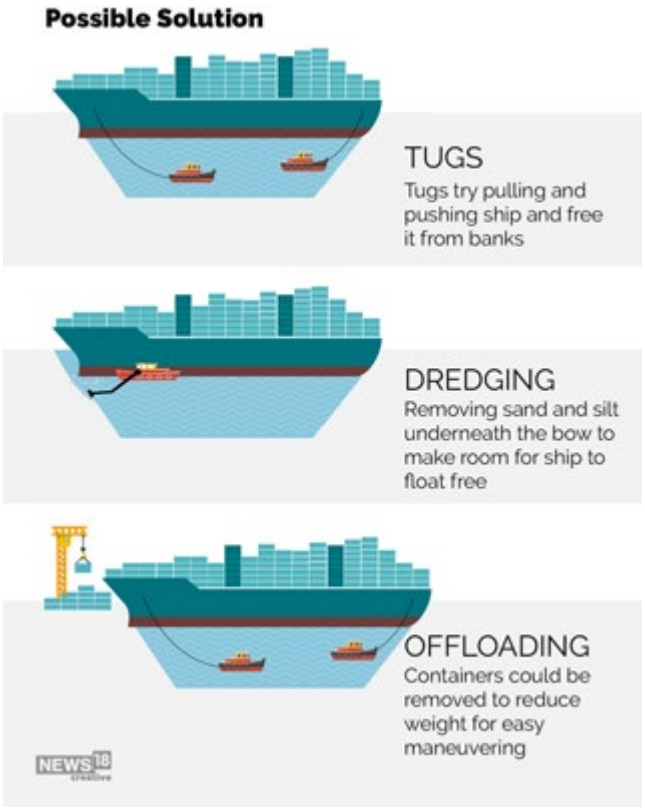

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the opinion, we need to examine the process, share our common responsibility and improve the training process. The archaic commercial laws will have to redefine shore and ship's staff responsibility, especially about the Master and Chief Engineers. The trend to apply the local laws in case of marine incidents and convert the basic common/civil laws to criminal paradigm has to change. Regrettably, the champion states of Human Rights have a history of violating the basic principles of Universal Declaration of Human Rights (UDHR) 30 Article when it comes to seafarers. Several incidences of recent oil pollution have brought out the darker side and the sincerity in application of the UDHRs articles, especially the provisions under article 9.

Most of the marine casualties at sea or in and around the restricted waters have a 'human error' component in it. In the current case, where the vessel was under effective charge of a Pilot under mandatory pilotage, the scope under ''human error" goes far beyond the ship's crew or the Master and has to take into account the services provided by Pilots and even the shore/traffic monitoring stations."

And with his humour Captain Panda asks, "Who will they blame when they have autonomous ships?"

ANALYTICAL THOUGHT:

Let's understand that even if a Master has is assumed to have created an error of judgement and has been the central point of this navigational error coupled with weather elements, are we in any position to point fingers at his incompetence, his professional integrity, or to an extent criminalize him?

Can we expect a Captain to have the courage of his convictions to instantly react to a corrective action of the bow of his vessel being caught in a gust of wind when incremental and immediate reaction is expected to steer her to safety and avoid a disaster of this scale? Why should a fellow mariner be in a compromising position or even having been looked at with raised eyebrows for commercial losses, which are largely insured against? Is it fair?

This is what we want this article to be pondered upon and thought about, in the sense of where we stand in harmony and complete solidarity as merchant marine navigating officers in charge of watch keeping, or the command of vessels.

This article is written with a humble and genuine request towards those who have the capacity and are in a position to protect the Master's personal and professional interest, to be standing by him and to do what it takes to save the matter from being steered into a dangerous blame game. I feel it has the potential of being taken in this direction for no other motive other than finding a "scapegoat" for this unfortunate accident.

In my independent view it is an accident (yes it happens to a big one) of international and multi-dimensional commercial losses only. I would stand in solidarity with the Master and the crew of the 'Ever Given' to let them know that they have done what they could to safely negotiate the narrow passage of the Suez Canal. We have all the respect and the admiration for the courage and their professionalism in the difficult situation they have found themselves in.

So, in conclusion, if you are a fellow Master Mariner or a seafarer, please take a moment to empathise with the Master of the 'Ever Given' and avoid passing unjust and unsubstantiated judgements over self-appointed platforms as normally occurs following incidents of this kind.

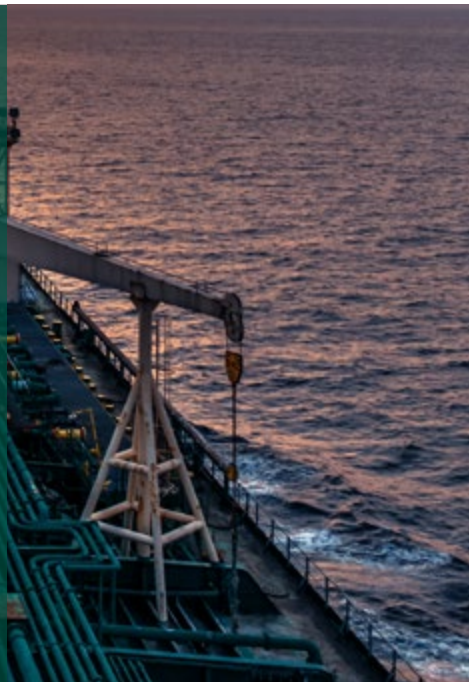
I hope that going forward, the Master and crew are investigated in a manner enabling dignity and basic Human Rights and appropriate legal representation, including mental well-being accorded where necessary.

I conclude with faith in fair assessment and hope the professional pride of seafarers remains upheld.

ABOUT THE AUTHOR

Capt Zarir Irani is an experienced marine surveyor and prominent 'claims and casualty investigator' who has an admiration and respect for the maritime community. He has successfully concluded more than 22,300 nominations, many of them internationally acclaimed in the 30+ years he has been involved in the maritime profession having started as a teenage cadet on global tramping vessels. He is invited by international media to comment independently on the first response of 'global maritime disasters', some of which can be viewed on his YouTube channel at: **https://www.youtube.com/user/izarir/videos**.

Capt Irani is Chairman of the Board of Directors at Constellation Marine Services, London, UAE, Singapore and India. He's also the immediate Past President of the International Institute of Marine Surveying (IIMS) and current member of IIMS Management Board. Email: **capt.irani@constellationms.com**.



The views and opinions expressed in this article are those of the author solely and are not necessarily shared by the International Institute of Marine Surveying.

THE DESIGN OF CATHODIC PROTECTION SCHEMES FOR CANAL CRAFT

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

INTRODUCTION

Retirement from a long period of active marine surveying in the small craft field has left me somewhat astonished at the amount of misinformation, misnaming, lack of knowledge and excess bar room gossip on the allied subjects of corrosion, anodes and their necessity and use. Over the years, I have given these subjects much thought based on that long and very varied experience together with much scientific and mathematical research combined with practical observation. This paper is the result.

First of all, we must be very clear about one point. By a very long chalk, the majority of corrosion found on the outside of the hull is due to the simple process of galvanism NOT the related but different electrolysis, "hot" marinas or being tied up alongside another boat. The second most common source of external shell corrosion was due the actions of the microbes that exist in the water. If you do not believe the last part of that remark, take a look at the photographs of the effect of microbial damage on the wreckage of the *rms TITANIC*. Over the past fifty years or so, I must have surveyed more than seven thousand steel boats, over 80% of which had some form of shell corrosion and of which I can recall only THREE which could be definitely proven to be suffering from shell damage due to the process of electrolysis. Probably some 40% of them had some form of MIC (**M**icrobially **I**nduced **C**orrosion). Yes, there are "hot" marinas or other boats with defective electric equipment, but a boat has to be electrically connected to that defective source in order to suffer any form of electrolysis damage. The electricity does not hang about in the water waiting for a boat to moor up near the defective source any more than lightning hangs around in the sky waiting for someone or something to strike. It is fundamental that, for a current to flow anywhere, the circuit it is using must be complete and, if a boat is not electrically connected to the faulty source, she will not suffer from any electrolytic damage caused by it.

Now, shipbuilding quality mild steel is a type of carbon steel containing a very low amount of carbon and the amount of carbon typically found in such metal is only 0.23% by weight. Steel is not an iron alloy and, further, does not contain large amounts of other elements such as chromium, molybdenum or manganese, although all of those can be found as trace elements together with small amounts of sulphur and phosphorus. Since its carbon and alloying element content are relatively low, there are several properties it has that differentiate it from the higher carbon and alloy steels. Less carbon means that mild steel is typically more ductile, machinable and weldable than high carbon and other steels, but that also means it is nearly impossible to harden and strengthen through heating and quenching. The low carbon content also means that the carbon and other alloying elements do not block dislocations in its crystal structure, generally resulting in a lower tensile strength than the high carbon and alloy steels. Mild steel also has a high amount of iron and ferrite, making it magnetic. The carbon is usually found in carbide crystals of pearlite and cementite. Both those crystals are cathodic to those of the ferrite, so that when unprotected steel is placed in an electrolyte such as canal, river or sea water, a galvanic cell is set up between them causing the ferrite to dissolve forming deep pits over the steel surface. In order to prevent the resulting damage, the steel has to be properly coated with a protective paint and fitted with a suitable type and number of anodes. The strength of that galvanic current is, *inter alia*, a function of the conductivity of the water and that, in turn, is a function of the water's salinity or impurity. The particles that make up that current also possess mass and are, therefore, controlled not only by Ohm's law but also by Newton's laws of motion and a properly designed (not guessed) cathodic protection scheme has to take that fact into account.

Ohm's law is a formula used to calculate the relationship between voltage, current and resistance in an electrical circuit and is named after German physicist Georg Ohm (1789-1854). It addresses the key quantities at work in simple electric circuits.

Symbolically, it states that:

$$V = I \times R \quad (1)$$

where

I	=	The current in the circuit	amps
R	=	The resistance encountered by the current	ohms
V	=	The potential difference in the circuit	volts

The formula is usually demonstrated graphically as a triangle as in Figure 1.

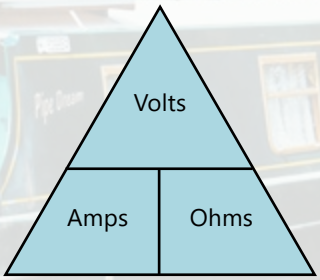


Figure 1 - The Ohm's Law Triangle

If two of those three factors are known, then the third is easily calculated.

The resistance in the circuit is governed by the equation: -

$$R = \rho L/A \quad \text{ohms} \quad (2)$$

where

A	=	the area of the electrical path	mm^2
L	=	The length of that path	m
R	=	the resistance	ohms
ρ	=	the specific resistance	ohms/mm.m

Effectively that means that the area over which the anode provides cover is limited and that fact decides the distance over which an anode will work and, therefore, the distance apart that anodes must be fitted.

Sir Isaac Newton (25th December 1642 – 20th March,1726) who is widely recognised as one of the greatest of mathematicians and most influential of scientists, first published his three laws of motion in his book *Philosophiae Naturalis Principia Mathematica* in 1687. The first of those laws states that if a body is at rest or moving at a constant speed in a straight line, it will remain at rest or keep moving in a straight line at constant speed unless it is acted upon by another force. The postulate is also known as the law of inertia and was first formulated by Galileo for horizontal motion on Earth and later generalized by Descartes. Before Galileo, it had been thought that all horizontal motion required a direct cause, but Galileo deduced from his experiments that a body in motion would remain in motion unless a force (such as friction) caused it to come to rest.

According to that law, an object remains in the same state of motion unless a resultant force acts on it. If the resultant force on an object is zero, then:

- a stationary object remains stationary,
- a moving object continues to move at the same velocity and in the same direction.

Those two laws have a number of clear implications for the effectiveness of an anode.

Ohm's law means that as the only force acting on one of the particles making up the current is the algebraic sum of the potential difference between the anode, the cathode and the resistance offered by the electrolyte (the water in which the vessel floats), there is a definite limit to the area over which the anode can be effective. It must also be clearly understood by the marine surveyor that that effective area over which the anode works, is a function of the wetted surface area of the anode

NOT its mass. The mass or weight of the material affects only the length of time that the anode will last before it requires replacement.

Newton's law, similarly, implies that the path of the particles is a straight line and that such particles will not go round bends in the plating, pass over such items as bilge keels, wearing chines or round corners in the structure etc. Anodes fitted to the swims of a narrowboat, for example, will NOT protect her parallel midbody or the underside of her bottom plate but will protect only the swim areas. (See Figures 3 and 4). The rather expensive practice of letting anode boxes into the side and bottom plating of narrowboats, which is still occasionally seen, was and is pointless as the Newtonian law effectively confines the protective current from the anode to the inside of the box and so provides no protection to the shell plating elsewhere.

Experience will show that the best anode for such a boat is thin, flat and of approximately oblong shape. Such an anode will only protect an area of approximately the same general shape of the anode which has a total principal length of roughly fourteen times the length of the anode and a principal width of about fourteen times its width.

ESTIMATING THE WETTED SURFACE AREA OF A BOAT'S HULL

The first thing for the marine surveyor to do when designing a cathodic protection scheme is to make a reasonably accurate estimate of the subject hull's wetted surface area i.e., the area of her shell in contact with the water in which she floats. That is usually carried out by means of a simple formula using the vessel's principal dimensions i.e., her waterline length, her waterline breadth and her mean draught. Those dimensions should be *measured* when the boat is undergoing an out of the water survey. For good, legal reasons, the marine surveyor should never rely on a broker's or even an owner's dimensions as, far too often, they are incorrect or incorrectly defined. **BEWARE!**

He/she also will often come across a standard formula published by a well-known supplier of anodes which states that:

$$A_{WS} = L_{WL}(B + T_M) \quad m^2 \quad (3)$$

where

A_{WS}	=	area of wetted surface	m^2
B	=	waterline breadth	m
L_{WL}	=	waterline length	m
T_M	=	mean draught	m

That formula, which appears to be based on Kirk's analysis the details of which may be found in any good standard work on naval architecture, is manifestly incorrect, will give wrong answers and should NOT be used.

A correct version of the formula is:

$$A_{WS} = k \times L_{WL} \times (B + 2 \times T_M) \quad m^2 \quad (4)$$

where

B	=	waterline breadth	m
L_{WL}	=	waterline length	m
T_M	=	mean draught	m
k	=	a constant	-

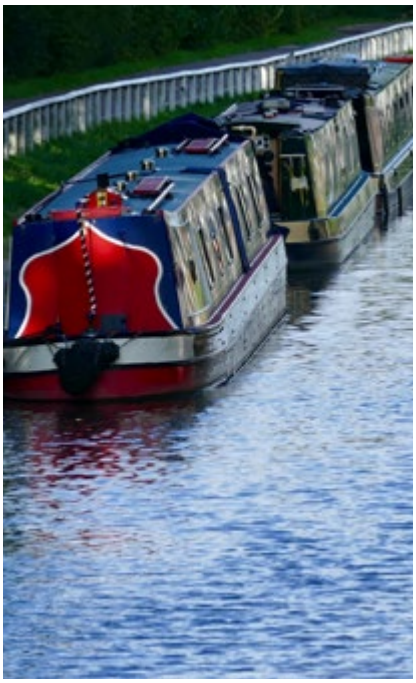
for full displacement motor yachts, narrowboats and long keel sailing yachts	k	=	1.00
for medium displacement vessels	k	=	0.75
for fin keeled sailing yachts	k	=	0.50

Even so, the formula is not strictly accurate, but the answers given lie well within the limits of experimental error.

The reader should note that, in the case of narrowboats, Dutch barges and similar vessels, the formula gives the total wetted surface area of the bottom plating as well as the side shell plating. That fact is important and should be taken into account when calculating the number of anodes to be fitted to a given boat.

THE EFFECTIVE AREA COVERED BY A SINGLE ANODE

The fundamental principle underlying this calculation is that the area actively covered by the anode is a direct function of that anode's wetted surface area and independent of the weight of anodic material. The weight of anodic material controls only the length of time that the anode will be effective. As the electric current involved is in a simple DC circuit, it is governed by Ohm's law and the specific resistance of the electrolyte which facts necessarily limits the range over which the current is effective. The voltage in the circuit is the difference between the static potential of the anode and that of the shell. The resistance will be that obtained in fresh(?) water and increases with distance from the anode. The covered area, from the analysis of survey experience, as stated above, is of the same general shape as the anode with a major axis about fourteen times the length of the anode and a minor axis about fourteen times its breadth.



Assuming that the anode in question is of the thin oblong type with rounded corners, its dimensions are usually of the order of:

Anode Length	L_A	35.6	cm
Anode Breadth	B_A	15.2	cm
Anode Thickness	T_A	3.2	cm

and the anode's effective wetted surface area (AWSA) is length plus twice the thickness times breadth plus twice the thickness minus the corner excess areas, i.e.,

$$A_{WSA} = (L_A + 2T_A)(B_A + 2T_A) - [(2T_A)^2 - \pi T_A^2)] \quad cm^2$$

= wetted surface area of the anode

$$42.0 \times 21.6 - [40.96 - 32.17] = 907.20 - 8.78 = \underline{\mathbf{898.42\,cm^2}}$$

The area on a flat plate (C_{AA}) covered by a single anode is, therefore,

$$C_{AA} = 14(L_A \times B_A) - 4 \times 2/3 \times (14 - 1)(L_A - B_A) \quad cm^2$$

= area of steel covered by the anode

$$= 14^2(35.6 \times 15.2) - 4 \times 2/3 \times 13(35.6 - 15.2)$$

$$= 106059.52 - 707.20 = \underline{\mathbf{105352.32\ cm^2}}$$

and the area ratio per anode is

$$= 105352.32/898.42 = \underline{\mathbf{117.26}}$$

See the Figure 2.

It is good practice for the marine surveyor to measure a number of popular anode types, calculate their wetted surface area and make a note of those figures in his/her private notebook.

As the particles that form the current possess mass, they are also governed by Newton's first law of motion which means that it does not pass obstacles such as chines or bilge keels, nor travel round bends in the plating such as the luff of her bow (her shoulders), the loom of her buttocks or around corners. It also means that anodes fitted to the swims of narrowboats, for example, do not protect the parallel mid body or the boat's bottom plate. Forward, they protect the swim as far aft as the luff of the bow (or her shoulder) and aft, they protect the underside of the uxter plate and the swim as far forward as the loom of the boat's buttocks. The marine surveyor's experience will show that, even when anodes are fitted to the swims, those areas still often show some galvanic pitting. Oxygen is not absolutely necessary for the process of galvanism but may/will act as a catalyst.

The black area in Figure 2 is above the waterline and the uncoloured area below the underside of the keel. Obviously, neither would be covered by the anode. The analysis above assumes that the boat is stationary and, therefore, the covered area would be similar to the shape of the anode. If, however, the boat was in motion, there would be a force from the relative motion of the water past the hull acting on the particles so that the covered area would be moved slightly aft depending upon the boat's speed.

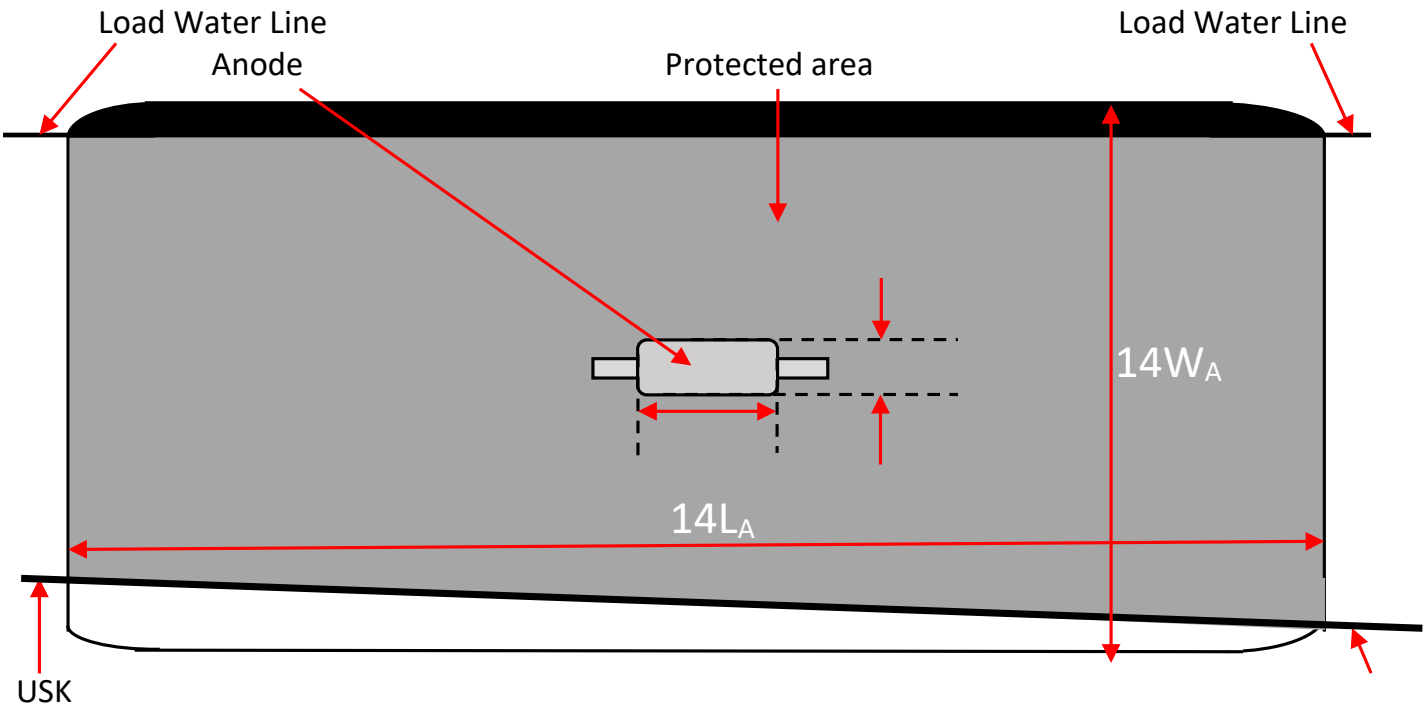


Figure 2 - Sketch of One Anode on a Plain Mild Steel Side Shell Plate

The sketch shows the area ratio calculated above

REQUIRED NUMBER OF ANODES

If, as is usually **recommended**, the flat, oblong type of anode defined above is chosen, it may be assumed that each will protect about 9 to 10 square metres of shell plate wetted surface area. On a boat, say, 15 m x 2 m x 0.7 m mean draught, the wetted hull surface area (AWS) would be about

A_{WS} = 15(2 + 2 x 0.7) = 51 m^2

That, however, does not tell the whole story as that 51 square metres would be divided unequally between the bottom plate and the two sides which have to be dealt with separately. The bottom plate would account for about

A_{BP} = 12 x 2 x 0.8 = 20 m^2

and each side A_{SP} = (51 – 20)/2 = 15.5 m^2

where

A_{BP}	=	area of bottom plate	m^2
A_{SP}		area of side plate	m^2
0.8	=	coefficient of baseplate area	-
12	=	length of bottom plate	m

To allow for some overlap of cover along the sides, each anode should be assumed to cover a length of hull of about 12 times its own length i.e., about 12 x 0.356 = 4.27 metres in length, that would imply, for the example, at least (and not more than) four anodes along each side (i.e., one on each swim and two equally spaced along the parallel mid-body each side) and four along the centreline of the bottom plate. Experience shows that to be both practical and sufficient.

It should also be remembered that, just as it is possible to fit too few anodes, it is also possible to fit too many.

For canal boats, the anodes should be of magnesium or aluminium. In fresh water, zinc gets coated with an impervious layer of zinc oxide and the anode ceases to work.

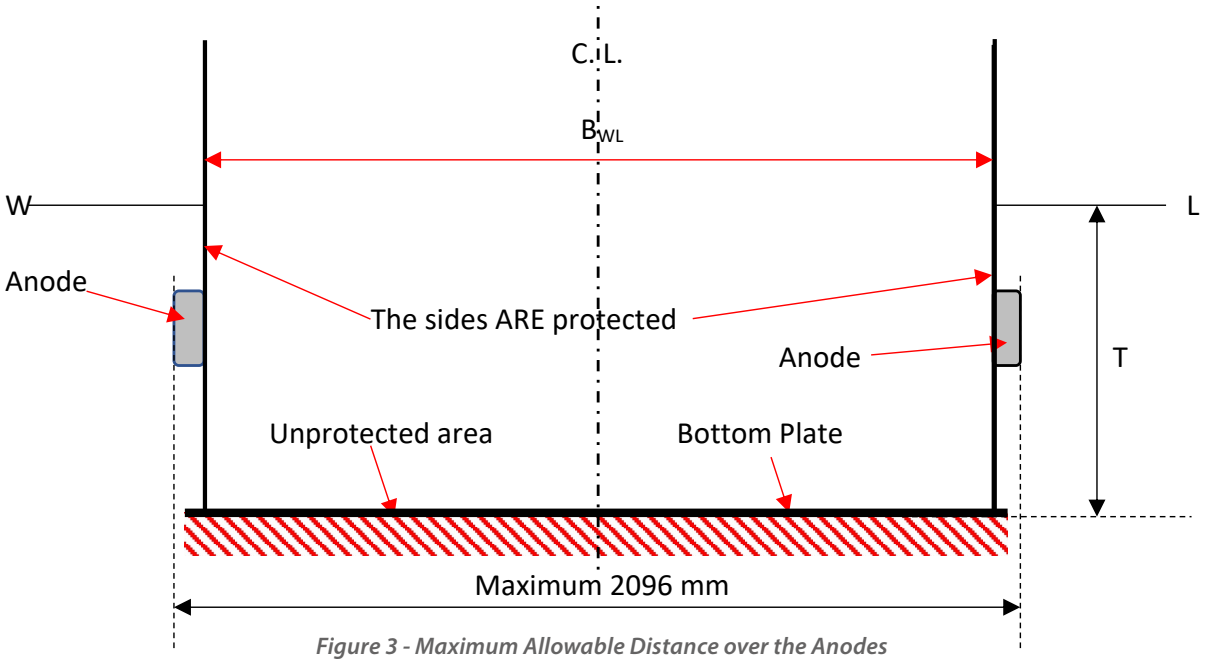


Figure 3 - Maximum Allowable Distance over the Anodes

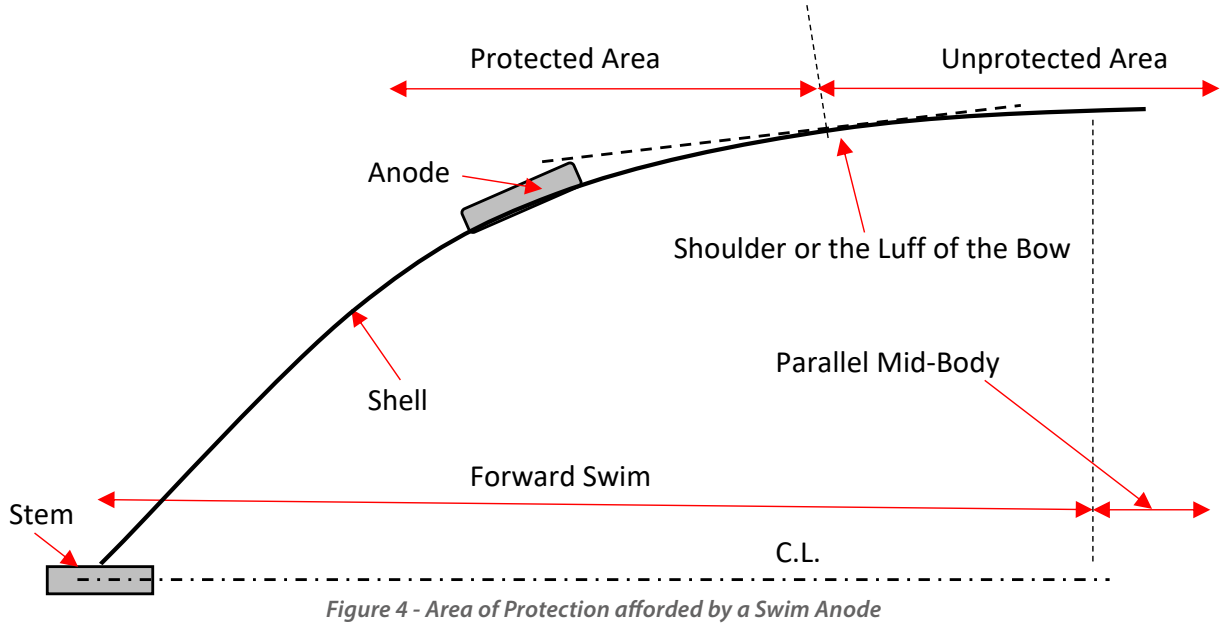


Figure 4 - Area of Protection afforded by a Swim Anode

THE PLACING OF ANODES

Based on the above, on narrowboats, it is **recommended** that the anodes protecting the side shell should be placed in a line at about half the mean draught above the bottom plate with one in the middle of each swim and the others spaced at about $14L_A$ apart centre to centre. The marine surveyor should, after the anodes have been fitted, measure and report the breadth from the outer face of the anode to port to the outer face of the anode to starboard. That distance should not exceed 2096 mm. (See Figure 3). He/she should also bear in mind that the density of the anode's protection falls off with the square of the distance from its centre. The writer further **recommends** that anodes should be fitted at similar distances along the centreline of the bottom plate which should also be blacked.

It is good practice that every vessel should be provided with a docking plan showing, *inter alia*, the position and size of the anodes.

THE TIME AN ANODE WILL LAST

The amount of electric current required per unit of a metal hull's wetted surface area from anodes protecting it is primarily a function of the water's flow rate and the quality of the metal's protective paint coating. It can be estimated for either a mild steel or aluminium alloy hull from the design estimates for fresh water given in Table 1.

For steel and aluminium alloy boat hulls (or underwater structures) the following formula can be used to calculate the time in hours that the total weight of a sacrificial anode will last before renewal becomes a necessity. A two-year renewal period should be considered reasonable.

$$H_I = \frac{E_C \times W_A \times 10^3}{A_{WS} \times I_R} \quad \text{Hours} \quad (5)$$

where

A_{WS}	=	wetted surface area of boat's hull	m^2
E_C	=	energy content of the anode	AH/kg
H_I	-	immersion time	H
I_R	=	required current density	mA/m^2
W_A	=	anode weight	kg

The energy content for zinc anodes is 810 Amp-hours per kilogramme (AH/kg), for aluminium alloy anodes 2438 AH/kg and for magnesium anodes 2196 AH/kg.

N.B. There are 168 hours in a week and 8765 hours in a year.

For example:

How long could the anode shown in Figure 1 above be expected to last. Assume that it is a magnesium anode attached to a mild steel hull and that its weight is 2.50 kg and that the area it covers is 10 square metres. If the vessel is stationary in a marina and has a reasonably well-coated hull which remains so, the current generated would be of the order of 16.1 mA/m^2 from Table 1. Then for a magnesium anode:

$$H_I = \frac{E_C \times W_A \times 10^3}{A_{WS} \times I_R \times 168} \quad \text{weeks}$$

$$= \frac{2196 \times 2.50 \times 10^3}{10 \times 16.1 \times 168} = 203 \text{ weeks}$$

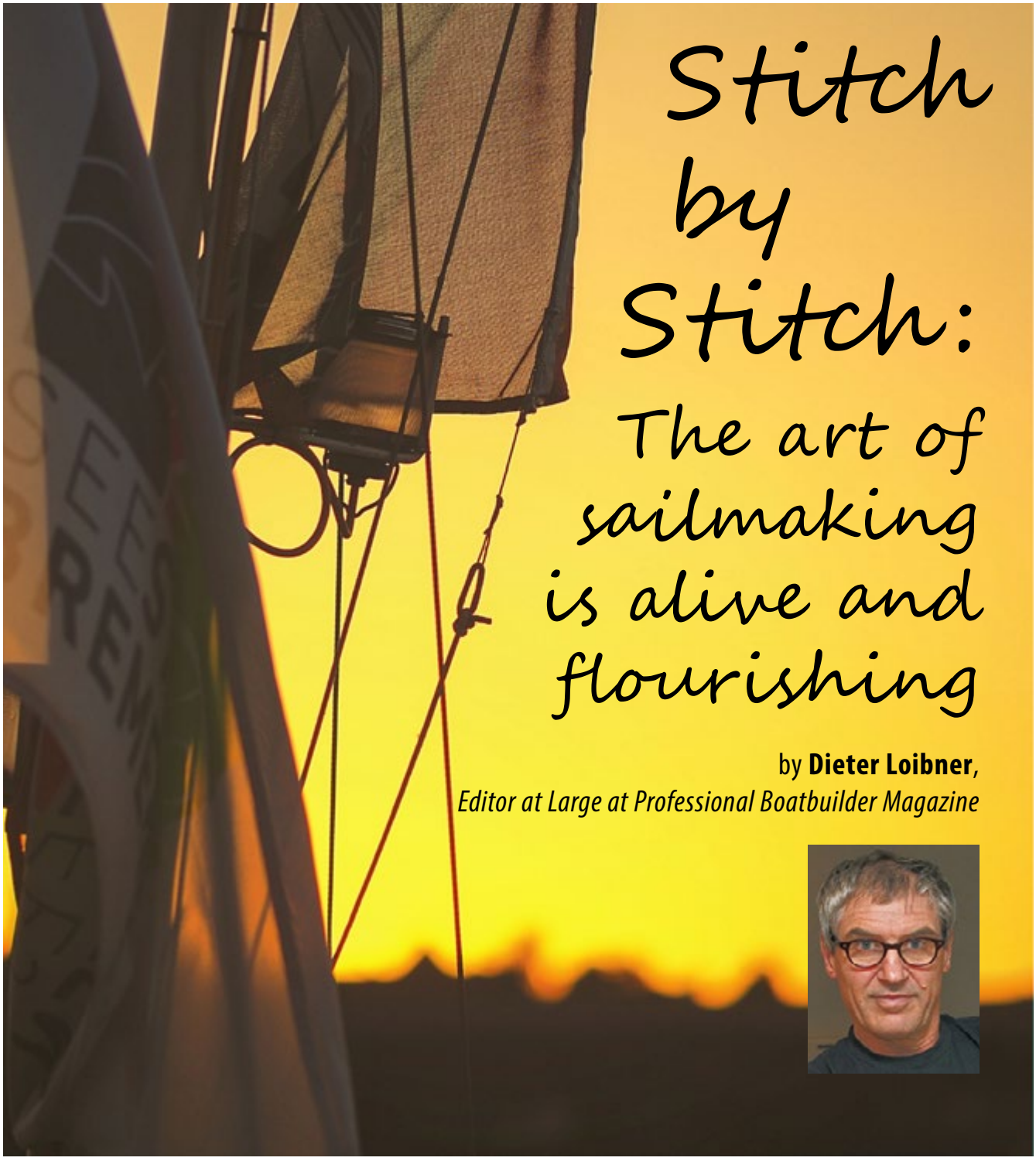
i.e. about 3.9 years

That figure makes a number of assumptions that, most probably, would not be borne out in practice such as the coating remaining in good condition for that period – a most unlikely event. As the coating deteriorates, the current generated increases and the life of the remaining anode reduces. It is also usually **recommended** to renew the anodes when they about 80% dissolved. Allowing for coating deterioration and the 80% figure, experience will show that the anode would probably be satisfactory for a period of about two and a half years at most. It is good practice, therefore, to assume that anodes require renewal every two years.

Table 1
Estimate of the Current Generated by an Anode

Item	Mild Steel Hull mA/m^2				Aluminium Alloy Hull mA/m^2			
Speed knots	Stationary 0-0.45	0.45-1.8	1.8-4.5	≥4.5	Stationary 0-0.45	0.45 -1.8	1.8 -4.5	≥4.5
Well coated	16.1	21.5	32.3	53.8	5.4	10.8	21.5	32.3
Poor or Old Coating	21.5	43.0	53.8	110	10.8	21.5	32.3	53.8
Uncoated	32.8	53-160	160 -320	270 -1080	21.5	44 - 86	54 -130	108 -270

The views and opinions expressed in this article are those of the author solely and are not necessarily shared by the International Institute of Marine Surveying.



Stitch by Stitch: The art of sailmaking is alive and flourishing

by **Dieter Loibner**,
Editor at Large at Professional Boatbuilder Magazine

Enter the bustling Westrem Building of the Northwest School of Wooden Boatbuilding in Port Hadlock, Washington, and you'll find students planing planks, sawing frames, shaping pieces on the router and vacuum-bagging composite parts. Climb the stairs to the second floor in the back and you'll enter a different world. It's no less industrious, but the ambiance is bright, calm and clinically clean. Welcome to the loft of Northwest Sails and Canvas.

There are other small and successful sailmakers in this area, like Port Townsend Sails, which retiring founder Carol Hasse sold to the Port Townsend Shipwright's Co-Op, and Force 10 Sails run by the Chimenti family a couple of miles down the road. Each of them caters to a specific clientele, with NW Sails and Canvas serving perhaps the most diverse set of customers.

"I came from working in very large lofts around the world and that wasn't what I wanted to do," said Sean Rankins, the loft's owner and chief sailmaker. "I like making a broad scope of sails, from very traditional canvas or cotton sails with hand-sewn hemp bolt ropes and grommets, to high-tech modern cloths and everything in between. Not doing a lot of the same work all the time keeps it interesting."

When I visited, I got a firsthand glimpse at the historic side of sail making. The loft was working on the square sails for the brig Lady Washington, which required making soft cringles in the bolt ropes that can be used as reef points. In addition, dozens of grommets from seine twine had to be tightened on a wooden fid before they could be sewn into the fabric at precisely determined locations. In this quiet atmosphere the soundtrack consisted of the rustle of heavy sail cloth and the voices of the sailmakers who strictly used age-old hand tools like needle, palm, serving mallet and the hole punch, which punctuated the silence off and on in startling fashion.

Lady Washington, built and operated by the Grays Harbor Historical Seaport in Aberdeen, Washington, is a 1989 replica of the first American vessel to make landfall on the West Coast in 1788. Later, it became the first American ship to visit Honolulu, Hong Kong and Japan.

"Traditional sail making is labor intensive, and there are only a handful of lofts that still do it," said Jamie Trost, port captain of the Historical Seaport. "There's a lot of skill and knowledge involved, but it is difficult to understand the engineering of synthetic materials that are made to look old. We intentionally chose a heavier cloth that adds three to five years to the sails' life." New sails, according to Trost, should last about 10 years or 70,000 nautical miles.

The material of choice for Lady Washington is Oceanus, a modern warp-oriented polyester fabric with a soft hand that is available in cloth weights between 7 and 16 ounces per square foot. It features the color and texture of traditional cotton cloth, which makes Oceanus especially popular with traditional vessels. It was developed by North Sails with the help of Nat Wilson, a traditional sailmaker from East Boothbay, Maine.

Part of the routine maintenance schedule for those heavily used square-rigger sails is restitching them after a few years, because twine deteriorates faster than cloth. "It's not the sailing that wears them down the most, but sunlight," Trost said.

Emma Gunn sews a twine grommet.
Photo by Dieter Loibner

Stitching a grommet requires a steady hand
Photo by Dieter Loibner.

It is worth noting that every bid Rankins sends out includes an invitation to the client to come and help make the sails, an offer that Trost and several of his crew gladly accepted. Teaching and sharing knowledge is part of the ethos at NW Sails and Canvas, which is why Rankins has held workshops and taught sail making and rigging to students of the boat school, in addition to building sails for his clients. One of his students was Emma Gunn, who did well and showed interest in learning more of the craft, so Rankins offered an apprenticeship, which turned into a part-time job at the loft, an arrangement that works well for both parties.

"I like sailing," Gunn declared with a smile. Growing up in Port Townsend, she was one of the "pollywogs" who took to boats early and stuck with it, first sailing small dinghies, later as a sailing instructor, a deckhand and delivery crew. She's now studying for the USCG 100-ton master's license. Gunn is gone often, but "plugs in" whenever she's around and the loft needs help. Working here, she said, is a continuous learning experience, but with practical value. "There's no AAA to call on the ocean, so I try to fix it myself, not just for thrift, but to keep stuff out of the landfill by extending the useful service life of a sail."

The longest-tenured member of the NW Sails and Canvas crew is Holly Kays, who started working for Rankins in 2003. "Sean wanted the

The Rankins on their 1936 spidsgatter. Photo by Dieter Loibner

loft to stay small and fun and was great about me coming and working when I could," said Kays, who took up sail making because she "loved boats and wanted to do something useful, producing something." When she's not working in the sewing pit or repairing huge workpieces like the heavy Norlam-mainsail of a 96-foot Sparkman & Stephens motorsailer, Kays runs the Schooner Martha Foundation with her husband, shipwright Robert D'Arcy. It's a nonprofit that offers sail training vacations for families and youth aboard the 1907-built, B.B. Crowninshield-designed vessel of the same name. "Teaching and mentoring, which has been part of my work on Martha, still challenges me," Kays noted. "I show apprentices what works for me and let them figure out their own solutions."

Figuring out solutions is also part of the job for Inger Rankins, Sean's Norwegian wife of nearly 30 years, who runs the canvas portion of the business. "I like big boat covers; they are very satisfying for me," she says. Like her husband, she relishes variety. She learned at a canvas shop in town that only dealt with sailboats, but when she went into business for herself, she started to make powerboat covers and interior and exterior cushions. Inger's reasoning? "It's fun to do different things instead of the same stuff over and over again."

She met Sean in Greece on a ferry while crossing the Meltemi-tossed Aegean Sea as most other passengers were feeding the fish courtesy of mal de mer. They lost contact but ran into each other by coincidence years later at the central train station in Munich, Germany, with Sean recognizing Inger's colorful wool pullover that she had been knitting on that ferry trip. Both were globetrotters, Inger often traveling with her sister, while Sean worked as a sailmaker for North at big regattas. Before the Internet and social media, they kept in touch by writing letters, arranging to meet in different places around the world, but serendipitously ended up in Port Townsend in 1989. They have called it home ever since. In their leisure time they sail their 1937 spidsgatter Cito or the iconic little double ender Havhesten (Norwegian for sea horse), which they imported from Norway.

Sean Rankins at work. Photo by Dieter Loibner

As work was winding down for the day and the hand tools went back to the storage and workbench area, I asked Rankins about his company's niche, as it covers a lot of territory, from teaching to serving small-boat artists, cruisers and nonprofits with traditional vessels. "I worked at big sailing events with boats that came with a lot of money and just wanted to win, win, win," Rankins replied. "But I also saw cruisers, young people, couples with kids, singlehanders and competitors that had no backup of any type."

One of these unsupported racers, the late Mike Plant, left a deep impression on Rankins. He met Plant and his self-built Open 50 Airco Distributor during the Sydney stopover of the 1986/87 BOC Challenge. "Everyone had an army of people around and lots of money, but Mike had nobody and was just trying to get on. I always was attracted to those people and wanted to work for them. And that's what happened when I came to Port Townsend. There were people who were getting boats together to go off and realize their dreams."

After 45 years of building sails, Rankins' commitment is still obvious to anyone who makes it past the ground floor of the Westrem Building to climb the steps that lead to the quiet refuge of Northwest Sails and Canvas.

*This article was originally published on the **Soundings** website **https://www.soundingsonline.com** and is republished here with our thanks.*

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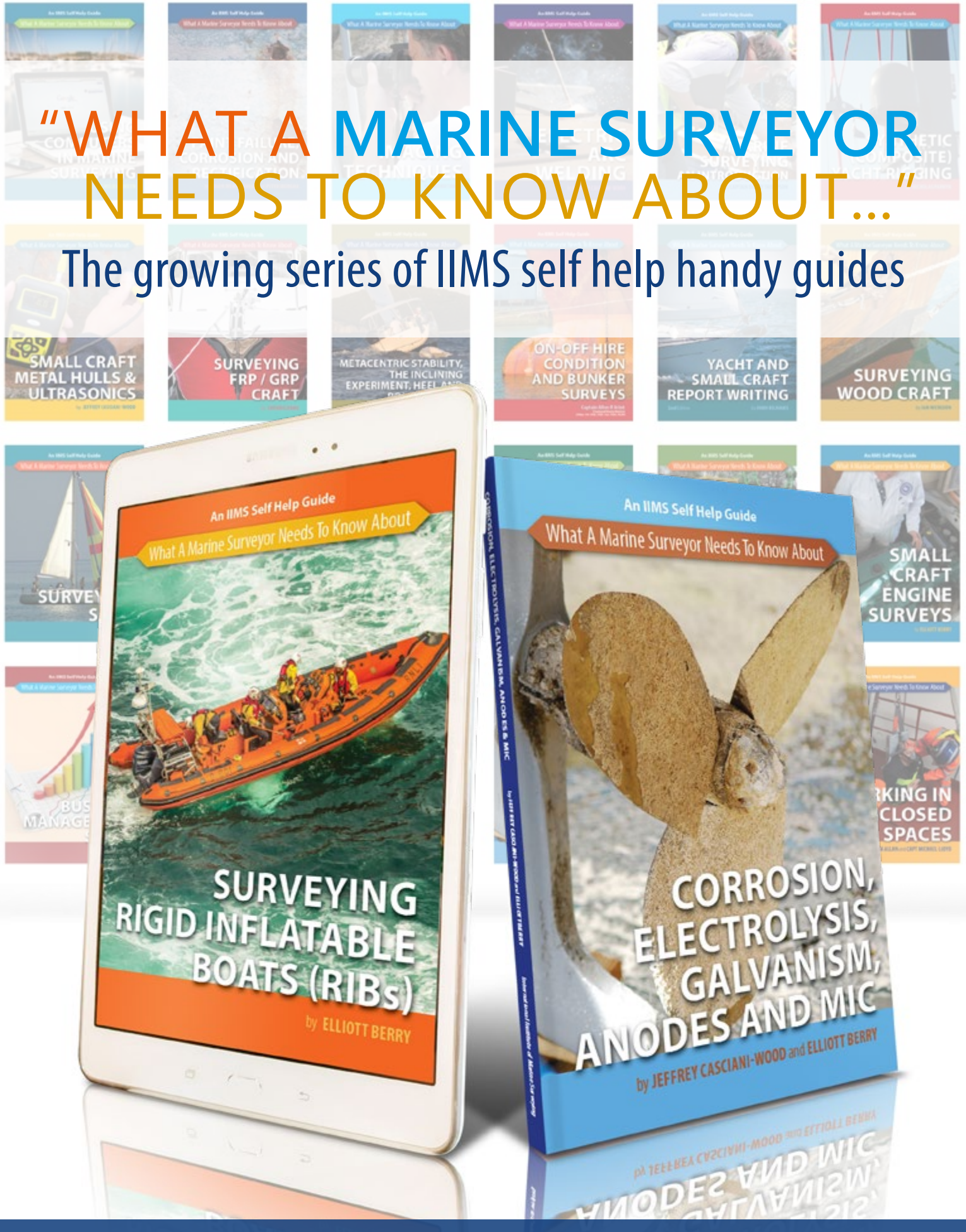

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Closing the safety gap in an era of transformation: DNV white paper

Throughout its existence, the maritime industry has shown that it is capable of continuously transforming itself to improve efficiency and productivity, irrespective of the challenges along the way. The two ongoing transformations related to digitalization and decarbonization are having a major impact on future operations and collaboration in the industry. Digitalization is catalyzing the wider use of data, data-driven models and remote services in shipping. To manage the required transformation in decarbonization, new technologies and fuels are being leveraged. But for the transformation to be successful, there is one key question that needs to be answered: How capable is the industry of recognizing and managing the associated safety risks?

by **Fenna van de Merwe**,
Principal Consultant at DNV and the paper's lead author

About DNV

DNV is the independent expert in assurance and risk management. Driven by their purpose to safeguard life, property and the environment, they empower customers and stake-holders with facts and reliable insights so that critical decisions can be made with confidence. As a trusted voice for many of the world's most successful organizations, DNV uses their knowledge to advance safety and performance, set industry benchmarks, inspire and invent solutions to tackle global transformations.

DNV is the world's leading classification society and a recognized advisor for the maritime industry. They deliver world-renowned testing, certification and technical advisory services to the energy value chain including renewables, oil and gas, and energy management. DNV is one of the world's leading certification bodies, helping businesses assure the performance of their organizations, products, people, facilities and supply chains.

DNV is also a world-leading provider of digital solutions for managing risk and improving safety and asset performance for ships, pipelines, processing plants, offshore structures, electric grids, smart cities and more. DNV's open industry assurance platform Veracity, cyber security and software solutions support business-critical activities across many industries, including maritime, energy and healthcare.

New white paper addresses emerging safety risks

DNV's new white paper, Closing the Safety Gap in an Era of Transformation, warns of a looming safety gap between today's safety risk management approaches and the changing safety risk picture that these transformations will shape within the next five years. In it, DNV explains its current understanding of safety, digital transformation, sustainability and decarbonization.

"The paper is a wake-up call to understand the safety issues that could arise as a result of digitalization and decarbonization to make our industry safer and cleaner," says Fenna van de Merwe, principal consultant at DNV and the paper's lead author. "Shipowners can use our arguments to help create a sound basis for a transparent, reasoned and informed analysis of digitalization and decarbonization methods, but with safe maritime systems uppermost in their minds. The paper applies to operational vessels and newbuilds and is relevant across a vessel's life cycle."

Safety described as an emergent property of the interaction between human, organizational and technical elements that together create robust, resilient systems that are capable of continuous improvement. Image credit: DNV

Safe maritime systems are the foundation

What is a safe maritime system? The paper defines safety as an 'emergent property' of maritime systems that are robust, resilient, and have a process in place for continuous improvement. Safety as an 'emergent property' means it is greater than the sum of its parts. In this view, a system is a set of human, organizational and/or technical elements that can achieve things together that each component part cannot accomplish alone.

The paper argues that holistic risk management, including a systemic perspective on safety, is key to managing 'safety hurdles' (safety risks) on the road to a more digitalized, carbon-neutral industry.

Safety hurdles during digital transformation

Digitalization offers huge potential to enhance efficiency, safety, and cost controls when applying innovative technology and valuable data. But with all these new technical opportunities, increased system complexity needs to be managed. Software, sensors and machines with control systems that depend on algorithms become interconnected and increasingly reliant upon one another, extracting added value when working in a coordinated manner, but undermining performance and interrupting operations when compromised.

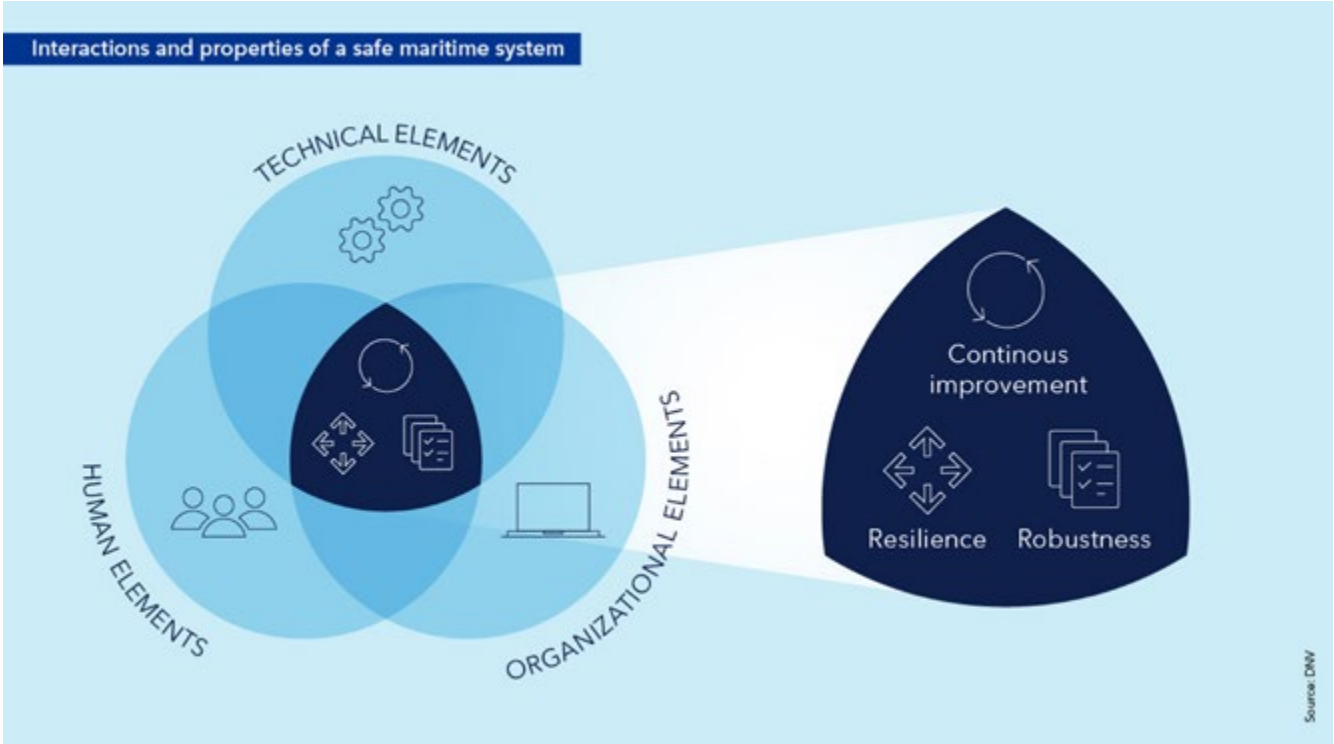
The paper identifies three main safety hurdles associated with this greater system complexity and suggests how to overcome them.

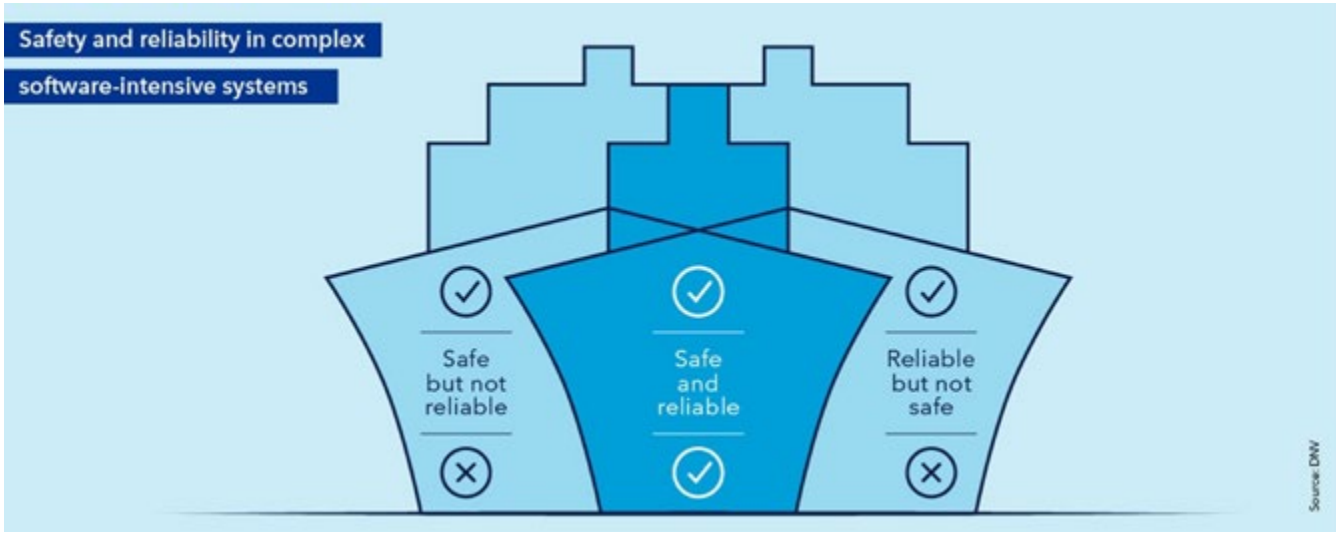
Firstly, as traditional risk management methods become insufficient, there will be a need to focus on system performance in addition to component reliability to manage increasingly complex ship systems. This is because an unreliable system may be safe and a reliable system unsafe. For this reason, it cannot be concluded that a system is safe just because the evidence demonstrates adequate reliability.

Product and process verifications are one means to ensure safe and reliable systems. By using digital twins, all information about the asset is easily available, including dynamic updates on condition and operational parameters. DNV is a partner in the Open Simulation Platform joint industry project where the use of digital twins has been proven as a cost-effective approach to support the design and operations of future maritime systems.

Centralization and dispersed teams will increase

Secondly, digitalization also affects how people will work. On the one hand,





Safety and reliability in complex software-intensive systems, showing that information about reliability alone cannot lead to conclusions about the safety of a system. Image credit: DNV

increasing automation and remote operation come together with growing centralization of operations. On the other hand, complex and integrated systems involve many different stakeholders to contribute to smooth operations, and lead to more dispersed teams that need to work together. Who is accountable for what? What happens if communication is disrupted, or normally 'passive' operators are rapidly called into action?

Companies will therefore need to support people's roles and needs. This, van de Merwe argues, requires two things. One is human-centred design of systems with technologies that support human performance. The other is balanced 'function allocation'.

In one example of raising holistic understanding of risk, a DNV-led joint industry project (JIP) on human-centred design of alert management systems addressed challenges related to alarm flooding on the bridge. The project arose from a general consensus that alarms function less well as a decision support tool than they should do, and at times are least helpful when they are needed most. One key conclusion was the need for system integration and human-centred design to provide the operator with the necessary information that they need to make decisions promptly and act appropriately.

Thirdly, as organizations increasingly become a patchwork of multiple stakeholders and suppliers, they need digital transformation strategies for managing emerging risks across the entire organization.

Allocating tasks between people and technology

The paper sees 'function allocation', the division of functions between technology and people, as particularly important during digital transformation. This, van de Merwe explains, is because there are potentially fewer people available to intervene if the system's design does not meet safety requirements or does not work as intended. People adapt better than technology to unknown challenges and use all means, including technology, to handle situations creatively, the paper observes.

In one practical example, DNV has been working with the European Maritime Safety Agency to identify emerging risks and regulatory gaps related to varying degrees of vessel autonomy. This has involved describing how functions should be allocated between the operator and the technical system, followed by risk analysis to evaluate the solution's safety.

"Clearly, function allocation in digital transformation requires an organization to have or source competence about how digitalization can affect the successful allocation of functions," van de Merwe points out.

Why do I need a digital transformation strategy?

As digitalization enables safety risk management but also creates new risk, organizations need digital strategies with processes to manage changes resulting from the transformation. Company decisions should support its digital ambitions, drive the organization's strategic goals, and, importantly, be understood by and communicated to all relevant stakeholders so that there is a unified understanding of the digital risks. "It is important that the transformation processes include a requirement to revisit the strategy frequently in order to keep pace with technological development," van de Merwe emphasizes. "At DNV we offer a holistic service approach to support our customers on their individual transformation pathways," Øystein Goksøyr, Head of Department Safety Advisory points out. "We have defined four areas ranging from strategy and smart fleet transformation through to management implementation and smarter operations in which we offer services to ensure the identified opportunities are safe and efficient and are implemented effectively."

Alternative fuels have specific safety risks

When it comes to decarbonization, existing and pending targets mean the clock is already ticking, creating pressure to make timely choices about realistic pathways to 2050: new, alternative carbon-neutral fuels and the associated fuel systems and infrastructure. International shipping must halve greenhouse gas (GHG) emissions by 2050 to meet International Maritime Organization (IMO) targets and full decarbonization by 2100.

But these new and alternative fuels possess properties that pose new, specific safety challenges when compared with conventional ones, which means that a new understanding and different safety systems and operations are necessary. Ammonia is an exciting alternative, but it is highly toxic and flammable and requires low temperatures. Hydrogen demands extremely low temperatures (–253°C) if stored as a liquefied gas and high pressure (250–700 bar) if stored as a compressed gas. It also has the smallest of all molecules, making it challenging to contain, as well as a wide flammability range and easy ignition.

Safety hurdles during decarbonization

Closing the Safety Gap in an Era of Transformation identifies three main safety hurdles associated with the development of alternative fuels and modes of operation. Firstly, stakeholders may be working in functional silos focused on subsystems. DNV therefore recommends system integration to enable collaboration and transparency.
"DNV leads industry projects that manage the risks associated with specific fuels," van de Merwe points out. "MarHySafe is one example of where we are working together with industry stakeholders in a joint development project (JDP) to develop a common understanding of hydrogen safety and provide a basis for outlining a road map to hydrogen safety for the maritime industry."

Missing regulations need joint efforts to close knowledge gaps

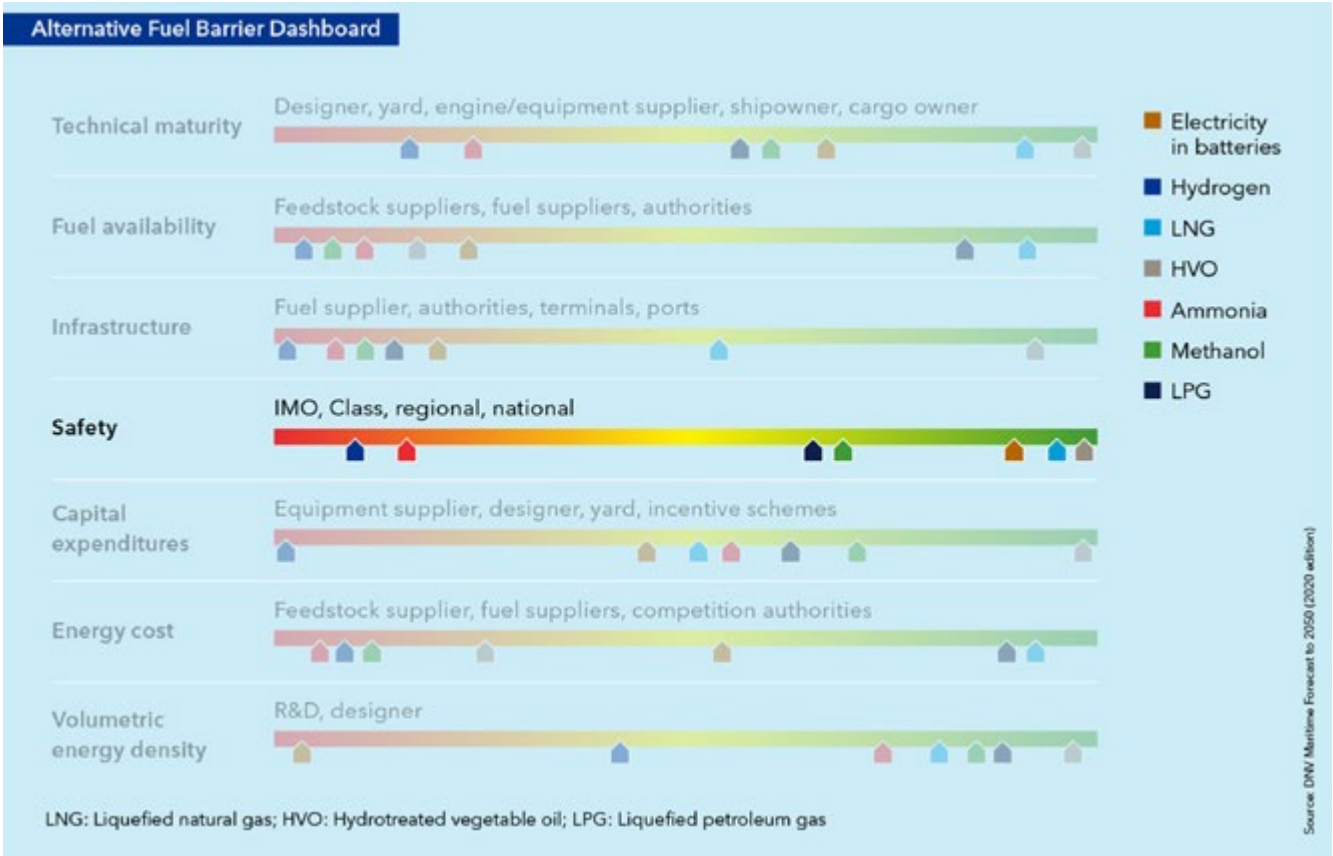
Secondly, regulatory frameworks cannot keep up with technological development. "This is why we recommend collective commitment to contribute with knowledge and experience to supplement missing regulations," van de Merwe explains. "Our classification rules for the use of LNG, fuel cells, methanol, ethanol and LPG are crucial steps towards ensuring safe design to protect vessels against fire and the release of toxic gases through segregation, double barriers, leakage detection and automatic isolation of leakages."

In a Battery Safety JDP, DNV took the lead in generating knowledge about risks related to batteries in vessels. To further foster the safe operation of ships running on ammonia and hydrogen, DNV is currently developing rules for these fuel options, while working with industry partners to remove hurdles against their uptake, as a partner of the Green Shipping Programme for example.

Thirdly, suppliers and end users may lack maritime and fuel-specific competence. DNV believes the answer here is to develop these competences and a culture of continuous improvement.

Road maps for reducing the safety risks on the way to a safer and cleaner future in maritime

"Our research showed that we need to continue to focus on the people on our way to a safer, cleaner future in maritime," van de Merwe concludes: "Through breaking down silos we can generate a holistic picture of safety risk and collaborate towards identifying and implementing mitigating measures." This will help us to be proactive in understanding, defining and meeting the challenges that we need to overcome in order to achieve greater digitalization and decarbonization in shipping.



The Alternative Fuel Barrier Dashboard, reproduced from DNV's Maritime Forecast to 2050 (2020 edition). Safety is one of the key challenges. Image credit: DNV

109 years after the Titanic sinking:

What if she sank today?

At a recent webinar hosted by Navigate Response with speakers including David Jardine-Smith (International Maritime Rescue Federation), Dustin Eno, (Navigate Response), Georgios Hatzimanolis (MarineTraffic), Richard Turner (International Union of Marine Insurance) and Genevieve Holloway (UK P&I Club), discussion focused on what has been changed 109 years on from the Titanic disaster and how the situation would have been handled in the modern world.

The records are unclear on the number of Titanic fatalities, but it is widely thought that more than 1,500 souls were lost from a total crew and passenger tally of 2,224. For a vessel that was declared to be unsinkable it is no surprise that the legacy of Titanic remains with us today.

Modern passenger vessels are significantly larger than Titanic and sadly maritime accidents will continue to happen, but none in recent times have resulted in such a high death toll. Costa Concordia, for example, was carrying twice as many people but only 32 perished. The loss of 32 lives is tragic and the circumstances of Costa Concordia's capsize were very different to Titanic's, but what has changed in the 109 years since the ship was lost?

Significantly, a raft of regulations are now in place to govern the safety of passenger vessels and to ensure crew are adequately trained to respond. SOLAS was born from Titanic's loss and the convention has been strengthened and enhanced periodically since then. Preparedness to carry out a mass rescue at sea has been improved. The aim is to bring together and exercise all relevant responders and ensure that plans, resources, command and control activities, and communications are in place and ready. Although there have been significant steps taken, performing a mass rescue in similar circumstances to Titanic would still be a major challenge, even in today's modern world. Picking up large numbers of people at sea, caring for them while they are taken to a place of safety and making sure that responding agencies are ready to receive them there are still major tasks, requiring careful planning and effective inter-agency communication.

Today, a tragedy of Titanic's proportions would attract sensational media headlines across the world, yet it didn't back in 1912. Early breaking media stories in northern Europe and North America reported the vessel safe and under tow to Halifax, Nova Scotia. It was some 36 hours later that the mood darkened as headlines recorded the vessel as sunk. In newspapers remote from Titanic's starting and end ports, the news wasn't thought important enough to make it onto the front pages. Today, news moves rapidly, and society is more connected. A Titanic story would make global headlines

and probably within minutes of the tragedy unfolding. As in 1912, initial reporting is likely to be inaccurate but as the saying goes – news is "never wrong for long".

In the current context, passengers, crew and rescuers would immediately film, record and share pictures, videos and messages on social platforms. And if close to shore – as with Costa Concordia – bystanders would instantly become 'amateur' journalists. Added to this, the array of online vessel tracking solutions makes a maritime incident transparent and visible, encouraging comment and speculation from all quarters. Consequently, the media would be awash with armchair experts and sleuths, all eager to give their opinions.

Marine underwriters tell us that the chances of a vessel suffering a total loss in the very early 1900s was around 1%. Today that risk has dropped to 0.05%. Titanic was insured for £1 million (£115 million in today's money) and the premium levied was 0.75%. Such was the hype surrounding the vessel's unsinkability that the market felt able to charge a premium that was less than the probability of the vessel being lost. More than 60 London insurers were involved in underwriting the risk and many of those are still in business to this day.

Interestingly, vessels today are insured in roughly the same way as they were in Titanic's day – through co-insurance and with much of the physical risk being covered by H&M underwriters and the liabilities being taken by the P&I Clubs. The difference, however, is that underwriters have developed expertise and have many more tools at their disposal to more accurately assess and price risk. Safety has unquestionably improved, and lessons are learnt each time a major incident occurs, but human error is still considered to be the primary cause of many marine casualties.

H&M insurance paid out the full £1 million on the Titanic claim and P&I paid a further US$665,000 to families who had lost loved ones. Today, improvements to insurance cover make it easier for individuals to claim for losses and damages although in some jurisdictions passenger vessel operators have the ability to impose limits. This gives operators more certainty as claims can be both limited and time-barred. But in some regions, such as the US, no limits of liability are set and punitive damages may also be awarded.

And so, 109 years on from the loss of what is probably the world's best-known ship, a lot has changed, but much has also stayed constant. The way we insure maritime risk and protect passengers' interests has significantly improved, but is largely unchanged at its core. Undoubtedly ships are safer and that is a result of better design, regulation, and enhanced training. And we are much better prepared to respond to a major incident at sea. But should the worst happen today, the world will be watching, reporting and commentating on every decision taken and every action undertaken.

NEW PRODUCTS

Each quarter The Report brings you an update on some of the new products and innovations to hit the boating, shipping and maritime industry.

New low turbidity head set to make port and harbour dredging more eco friendly

A new low turbidity dredging head that promises to make ports and harbours' dredging activities significantly less damaging to the environment has received seed funding in the UK. Cornish specialist company Lutra Marine has received investment from the British Design Fund to bring its patented environmentally friendly dredging technology to market. Lutra's technology solves a huge problem within the dredging sector around how to maintain harbours and ports without causing damage to the local habitats, something which often results in dredging licenses being withheld or withdrawn.

The team at Lutra Marine, led by Daniel Wormald, have developed a unique approach to dredging silt, sediment and rock from harbours and other marine environments. By using high-precision cutter heads the team claims it can vastly reduce turbidity and sediment being stirred up. All the dredged material is captured within the cutter head unit and is pumped safely to the chosen disposal location.

Lutra's technology is incredibly important for sites of special scientific interest or where dredging poses a risk to local natural habitats. But further, the cutter heads that the team have developed also allow for extremely high precision and can dredge to within 10cm of underwater obstacles and harbour perimeters. This is possible due to the 90-degree angled sides which allow for cutting all the way to the edge of the unit. This also allows the team to cut straight, deep edges right to the bottom of harbour walls.

Damon Bonser, CEO of the British Design Fund said, "We are delighted to be supporting Lutra Marine, they bring a huge amount of technical expertise to the table and their product has been borne of frustration that all the alternative dredging solutions were so damaging to their local environment."

SX7 Vertical Windlass launched by Lofrans'

Lofrans' has introduced an anchoring solution for megayachts from 80ft-120ft called the SX7 Vertical Windlass. Suitable for chains of 12mm-14mm, the SX7 offers top performance, safety and style. Lofrans' has also been made Ferretti's windlass solution partner for its new flagship and largest yacht to date, the Ferretti 1000. Like all Lofrans' windlasses, the SX7 is made of marine grade materials for extra mechanical strength and in order to withstand marine corrosion. It boasts a stainless steel base and drum, with anodised marine aluminium gearbox.

New boaters' information sharing app by Dockwa

Dockwa is a free boater app that makes it easy to find marinas, book reservations, pay for supplies and plan trips in one digital place.
For marinas, Dockwa also offers a platform to take inquiries, assign slips, process payments and communicate with guests through direct messaging and automated emails.

Jeremy Crane, vice president of product for Dockwa said it was a pleasure to collaborate with savvy navvy. "Their unique algorithm and on-tap marine information is a real asset to anyone who loves spending time on the water," he said.

"By integrating their routing into our booking process we'll be helping our users get from one marina to another easier than ever before. Hopefully this integration will remove barriers for boaters and get even more people out on the water," he added.

The savvy navvy app was developed by ex-Google software engineer, Jelte Liebrand, who became frustrated with cumbersome and outdated navigation technology. Thanks to this new partnership, savvy navvy has now integrated details for thousands of marinas into its boating app, greatly extending its reach across the US.

Crewsaver launches cylinder locking system

Crewsaver has launched Exolok, a cylinder locking system that is said to provide increased security for gas cylinders attached to lifejackets. It allows a visual check to see that a gas cylinder is correctly threaded by glancing at two arrows.

Exolok will be fitted to all Crewsaver lifejackets going forwards. Owners can retrofit the system to all existing Crewsaver lifejackets with UML or Halkey Roberts firing heads.

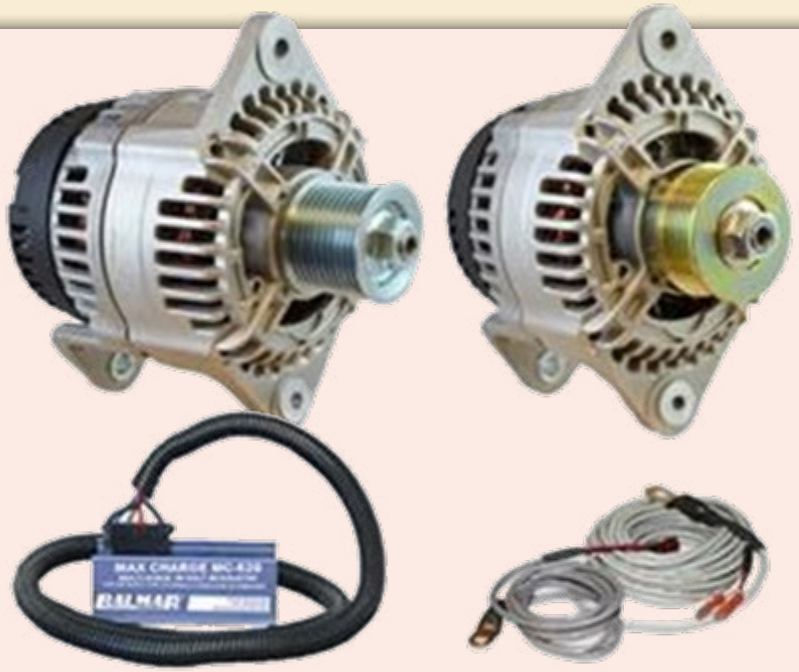
"At Crewsaver, we see it as our role to not only build the safest lifejackets available but also to ensure they are worn correctly and are always ready for action," says Matthew Bridge, Crewsaver's commercial director.
"People can be confident on the water when they know their kit will work."

Besenzoni launches an electronic gangway

Besenzoni's latest gangway uses the latest electronic technology to make it lighter, more efficient, quieter and more environmentally-friendly. The LaPasserella range can be operated with either a 12V or a 24V power supply and with it being electronic, there is no need for oil or a hydraulic control panel.

"LaPasserella has achieved the ambitious objective of making the gangway easier to use and more environmentally-friendly while maintaining the operating standards required in a marine environment, and at the same time simplifying the production process and making it easier to install on the yacht," says Giorgio Besenzoni, Besenzoni MD.

The platform is available with either a synthetic teak or a woven rope surface, has LED lighting and can be operated from a smartphone using the Besenzoni Control Device App or via the standard remote control provided. It is available in three versions of different lengths ranging from 2m to 4.5m.



Introducing 48V alternators for marine applications from Balmar

US-based DC charging solutions specialist Balmar has introduced two new 48V alternators (60amp and 100amp) that are specifically aimed at the charging of high-performance AGM or Lithium batteries. With more and more home-style appliances being installed onboard such as air conditioning, microwaves, and induction hobs, Bamar says there is a growing trend to provide power via a 48V battery system.

"Silent running is a key factor to a comfortable life on board, which is why we are seeing many boatbuilders and RV manufacturers moving away from installing noisy, fuel-guzzling generator sets which require a lot of space and extensive sound and exhaust insulation," says Balmar CEO Tim Bock.

Italian start-up unveils new yacht components range

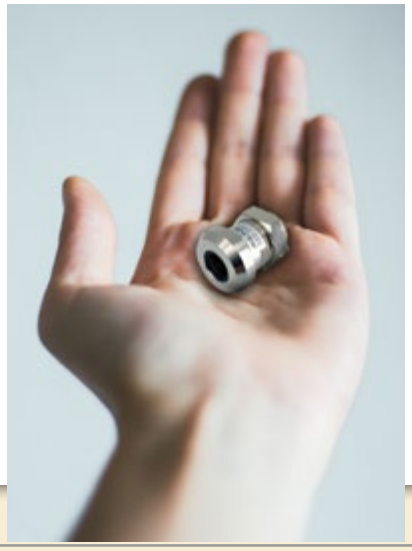
Four friends who enjoy offshore sailing and the sea have combined their experiences and professional skills in engineering, new technologies and project management to launch a marine hardware company, I-Carbon, focused on process innovation. Based in Ancona, Italy, the group designs, develops and manufactures all products in-house, paying particular attention to industrial processes in order to enhance mass production, reducing time and costs with the highest quality.

Its product portfolio includes the following items:

- Mooring systems made of carbon, aluminium and stainless steel: pop-up cleats combine stylish design, functionality, high resistance and innovative technologies. The carbon cleat is produced with a modern process borrowed from the automotive industry, never used before in the nautical field. Titanium alloy pins are employed for all the versions of the pop-up system.
- Carbon sun awning systems, with an elegant design, are functional, of extreme quality and produced with a particular attention to details. The innovative hooking system to the hull (patent pending approval), avoids the use of bulky sockets.
- Fenders for swimming platforms of megayachts, are made of carbon, lightweight for easy handling, equipped with a damping system, to damp any blows during mooring.
- Carbon arch stanchions conceived for superyachts, either to be permanently mounted and disassembled, are suitable for all applications which require this solution, as helicopter platforms or owner balconies.

Iris Innovations unveils world's smallest thru-hull camera

Marine camera specialist, Iris Innovations, has launched what it says it the world's smallest thru-hull/bulkhead camera, the IRIS-735. Machined from marine grade 316L stainless steel, the micro-compact IRIS-735 is smaller than a golf ball, only 28mm diameter x 36mm long and is waterproof to IP67 standards. It is designed to sit flush against a surface with a bezel height of only 8.5mm. Utilizing a 140-degree wide angle lens, the camera provides an ideal solution for unobtrusive surveillance where space is at a premium.



The camera module features a Sony Starlight sensor which provides excellent performance in all light conditions and it can easily be switched by the user to output various composite or analogue High-Definition video formats. Its low-profile design is ideal for thru-hull mounting on the sides or stern of the vessel to provide all-round coverage when docking or it can be fitted to an engine room bulkhead to enable remote monitoring of the engine.

New freedom chargers from Xantrex

Xantrex has introduced two new FREEDOM XC PRO marine models, continuing the evolution of the inverter/charger brand. Features of the new compact and lightweight inverter/chargers include a 50A transfer relay (on the 3000W model), dead battery charging, the ability to charge any battery chemistry including lithium ion and NMEA 2000 communications.

The NMEA 2000 communications allows the inverter/charger to integrate with other compliant devices, enabling it to be monitored and controlled via a single multi-function display (MFD) along with the other compliant onboard connected devices. The new model is available in both 2000-watt and 3000-watt models.

Both models have been developed to surge to two times their rated power for five seconds. Other key features include full output in higher temperatures, operation control via ignition key, and monitoring and control via Bluetooth app available on both iOS and Android.

Y adapter by Hubbell Marine rectifies electrical mismatches

The YQ230 Intelligent Y Adapter from Hubbell Marine rectifies electrical mismatches by plugging into two 30A pedestal outlets to provide safe, correct and full power to a vessel. The adapter has an internal PC board that automatically checks that both plugs are engaged and in separately-phased outlets.

As a safety feature, the YQ230 verifies correct polarity of a pedestal in case the hot and neutral wires are incorrect, or one of the plugs has become disengaged. If anything is amiss, the device shuts off to prevent an accident. A safety indicator light displays when the adapter is connected and working normally. The adapter has a sealed UV-and impact-resistant housing; integrated clamps prevent strain on the cord terminals.

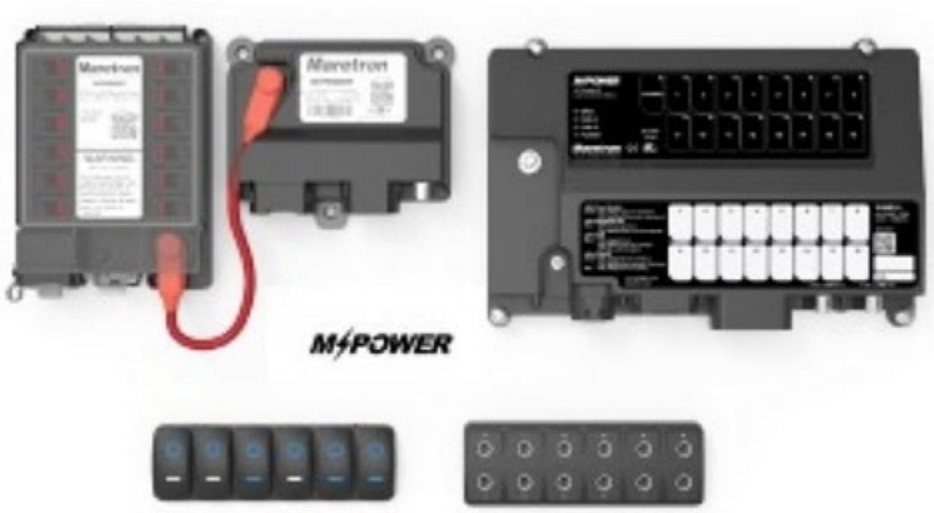
Quick and easy towing and mooring connection makes its debut

Maritime and offshore synthetic fibre and steel wire rope manufacturer Lankhorst Ropes has introduced Lankoloop, described as the world's quickest and easiest towing and mooring connection. Lankhorst's Lankoloop connection uses a simple knot and eye connection to 'complete the connection in seconds' and can be repeatedly opened and close if needed. Feeding it through any smooth strongpoint completes the connection. A feature of Lankoloop is that no other hardware is required with the connection replacing a conventional cow hitch or shackle.

The manufacturer states that ease of handling and the ability to connect lines safely and quickly are 'vital' in many towing situations, particularly in adverse weather conditions and that simplifying the connection to a single openable eye ensures 'a safer operation without compromising on the strength of the complete line configuration.'

Wilco Stroet, Lankhorst ropes managing director said: 'For both towing and mooring, the Lankoloop is a breakthrough in terms of safety and ease of connection without the need to handle heavy shackles, allowing single person towing and mooring connections. Lankoloop is an important development for the maritime industry that makes soft line rope connections quicker and easier to complete.'

Carling unveils new digital switching tool



Carling Technologies has launched a new digital switching platform that delivers simple, intuitive control over the increasingly complex systems found on today's vessels. MPower is a modular, programmable solution targeted at all segments of the leisure marine market, from smaller vessels to large boats with multiple helms. It enables full control and monitoring of onboard electrical and electronic systems including lighting, security systems and bilge pumps with critical alarms delivered directly to mobile devices to allow boaters to take immediate action both on board or remotely.

The new platform comprises 12-Channel and 16-Channel DC Load Controller Modules, Contura 6-Rocker Digital Switch Modules, 12-Button Customisable Keypads and a 12- Channel Optional Bypass Module. MPower allows circuits to be paralleled and offers Ignition Protection. All MPower components connect directly to the NMEA 2000 network, allowing circuit breakers to be controlled, monitored or reset from various electronics including the Maretron MBB300C Black Box, Maretron DSM Color Displays, the TSM810C Dedicated Maretron Touchscreen, Garmin OneHelm or any device running Maretron's award-winning N2KView V3 software.

Two new fuels from plastic waste launched by Clean Planet Energy

Clean Planet Energy has unveiled two new fuels made from non-recyclable plastic waste to help reduce the marine industry's reliance on fossil fuels. The ultra-clean fuels, manufactured under the Clean Planet Oceans brand, are suitable for use in any ship or vessel and can reduce CO2 emissions by more than 75% and harmful particles by up to 1,500 times.

"There is currently no legitimate and scaled alternative compared to using carbon-based fuels in the marine and aviation sector," said chief technology officer, Dr Andrew Odjo. "By using non-recyclable waste plastics as a feedstock for fuels in these industries, we can reduce the daily CO2 emissions by 75%, keep fossil-oil in the ground, and win valuable time in the world's battle to hit net-zero carbon emissions."

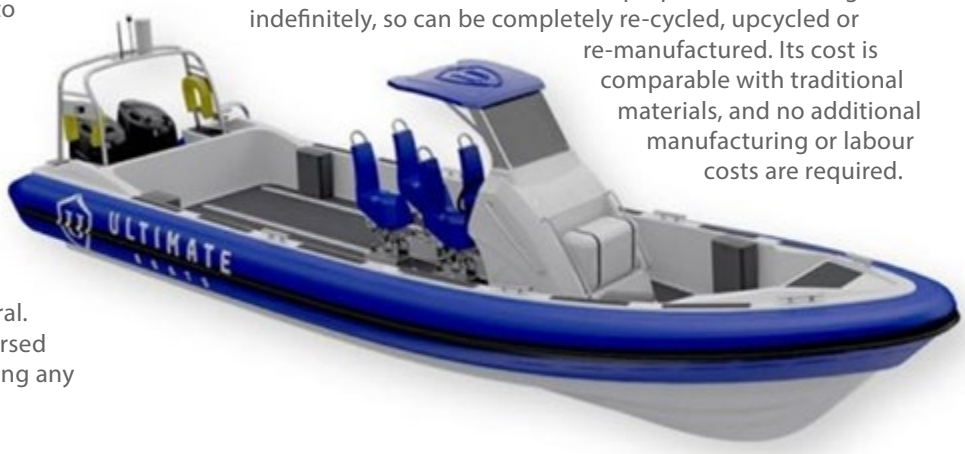
The fuels are produced at the company's ecoPlants which each process 20,000 tonnes of waste plastic every year which would otherwise end up in landfill or in the oceans. The company currently has two ecoPlants in construction, with another four in development and aims to process over one million tonnes of waste plastics per year.

UBC develops sustainable hulls

The Ultimate Boat Company (UBC) will use a new recyclable and sustainable material to construct all the hulls in its range and cut pollution. Stronger and lighter than fiberglass and less brittle than carbon, DANU is comprised of a styrene free resin and sustainable fibres. It was developed by boat designer, champion sailor and founder of TYNC Yacht Design, Jeroen Wats. UBC has now acquired TYNC Yacht Design and Jeroen will become UBC's technical director.

"DANU has been developed to be stronger and lighter than GRP, sustainable and circular (no EOL), and, for production, identical to conventional yacht building (provided that vacuum infusion is used)," said Scotland-based UBC. "The materials we use for DANU are all natural. Each component can be reversed to its virgin state without losing any technical properties."

The material maintains its technical properties and strength indefinitely, so can be completely re-cycled, upcycled or re-manufactured. Its cost is comparable with traditional materials, and no additional manufacturing or labour costs are required.



How Professional Indemnity Insurance Has Evolved To The Present Day

By **Karen Brain,**
Matrix Insurance Services Ltd.

The development of Professional Indemnity insurance has very much been driven by the demands of clients for certain covers. These demands have predominantly arisen because of changes in liabilities attributed to professions by the courts, now set in case law.

The origins of professional liability go back many centuries. Then the liability was established in the contract between parties. There are reports of accountants, solicitors and architects trading with unlimited liability as a guarantee of their work. This was no doubt in their agreement with their client and if they made mistakes they would compensate their clients out of their own pockets, limited only by the value of their assets. As such they could literally "lose the shirt off their back" if their mistake was significant.

It was not until 1964 in the case of Hedley Byrne & Co Ltd v Heller & Partners Ltd that the law established the rule that irrespective of the existence of a contract, if someone who possesses a special skill undertakes to apply that skill for the assistance of another person who relies upon that skill, a duty of care will arise.

Hedley Byrne & Co Ltd v Heller & Partners Ltd is thus the first English tort law case on economic loss resulting from a negligent misstatement. Prior to the decision, the notion that a party may owe another a duty of care for statements made in reliance where there is no contract had been rejected with the only remedy for such losses being in contract law. In recognising the liability the House of Lords overruled the previous position that pure economic loss could only arise from a contractual relationship; they applied to commercial negligence the principle of **"assumption of responsibility".**

Hedley Byrne was a firm of advertising agents. A customer, Easipower Ltd, put in a large order. Hedley Byrne wanted to check their financial position and credit worthiness and so asked their bank to obtain a report from Easipower's bank. Heller & Partners Ltd who replied in a letter that was headed "without responsibility on the part of the bank" ...Easipower is considered good for its ordinary business engagements".

The letter was sent for free i.e. no charge was made. Unfortunately, Easipower soon after went into liquidation.

Hedley Byrne sued Heller & Partners for negligence claiming the information was given negligently.

The court found:

- the relationship between the parties was "sufficiently proximate" as to create a duty of care. It was reasonable for them to have known that the information they had given would likely have been relied upon for entering into a contract of some sort. That would give rise, the court said, to a **"special relationship"**, in which the defendant would have to take sufficient care in giving advice to avoid negligence liability. The relationship was that the plaintiff trusted the defendant with the information and therefore the defendant ought to have been honest.

- however, on the facts, the disclaimer was sufficient to discharge any duty created by Heller's actions. Therefore, there was no order for damages.

This case led the way on the development of Professional Indemnity insurance; in the USA it is more commonly known as Errors and Omissions (E&O) insurance. Insurance was a much needed solution to what had become a growing problem.

The insurance was developed to provide cover for insureds' losses arising from their oral or written negligent misstatement. However, as time has gone by the cover provided under these policies has expanded with changes in liability of firms and individuals to include covers such as:

- Libel and slander
- Cyber liability
- Data protection
- Unintentional breaches of copyright
- Loss of documents or data

A common mistake is passing on confidential client data by accidentally copying the wrong person into an email! Or perhaps a one-off comment about a third party at a function that affects their income!

Please bear in mind that Professional Indemnity insurance does not cover you for your losses arising from your loss of reputation because of your negligent misstatement; your financial loss could be greater than that of your clients!

The Professional Indemnity insurance market in the UK has changed dramatically especially over the last ten years. We initially saw significant rate-cutting and an oversaturated market by insurers, but the last few years have witnessed a mass exit of insurers from the underwriting of professional indemnity risks. Consequently, combined with the insurance market losses, the cost of insurance is rising significantly and insurers are no longer as flexible, or willing to underwrite certain risks as they used to be.

So insurers that have remained in the Professional Indemnity insurance market have taken measures to limit their exposures and reduce the risks of paying out costly claim settlements. These measures include:

- Requesting additional information before renewal terms are provided, particularly information regarding business operations, supply chains and how insureds manage risk.

- Charging increased premiums: Insurers lost a lot of their profits from claims arising from recent tragedies, disasters and other professional negligence exposures. Because of this, they have had to increase the premium rates to ensure that adequate cover can be provided.

- Applying cover restrictions: Insurers are imposing more restrictions on policies such as limiting cover to a single aggregate amount, imposing a higher excess, excluding consequential or economic losses and removing some extensions, such as cyber cover.

Even though these are challenging times for those that need Professional Indemnity insurance there is always a glimmer of hope as insurance premiums and restrictions on covers have always shown to be cyclic.

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A day in the life of...

Nick Parkyn

AffIIIMS

"The enthusiasm of others to increase their knowledge is captivating!"

- Nick Parkyn

Mike Schwarz went in search of Nick Parkyn, an interesting character based 'down under', who has some fascinating strings to his bow apart from marine surveying. How appropriate that he found Nick eager to speak about the impact of technology on the surveying business in coming years as IIMS reflects on the history of the past thirty years. And as Nick says, "Watch out for the coming of the Fourth Industrial Revolution".

QUESTION 1
Might I suggest that your route into the marine surveying profession was not the usual one? By that what I mean is you have brought a broad range of skills from other disciplines, including information technology, with you. What made you want to become a certified marine surveyor?

I have always had an interest in boats, sailing and small craft design. I built my first boat at 12 years old and later worked at the weekend for a local builder of sailing dinghies as an apprentice. At age 14, I had my own business building and rigging aluminium dinghy masts and doing repairs to small craft, when not busy with schoolwork. Later after completing my schooling, I spent part of my "gap year" in the UK working at the Elephant Boatyard and socialised at the Jolly Sailor pub in Bursledon, Hampshire.

Upon my return I studied yacht and small craft design through the Yacht Design Institute in the USA and studied Computer Science while working for the University of Cape Town. In the early 1980's myself and a partner developed one of the first computer aided yacht design systems (CAYD) to run on a personal computer, it was adopted by many leading yacht designers. After moving to Perth, Australia, I studied marine composites at Curtin University, wrote a series of books on composite technology and specialised in consulting on composite design and fabrication. Throughout my career I was increasingly involved in Information Technology (IT) consulting for many large IT and Telecommunications companies

worldwide and spent several years working for a division of Hewlett Packard (HP) in Silicon Valley, USA. While at HP and other companies, I was the inventor of several patents.

I wanted to round out my yacht and small craft design, boat building and composite design and fabrication experience and skills with Marine Surveying. While on business doing IT Consulting, I used my spare time to complete the IIMS Yacht and Small Craft Marine Surveying course through the Australian Maritime College. This enabled me to understand both the "heart and the soul" of small craft.

My love of boats and boatbuilding resulted in building and re-building of many monohulled and multihulled yachts.

I have been fortunate to have been able to fulfil both IT and Marine interests and the combination of both. IT consulting has been the most dominant as a "day job", but the dual skill sets have allowed resilience and peace of mind in times of economic down turns and turmoil.

In marine design I have a good appreciation of classic craft and what has gone before, but my interest lies in new innovative technology, which is often not well accepted by the conservative marine design fraternity.

The combination of IT and marine disciplines has always been extremely powerful and rewarding and has been an area where I was able to make significant contribution to the IIMS and the Society of Naval Architects and Marine Engineers (SNAME).

QUESTION 2

Having mentioned your wider background in sectors other than marine surveying, how have your experiences and knowledge gained from them helped you make a success of your career as a marine surveyor?

With Computer Programming and IT Architecture you must be precise and have an "almost uncanny" ability to see and report things that are incorrect. It is this critical eye and relentless drive for perfection that are skills that transfer over to the marine surveying discipline.

QUESTION 3

You have written several handy guides for the IIMS and have spoken at various events with a passion for your subject. What is it that motivates you to want to share your knowledge for the good and benefit of others?

I enjoy learning and expanding my knowledge, there is always something new to learn – that is one of the things that makes life exciting. My work as an Information Technology Consultant has required me to mentor and motivate individuals and teams worldwide, something which comes naturally. I enjoy sharing my knowledge with anyone who wants to learn. The enthusiasm of others to increase their knowledge is captivating.

In the IIMS context, it is the vision of Mike Schwarz and his passion for enabling the members and the discipline that has provided the platform and opportunity for members like myself to share knowledge through presentations at conferences and writing IIMS Handy Guides.

QUESTION 4

One of the areas I know you have developed a specialism in is synthetic yacht rigging. What was it about this subject that interested you to want to develop your skills to a higher degree; and what implications are there for surveyors who do not understand this new technology as it gathers pace?

Most technology evolves through evolutionary change and it is not often that disruptive technologies emerge, and synthetic rigging is one of those. Disruptive technologies create space for and enables innovation. It is this innovation that captures my interest to understand a new technology and how it will change the status quo. My work as an Information Technology Consultant has demanded that I constantly keep abreast of technology, so I naturally embrace the marine discipline in the same way.

"If you always do what you've always done you'll always get what you always got."

- Henry Ford

Synthetic rigging increases the suite of specialised and differentiated services that a marine surveyor can offer, so it is beneficial for marine surveyors to understand the technology so that they can offer these services. It is prudent for practitioners to be ahead of the new technology curve so they can start to provide services to early adopters. Boat owners and marine Insurers are always unsure of the suitability and reliability of emerging marine technology and look to organisations like IIMS and its practitioners to provide practical insights, guidelines for inspection and service life.

QUESTION 5

Given your background in and knowledge of IT, what do you feel will be the impact and significance of technology on the general life of a marine surveyor over the next 10 years?

Without a doubt, every industry is being impacted by the exponential rate of technological change these days.

The Third Industrial Revolution was the computer revolution, starting in the 1960s, that brought us the mainframe and then personal computing, as well as the internet.

Currently the Fourth Industrial Revolution is playing out, which will affect governments, businesses, and economies in very substantial ways.

There is significant change to come, as there are at least three differences between this revolution and the previous ones:

- **Speed:** The speed of change is even greater
- **Change is not related to one area:** It is an interplay between many technologies, accessibility and affordability of complex technologies will enable them to spread faster and farther.
- **Innovation is driving entire systems:** It is not about innovation of a single product or service.

"We're just at the beginning of an explosion of intelligent software".

- Tim O'Reilly

In my opinion the technology advances which will significantly enable marine surveying will be:

- Artificial Intelligence
- Machine learning
- Spatial Computing in particular (Augmented Reality and mixed reality)
  - Augmented Reality: guided workflows seamlessly integrated with wearables and mobile devices.
  - Mixed Reality (MR): the merging of real and virtual worlds to produce new environments and visualizations, where physical and digital objects co-exist and interact in realtime.
- Digital ID / Digital Wallet technology

"The secret of change is to focus all of your energy not on fighting the old, but on building the new".

- Socrates

QUESTION 6

How important do you think it is for marine surveyors to keep their skills up-to-date and what role should continuing professional development play?

Professional development is essential, but it must be relevant, current, and easy to access. At a time when many industry specific organisations were fighting to remain relevant, Mike Schwarz brought new direction that ensured and highlighted the

relevance of the IIMS by providing new options for marine surveyors to develop professionally. Professional development can and must be fuelled by our natural curiosity and interest to learn. How you progress in your career is your own responsibility, and you take control of that through professional development. With the exponential rate of technological change, you never have enough knowledge, you must continuously increase your knowledge through formal learning (professional education) and informal learning (your own reading and research).

"Change is good. And in fact, unavoidable" ***- Dirk Benedict***

QUESTION 7

Advice passed down from someone with knowledge is always valuable. What couple of nuggets of wisdom would you cherry pick to pass on to an up and coming younger surveyor who is new to the profession?

While the primary role of a Marine Surveyor is to factually report what they see, the ability to report what they see is based on their understanding of what they see, which in turn is based on what they know about the many facets of marine craft (scantlings, materials, construction techniques, mechanics, and mechatronics).

Be realistic about what you do know and do not know about your discipline, be curious and continuously learn more. There is always more to learn, seek out knowledge and have an inquiring mind - develop a passion for learning.

There are several quotes from Albert Einstein which have great applicability to a marine surveyor who is new to the profession:

1. "The value of achievement lies in the achieving."
2. "I believe in intuition and inspiration. At times I feel certain I am right while not knowing the reason."
3. "The only source of knowledge is experience".
4. "If you can't explain it simply, you don't understand it well enough".

With the Internet, there is no proof and trust. Do not blindly believe what you read on the internet, base the value on the credentials of the author.

If you do not already have a background in boatbuilding or marine design, the barrier to entry is high as you require a lot of knowledge just to get started. This knowledge can be gained from books on boatbuilding, published plans or study plans of different types of boats. These can be studied to understand the approaches that designers take to construction and scantlings.

Marine surveying and IIMS are extremely fortunate to have access to the wisdom of the great practitioners like Ian Nicolson, Jeffrey Casciani-Wood, and others, so read all that they have written. The IIMS Handy Guides are another focused source of information.

The new builds upon the old and it is important to understand both classic and modern craft.

"The only gift to yourself is your ability to seek knowledge."
- Lailah Gifty Akita

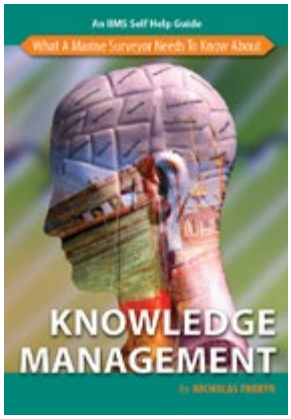
QUESTION 8

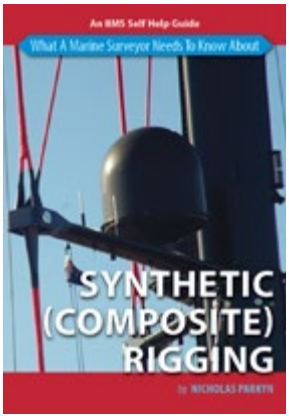
Can you recall an interesting event that happened whilst on survey and, if so, what was it?

Traditional swing moorings were being replaced by eco-moorings as seagrass beds are extremely vulnerable when traditional moorings are used by boat-owners. Chains on, traditional mooring drag along the seabed and destroy the seagrass. Eco-moorings prevent this as no parts of the system drags on the seabed.

Failure occurred to the upper stem area of a wooden craft attached to a mooring recently upgraded to an eco-mooring. From the survey it was clear that there had been no prior damage or deterioration to the stem area and the craft had been moored on the previous mooring equipment for several years.
After research it transpired that the force dampening behaviour and the angle of load is quite different with eco-moorings. This contributed to the failure of the upper stem area.

"When technology changes so can the physics!" ***- Nick Parkyn***





QUESTION 9
I understand you are currently located in New Zealand and were lucky enough to watch some of the recent Americas Cup. What most excited you and left you in awe by the spectacle you witnessed?

The structural aspects; during the 36th America Cup series, there were no structural failures during the normal operation of the craft. The AC75 foiling monohulls technology would not be possible without modern composite fibres (primarily carbon fibre) and advanced construction techniques.

QUESTION 10
When the work is done, how might we find Nick Parkyn relaxing at the end of a busy day?

When the work is done you will typically find me relaxing by:

- Designing or building a new yacht or small craft
- Writing a new IIMS Handy Guide or book
- Writing papers to present at marine conferences.
- Reading a book on a technical subject
- Developing some marine related computer software

I may also be found in my workshop rebuilding a classic outboard engine or machining a part on the lathe or milling machine.

QUESTION 11
Which four things remain as yet unfulfilled on your bucket list?

My bucket list is long, but the top four items would be:

1. Enabling marine surveying through the application of Artificial Intelligence, Machine Learning and Augmented Reality through my new company MarineML.
2. Writing further marine related books and handy guides.
3. Further research and development of a planing hull form which will deliver the same speed as a conventional craft using only half the horsepower, promoting "Green Technology".
4. Completing the software which I am writing for the design of unstayed carbon fibre masts.

"Time is your only enemy, it disappears very quickly and never gives you a second chance."
- Steve Douglas

QUESTION 12
And finally, as this interview is being published in the Report Magazine that celebrates the 30th Anniversary of the Institute, what would you say are the key benefits and importance of such an international organisation in today's modern marine surveying world?

The IIMS has re-invented itself to become the essential ecosystem provider and enabler for the marine surveying profession. It is the catalyst that brings the fraternity together to ensure capability, integrity, and professionalism of the practitioners. The IIMS is in a commanding position to fully embrace the technical advances of the Fourth Industrial Revolution (Industry 4.0).

"The best way to predict the future is to invent it." ***- Alan Kay***

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