THE REPORT

JUNE 2020
ISSUE 92

The Magazine of the International Institute of Marine Surveying

Airborne & Structure Borne Ultrasound

Salvors save 2.3 million tonnes of pollution

Fastenings: what a surveyor ought to know

Construction requirements for an innovative new build

How to survey a mast, its rigging and sails

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THE REPORT

The Magazine of the International Institute of Marine Surveying

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Editor's Letter

Dear Colleague

Just three months has passed since I wrote my last editor's column for the March Report Magazine, yet we are inhabiting an entirely different world just a few short weeks on. COVID-19 has caused many surveyors to become idle - an enforced career break - and the future for some remains uncertain at this time. My colleagues and I send you our best wishes at this time and hope that you are soon busy again doing what you do best. Signs are starting to suggest that things are moving slowly in the right direction. And remember, if you cannot physically move to another part of the world to conduct a survey at this time, consider using the network of IIMS members located around the globe.

IIMS has kept the entire head office team operating from home during the lockdown, enabling us to provide a good level of service to our members. On 1 June, we are planning to reopen the office for staff on a voluntary basis.

It would have been easy to produce an entire Report Magazine devoted to COVID-19 related features, for there is a mass of content about. But I am sure that, like me, you are weary of this topic. But never become complacent to this dangerous disease as it continues to lurk in our communities! With this in mind I have published the IIMS CVOID-19 safety guidelines in this edition. More uplifting is the article about what marine organisations have been doing to help in the fight against the pandemic on page 94. Apart from that I promise you a COVID-19 free Report Magazine with some first class content.

This edition is a big one and, if you may have time on your hands, I hope you will find something to keep you entertained. I am grateful to Kim Skov-Nielsen for authoring the lead article. Kim recently delivered something of an online masterclass on how to conduct a rig and mast survey to a large audience. He has now turned that presentation into a feature length article (page 34).

Jeffrey Casciani-Wood has written a detailed two part article entitled 'Fastenings: what a marine surveyor ought to know'. Part one starts on page 62. The second part of 'Excellence in Marine Surveying' by James Newcombe concludes from page 42. The story on page 48 - What's required to construct a new vessel type packed full of innovations? - is fascinating. Q-West takes the reader through what is required to bring a vessel rich in innovation to market. The first mussel harvester was launched from its yard at Castlecliff, Whanganui, New Zealand. Sarah White, who was recently heavily involved in the organisation of the IIMS Canada Branch Conference in Vancouver, is the subject of 'A day in the life of' - page 107. These are just a few examples of the many fine articles this issue boasts.

Many will wonder why there has been no recent update about the purchase of Murrills House. The news remains positive, but we are not quite over the line yet. I have prepared a short statement in member news about the very latest position and I hope it is not long before I can formally announce IIMS is the new owners of the freehold property.

Later this month, members are invited to attend the 2020 Annual General Meeting online. Full details are published in the member news area of this edition and you will need to register your free place in advance. I hope to meet you online at 14.30 (UK time) on Tuesday 16th June.

Please risk assess, stay safe and let's hope we meet in happier times soon.

Regards

Mike Schwarz
Chief Executive Officer
International Institute of Marine Surveying

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The President's Column

Dear IIMS Member

I hope you and your families are keeping well during these testing times that we are facing the world over.

They say there's never a perfect time to say goodbye, nor is there a perfect time to hand over the 'gong', especially in the middle of a storm which is playing havoc in our lives on two fronts - our, health and the economy. On the brighter side, we have positive news coming your way as Geoff Waddington takes over this column as your incoming President. Geoff is not only an optimist but has a lot of experience and knowledge to share. I have known him for many years as a friend first, and also as an IIMS board member. I assure you he is a people's man and very approachable.

This is my last column as I near the end of my two years as President. The time has flown, so let me ponder on some of the more testing moments and positive experiences. It was 6 years ago when my name was put forward for the Deputy Vice President's role, bringing on a younger generation with new ideas. Hopefully, I have fulfilled some of that expectation, particularly with taking IIMS forward digitally. Since then we have made noticeable progress, driven mainly by Mike and his team at our Portchester HQ. The ongoing webinar series initiated by the team, the 24 hour online Marine Surveying Fest and the eCMID accreditation programs are some of the ways we have established a digitally strong professional foothold. Also the CPD app and the initiative for making a simple website for every small surveying firm going about his surveying work at a small fee. It is amazing value and more should consider it. Long may the IIMS move digitally forward!

The experience of adapting and understanding priorities teaches one patience, at least it certainly has for me. I say this knowing that there is a wise bunch of senior surveyors around the table during board meetings, who take pride in giving their time and expertise for the good cause of uplifting our surveying profession. I have had the privilege of sharing many a long day gaining knowledge and learning from two of my many mentors on the IIMS board. Special mention must be made to one of these, namely our past president Captain Allen Brink, who has so often guided me and been steadfast in his straight-talking advice. I remain thankful to these wise men.

The UAE branch and committee have carried the President's badge with as much pride as I have during these past two years. During the very first meeting, I was given a token of appreciation by the UAE branch committee after taking over as IIMS President. Nothing made me feel more honored than being appreciated by peers. We as the UAE branch were successful in keeping the traditions of our biennial conference on course and in doing so celebrated last November our 10th year as a branch, being the longest standing branch of IIMS thus far. We are grateful for all the support that as a branch we have received during those 10 years from local and international sponsors and members.

Finally, before passing on the baton, I have planned a get together by webinar to speak with the Regional Directors, Branch Chairmen, and in-country representatives who bear the torch for the IIMS in their respective regions and countries. We need more to come forward, but we surely need to hear first from the ones who have already volunteered for many years. The IIMS will continue to grow over the coming years and my parting vision is to see branches and in-country representatives on every coastline, convincing the communities who hire surveyors that there is now an organisation that follows the high professional standards that have been established in the surveying profession. As part of this, we look forward to the surveyor's voluntary accreditation program that's due to be rolled out soon.

Here's wishing you all safety first and happy professional surveying. Like they aptly say from the country I come from "JAI HO"(or in English "let victory prevail" over COVID-19)

Your President Zarir.

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Your President Elect talks

An open letter from your President Elect, Mr Geoffrey Waddington

Dear Colleague

I hope that I measure up to the prestigious Past Presidents of this splendid institution as in June I become your latest President for the next two years. I come to the chair during difficult times for all, but also during exciting times for our Institute; and when we finally exit from the clutches of this destructive and deadly virus I am confident that we will continue to drive our industry forward.

Having started my career as a junior marine engineer, (stoker), fifty years ago on ex-second world war steam ships, I was trained to be an engineering technician (artificer) and later a shipwright. Being a shipwright involved surveying ships' structures for the Royal Navy and also smaller vessels for the Royal Marines. My 'other job', both within the service and in the civilian world, was small craft surveying. Having retired from the Navy my new career as a ship repair manager in a Southampton shipyard suffered the same fate as most careers in the UK's ship building and repair industry when the shipyard ceased trading in 1999 and then my 'other job', became my only job. Small Craft Surveying led to small craft shipping, which in turn led to breakbulk cargo, out of gauge cargo and dangerous goods. In this process it never ceased to amaze me that there was no qualification to be a marine surveyor and this has been my goal ever since.

My time as Director of Education, as a practical training instructor and also as author of several units in the Institute's professional qualification program further fuelled this ambition. Progress has been steady and now as my turn in the chair has come about we are already The Institute for the accreditation of several surveying disciplines, separating the wheat from the chaff in the process. With fair winds and a following sea, next to be brought on line will be the Marine Surveying Practitioner (MSP), which as with the other accreditation schemes, will be an industry wide standard open to both IIMS members and non Institute members. Also in common with the other schemes the Marine Surveying Practitioner scheme has already been given a positive reception by the wider marine industry and should in the future be driven by the marine industry as the required standard for current and future surveyors. As an Institute we have left all in our wake and with Mike at the wheel our reputation as The Surveying Institute and professional body can only continue to grow. We are already setting the standards for MCA recognised tonnage surveyors and the move to setting the standards for coding surveyors is also gathering momentum. This is due to the professional support of Members of the board and the hard work of the office staff, both MSA and IIMS.

Another exciting development, which has been close to my heart is finding a permanent home for the IIMS and I hope that you will agree that the impressive and perfectly positioned Murrills House, suits our purposes perfectly. At the time of writing we are almost there with regards the purchase, but financial support from the membership both in regard to the purchase and the required repair and refurbishment would still be greatly appreciated in our buy a brick scheme.

If during my tenure we can achieve most, if not all of these aims, I will feel that I have paid my dues to an industry to which I owe so much.

My very best wishes to you all.

Your President Elect

Geoff W.

Geoff Waddington, *Vice President and Chairman of Administration International Institute of Marine Surveying*

COVID-19 Safety Working Guide – latest IIMS update

The points made in this updated COVID-19 Safety Working Guide produced by IIMS are essentially common sense suggestions and do not carry any official or authorised backing. Also, remember that advice will change periodically around the world in what is a fast moving situation. Thanks are due to Maurice Pickles, Capt Chris Kelly and the Workboat Association as additional reference sources.

The health and safety of marine surveyors, not just IIMS members, and other related personnel at this time is of primary importance and must not be compromised, especially when coming into contact with others during the course of their work. Whilst many marine surveyors are idle at this time, some have still been working in various parts of the world. But as Governments start to look at progressively loosening lockdown procedures, now is not a time to become complacent. COVID-19 remains active in our communities and is likely to remain a challenge for many months until a reliable vaccine is found; so great care should be taken for the foreseeable future to avoid contracting or spreading the disease. No matter if you are currently working, or plan to resume surveying and inspecting soon, here is some practical, common sense advice to help you keep safe.

ADVICE FOR COMMERCIAL SHIP SURVEYORS

- Check with the terminal operator to understand what COVID-19 precautions are in place as the attending surveyor may be denied access.
- Before a surveyor will attend the vessel the vessel operator, he/she should contact the vessel's Captain/Master by email or telephone prior to arrival.
- In that communication, he/she should discuss the electronic exchange of documentation, the scanning of documentation requiring a signature, social distancing requirements while on board and how to conduct the survey with minimum interaction with the vessel's crew.
- Travel Letters should be issued to attending surveyors in the event of them being stopped by government officials and other authorities and questioned.

THE ROLE OF THE CAPTAIN and/or MASTER

The Captain and/or Master must satisfy themselves of the following and report to the attending surveyor:

- That safe access will be provided to the vessel in accordance with local government, port and terminal regulations in force.
- That a COVID-19 risk assessment will be conducted in advance and a copy made available to the attending surveyor.
- That following preparation of the risk assessment, onboard procedures are in place for the implementation of social distancing, as far as is practicable.
- That the specified PPE equipment, in accordance with guidelines published by the IMO, is available to protect the crew and the surveyor from the transmission of COVID-19.
- That onboard facilities will be provided for the surveyor to wash their hands and dry them with disposable towels.
- That wherever possible preparations have been made by the vessel's crew to expedite the survey process.
- That in the event of either the health and safety of the surveyor or vessel's crew being compromised, the survey will be terminated immediately.

THE ROLE OF THE SURVEYOR

The surveyor has a responsibility to:

- Decline or cancel a survey appointment if they have been in contact with someone else who has suffered COVID-19 symptoms in the 14 days before a survey.
- Decline or cancel a survey appointment if they themselves are showing symptoms of COVID-19.
- Decline or cancel a survey appointment if they are aware that the vessel to be inspected has been subject to health restrictions imposed by a government body in the 14 day period before survey.
- Decline or cancel a survey appointment where travel to the vessel would breach specific travel restrictions imposed by National, Regional or Local Governments, or require them to self-isolate upon returning home.
- Verify that travel to and from the port of survey can be completed in compliance with National, Regional and Local Government regulations in force at the time of travel.
- Comply with any additional safety precautions or PPE requirements deemed necessary by a port, terminal or vessel due to the COVID-19 pandemic.

As a minimum requirement, a surveyor should:

- Upon boarding the vessel immediately wash their hands using warm water and soap, or use hand sanitizer but only as a second measure.
- Wear suitable gloves that permit the surveyor to write and use a camera.
- Consider using a digital voice recorder.
- Use a face mask if considered appropriate.
- Avoid close personal contact when clearing terminal security (minimum 2 metres).
- Avoid close personal contact when clearing vessel security (minimum 2 metres).
- Stay outside the vessel's accommodation if possible and decline the offer of meals and refreshments, taking your own water onboard instead.
- Comply with social distancing requirements put in place by the vessel, terminal and, where applicable, the local government as far as is possible while onboard a vessel.
- Maintain a minimum 2 metre distance from all personnel during the survey where possible.
- Avoid the sharing of tools, electronic gadgets or stationery.
- After leaving the vessel, remove gloves, overalls and boots prior to getting into your vehicle and place in bin bags in the boot.
- Shower and change clothes prior to social contact after leaving the terminal.
- Wash working clothes at the end of the end of the working day to prevent contamination of your office and home at 56°C or hotter and tumble-drying clothes to kill the virus.

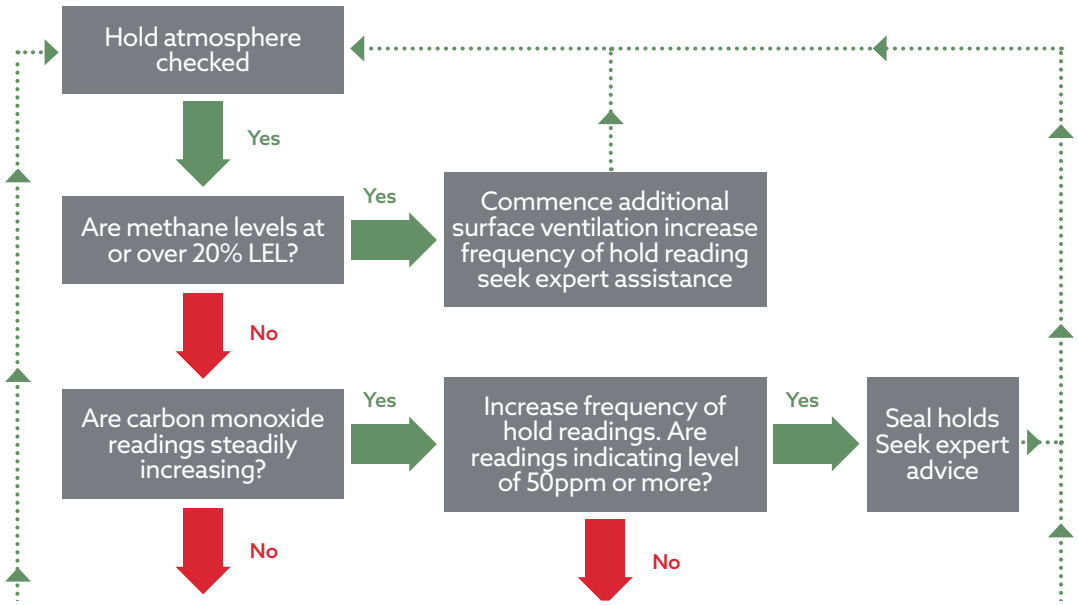
It is a requirement to report any potentially COVID-19 affected person(s) transported by sea to the respective port health office: **https://bit.ly/2z7zCPY**

Some of the above advice also applies to yacht and small craft surveyors, but additionally:

- Be aware that hand and guard rails could be a potential source of infection.
- Encourage owners, brokers and others to stay away so you can do the survey in isolation. If others must be present then use the social distancing requirements of a minimum of 2 metres.
- Use your own surveying tools and equipment only.

And finally a few other aspects of daily life for all to think about:

- If you are refulleing your vehicle en-route to survey be aware that fuel pumps are a potential source of infection, so use gloves and hand sanitizer once back in your vehicle.
- Bank ATMs are also said to present a serious risk of infection.
- Use contactless cards to pay for small sums rather than using key pads where possible.
- Avoid handling cash – bank notes and coins.
- Wear gloves if you need to use elevator buttons or activate the buttons with a pen.
- Avoid telephones and mobiles other than your own – they harbour millions of germs!
- Minimum contact with door handles is important.
- Contact with keys other than your own should be avoided.
- Science suggests COVID-19 can survive on glass, stainless steel and plastic for up to three days, so be mindful.
- ***Above all wear gloves and wash your hands regularly.***



NORTH P&I CLUB PUBLISHES CARGO CARE CHECKLISTS FOR NICKEL ORE, GRAIN AND COAL CARGOES

The North P&I Club has published three different and helpful checklists about the care of nickel ore, grain and coal cargoes giving details of how to deal with these types of shipments.

With nickel ore one should look for:

- excessive moisture prior to loading and:
- perform a can test before and during loading

Download the nickel ore cargoes checklist at https://bit.ly/34XhZ12

For grain cargoes the Club recommends:

- Camera ready with date and time set for evidence taking (continuous photographic record to be taken)
- Arrival times noted including notice of readiness tendered
- Vessel condition known including draughts
- No signs of self-heating
- No signs of mould growth
- No colour changes to the cargo
- No unusual odours
- No signs of infestation
- Cargo temperature recorded on discharge
- Monitor any tally operations
- Draught survey results to be confirmed as accurate and agreed by all parties
- Received copies of any 3rd party surveyor reports
- Ensure on completion an empty hold certificate is issued
- Ensure an out turn report / certificate is agreed

Download the grain cargoes checklist at https://bit.ly/2VTeBQK

And for coal cargoes

The vessel should be equipped with calibrated and certified gas monitoring equipment fitted with a catalytic sensor, which will measure methane, oxygen and carbon monoxide in an oxygen-depleted atmosphere.

It is important to be aware of the cargo temperature, which should on loading should be confirmed as less than 55 degrees Celsius.

If cargo temperature greater than 55 degrees, reject cargo and follow company procedures with letter of protest and request an expert. During loading, you should be alerted about signs of liquefaction or sign of foreign matte

On passage, the vessel should monitor the hold atmosphere for the concentrations of methane, oxygen and carbon monoxide at regular intervals and the readings recorded. Hold bilge water should be tested for its pH level, if acidic, increase the frequency in which bilges are emptied.

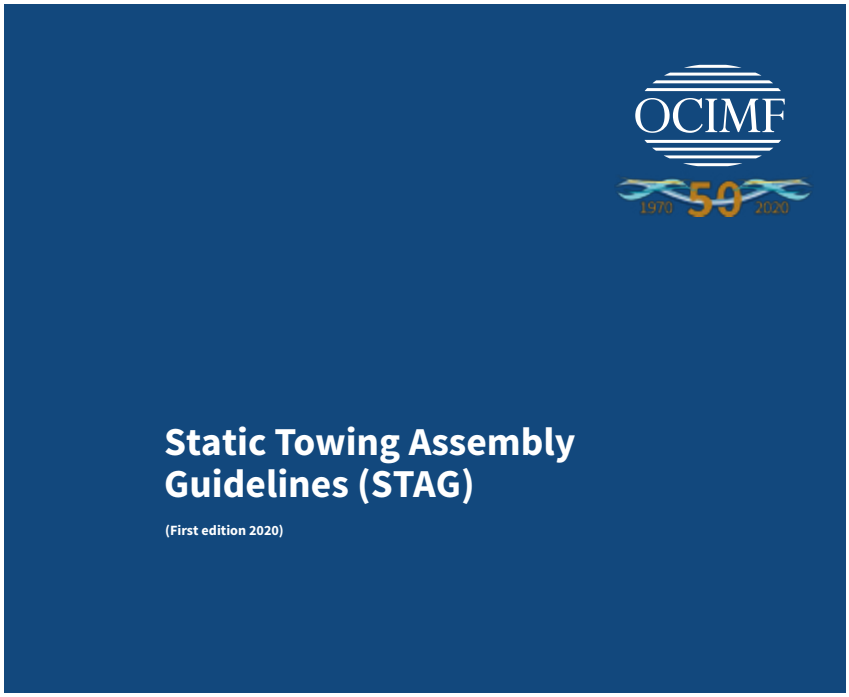
Download the coal cargoes checklist at https://bit.ly/2xTkDJ5

STATIC TOWING ASSEMBLY GUIDELINES PUBLISHED BY OCIMF

The purpose of this information paper is to provide technical guidance on selecting fit for purpose towing assemblies that minimise risk of injury to crew members or damage to equipment, and to optimise the effectiveness of static towing operations.

This paper discusses the technical factors that tug operators should consider, in collaboration with terminal operators, when selecting the components of towing assemblies for static towing operations at both Single Point Mooring (SPM) and Floating (Production) Storage and Offloading(F(P)SO) terminals.

The recommendations in this information paper come from extensive industry data gathering and a technical study. This study had pre-determined inputs, which do not represent all the variables found in static towing operations. Variables include tug size, constant pull or on-demand pull, tanker size, equipment specifications and environmental conditions. Therefore, it is recommended that operators carry out their own due diligence when designing a towing assembly.



Read the news story in full at https://bit.ly/2S4jyVY

Or download the guidelines at https://bit.ly/2zmDj4p

OVERPRESSURIZATION AND RUPTURE OF CARGO TANK ONBOARD FAIRCHEM FILLY REPORT PUBLISHED

NTSB issued an investigation report on the overpressurization and rupture of a cargo tank on the cargo ship Fairchem Filly while at Houston Ship Channel, in May 2019. Investigators stressed that the vessel and terminal personnel involved were not following procedures related to cargo discharge and nitrogen-blanketing operations.

On 30 May 2019, about 0750 local time, the Marshall Islands-flagged chemical tanker Fairchem Filly, with a crew of 22, experienced an overpressurization of the number 3 port and starboard cargo tanks while discharging liquid hexene at Vopak Terminal in Deer Park, Texas.

The overpressurization resulted in damage to the number 3 port cargo tank and the tank top (deck). All cargo was contained on board the double-hulled vessel, with no pollution or injuries reported. Damage to the Fairchem Filly was estimated at $750,000, and the contaminated cargo was an estimated $100,000 loss.

Probable cause: NTSB determines that the probable cause of the overpressurization and rupture of the 3P cargo tank was the vessel and terminal personnel involved not following policies and procedures related to cargo discharge and nitrogen-blanketing operations.

Analysis: Relief valves are fitted to cargo tanks to protect the tanks from an overpressurization event. The ship's PV valves were overhauled and pressure-tested in April 2019 and had been inspected 10 days prior to the accident, with no deficiencies noted. Therefore, it is likely that the PV valves performed as designed. The terminal had no recent history of terminal equipment failure.

Download the report in full at https://bit.ly/2VtJ8Wg

ROTHEN GROUP COMPLETES COMPLEX CANAL WALL REPAIR FOLLOWING INCLEMENT WEATHER

The Rothen Group was called upon to help repair a stretch of the Llangollen Canal after heavy rain caused substantial damage to the canal wall. A 20m section of the canal, which links north wales and south Cheshire, was damaged during Storm Miguel resulting in erosion that threatened to close the busy stretch near Marbury.

"The nature and location of the site meant that what should have been a straightforward bank stabilisation job became a tricky exercise in logistics," commented Mark Stephens, project manager at Kier. "Combine this with the fact that the canal is a popular route for members of the public, and the project quickly took on a whole new level of difficulty."

Within 24 hours of being contacted, The Rothen Group undertook a site visit and dispatched a 70ft crane boat accompanied by staff to manage both the piling operations and the boats themselves.

"We knew that we had to mobilise efficiently, if we were to keep disruption of the Llangollen Canal to a minimum," said Ian Rothen, The Rothen Group founder. "The project was completed efficiently and thoroughly with the canal completely reopening within a month."

Read the news story in full at https://bit.ly/2XYqcAL

GREEN MARITIME METHANOL CONSORTIUM HAS SUCCESSFULLY STARTED AN ENGINE TEST PROGRAMME

The Green Maritime Methanol consortium has successfully started a maritime engine test program trialing 100% methanol.

The consortium says new tests are being planned and two important new partners, Rijksrederij and Ghent University, have joined the consortium recently. Rijksrederij is the Dutch governmental organisation responsible for the management, manning and maintenance of more than 100 specialised vessels.

The fleet provides services for Customs, Coast Guard, Fisheries Research, and the Ministry of Infrastructure and Water Management.

University of Gent is one of the early movers in the research for methanol as a transport fuel for shipping.

In January 2020, Pon Power started its engine testing programme with a Caterpillar 3508 spark ignited high speed gas engine, said the consortium. With customised cylinder heads and a customised engine control management system, the engine operated on 100% methanol as a fuel. Green Maritime Methanol reports the tests were performed successfully, and the test setup enables the researchers to study questions with regard to optimisation of ignition timing, lubricating requirements, and emissions of gases such as CO2 and NOx.

In the coming months, Pon Power and the Netherlands' Defence Academy will continue to perform more engine tests on this Caterpillar 3508 engine.

The Netherlands' Defence Academy (NLDA) is also preparing a test programme for their MAN engine (type4L20/27), says the consortium. These tests include methanol injection directly in the cylinder blended with diesel which acts as pilot fuel for igniting the mixture. The tests are planned to include both a mixture stabilised by an emulsifier and a mixture blended mechanically.

Read the news story in full at https://bit.ly/2KuRGpz

SCHOOL BOAT FOR CHILDREN IN REMOTE PACIFIC ATOLL OF FAKAOFO LAUNCHED

Children on the remote atoll of Fakaofo in Tokelau will soon be travelling to school in style on a new school boat built in Christchurch with support from the Pacific Maritime Safety Programme. The Director of Maritime NZ Keith Manch said the boat will provide safe, reliable transport for around 50 children who must cross a lagoon to get to school each day.

The design and construction of the vessel, by ICON Custom Boats in Christchurch, was jointly funded by the Government of Tokelau and the Ministry of Foreign Affairs and Trade.

The 12.5m school boat has been named Te Kaniva, a name describing the traditional method of navigating using the stars and weather patterns. The $430,000 covered aluminium boat can carry up to 60 school children or 30 adults and has a cruising speed of 6-8 knots (11-15km/h). It is fully equipped with modern safety equipment.

In Tokelau, the Pacific Maritime Safety Programme has supported the government with:

- developing and implementing a safety management system for their government fleet, including the international passenger ship Mataliki which travels between Samoa and Tokelau
- providing the inter-atoll vessel Fetu o te Moana, which is designed as a passenger ferry between Tokelau's three atolls but can also serve as an emergency response vessel
- launching a community education campaign targeting the nation's fishermen, promoting the use of safety equipment and providing training in outboard motor repair and maintenance.

Read the news story in full at https://bit.ly/39BZ64u

WATERBORNE TRANSPORT DECLARATION MADE BY EU TRANSPORT MINISTERS

EU transport ministers held a meeting in Croatia and adopted a declaration on guidelines for the development of EU maritime policy, calling for an emissions trading scheme to cover ships from all countries with a target of achieving a carbon-neutral and zero pollution waterborne transport sector.

The European Community Shipowners' Associations has expressed its support, saying, "The declaration clearly shows that the ministers place a huge importance on the competitiveness of the European shipping sector, in view of the vital and strategic role it plays in the EU economy, global trade and the common market."

Efforts for a greener shipping future have been taking place across the globe, with the majority of shipping players issuing guidelines of how seafarers and ships can "act" greener.

In addition, the EU Ministers responsible for waterborne transport policy, through the guidelines published, highlight the vital and strategic role of waterborne transport to the EU economy, global trade and connectivity, and its importance to the functioning of the internal market.

Also, the Ministers note that education, training and lifelong learning of the seafarers and inland navigation workers in the rapidly changing waterborne transport environment is important. Therefore, they applaud the launch of EU's Green Deal, which aims to accelerate progress towards a fully sustainable EU waterborne transport sector within a fair and prosperous society.

Croatia stresses the commitment to maritime transport to effectively implement the global Sulphur cap, while also encouraging the research, development, funding and deployment of zero-emission vessels for short sea shipping and inland navigation in the near future.

Read the news story in full at https://bit.ly/2UyEvKb

THE RIVER PROJECT DESIGNED TO ELIMATE CO2 EMISSIONS UNDERWAY

Engineers at Aqueduct Marina have won a tender to work on the RIVER project, a new initiative they believe could help shape the development of the next generation of boat engines. The RIVER project, of which a new boat to be built by Aqueduct Marina for the Canal & River Trust will play a major part, consists of nine partners from five EU states and five associated partners involved in the capture, storage, treatment of CO2 and waterways.

The project aims to develop internal combustion engines to virtually eliminate CO2 emissions.

"It is excellent that CRT is involved in this European environmental collaboration and we are naturally delight here at Aqueduct Marina to be building this boat," said Robert Parton, Aqueduct MD. "We look forward with interest to seeing how the theory works on the water."

The new workboat will be adapted with a test rig added that will enable the project's engineers to evaluate the effectiveness of the technology in real-world scenarios.

Read the news story in full at https://bit.ly/2zjAKQA

COLD STRAIGHTENING OF BENT SHAFTS MAY SAVE TIME AND MONEY

The Gard P&I club believes cold straightening of bent shafts may save time and money. Some casualties involve damage to machinery parts which are considered very difficult to repair or deemed irreparable. This includes various types of shafts, such as propeller shafts and rudderstock. Large diameter shafts are subject to bending, which can occur during manufacturing, processing or through subsequent use. Such bending can occur in the rough forging of the shaft and when machining to final dimensions. In lively forgings the final cut for a keyway or similar can create bends. In some circumstances, the shafts will become bent after a period of use, or for example if a propeller strikes an obstruction.

Whether or not a shaft is reparable can sometimes give rise to disagreement between shipowners, manufacturers, repairers, classification societies and underwriters, and will require all parties to consider closely the various methods of repair available. For more than a decade Gard has had experience with a particular repair method for shafts known as "cold straightening", which has saved shipowners and underwriters substantial time and money.

The "cold straightening" method
The cold straightening technique is more than 50 years old and has developed and improved over time. The latest technology allows straightening of shafts of all sizes – from 20mm to more than 1, 500mm in diameter and more than 25 metres in length – as well as straightening the shaft within very narrow tolerances, even more precise than when the shaft was manufactured in the first place.

Cold straightening does not affect the metallurgy of the shaft, as it actually releases stress from the material. This differs from other straightening methods, such as the hot-spot method which uses heat and puts stress on the material, affecting the metallurgy of the shaft.

The cold straightening method is favoured because of its accuracy and quick delivery time. The most common shafts can be straightened within 24 to 48 hours and for only a fraction of the cost of a replacement.

The bent propeller shaft
The vessel had suffered extensive propeller shaft and rudder damage when it hit a rock off the Norwegian coast. The propeller shaft had only turned half around when it was blocked and pulled approximately one metre out of the stern tube. The vessel suffered water ingress, but was safely towed into a quay. Subsequent examination showed that the propeller shaft had suffered massive damage and was heavily bent...

Read the news story in full at https://bit.ly/2Vx1N3A

BIOFOULING: A GLOBAL CHALLENGE THAT NEEDS RETHINKING

The rapid pace of technological innovation has had a growing impact on the shipping industry. But as owners and fleet managers face increasing pressure to improve environmental performance, new technologies will be necessary to ensure a profitable and sustainable future. The impact of biofouling on ship fuel use and emissions has generated increasing attention. According to the Clean Shipping Coalition, fouled hulls cost the shipping industry as much as $30 billion per year.

Dr. Volker Bertram, Senior Project Manager at DNV GL, notes that a more proactive technology is needed to curb the build-up of marine organisms. "Preventive or proactive systems that control the fouling development at the level of biofilm or slime formation are generally seen as an improvement over reactive cleaning, which occurs long after the fouling has attached to the hull surface," he says.

"Increasingly, shipowners will document and record what hull management measures have been taken, such as type of coating, type of cleaning, etc., to bring more transparency for authorities and ports, ultimately also charterers or new owners of vessels."

Dr. Bertram sees an increased market demand for proactive hull cleaning solutions when technology is available. "We may also see a wider take-up on proactive measures when more economic cleaning options come on the market."

The future: More about hull performance than hull coatings
Seeking solutions to keep a ship's hull continuously clean is challenging as the biofouling risk and management options for each vessel will differ depending on design, operating profile, and trading routes.

Currently a number of international collaborations are working on the guidelines and standards for hull cleaning. The market is looking for solutions, whether in-house developments or business alliances or through acquisitions of smart start-up companies.

Read the news story in full at https://bit.ly/2ynsHBP

RED DIESEL FUTURE FOR BOATERS IN THE UK

The Cruising Association's Regulations and Technical Services group (RATS) has been in communication with HMRC and confirmed, as a result of the March Budget Statement, that it is their intention to legislate that red diesel in the United Kingdom can only be used in agricultural equipment, on the railways and for non-commercial heating from 1st April 2022.

Since the propulsion of waterborne craft does not fit into these categories, it is HMRC's intention that they will have to use white diesel for this purpose. The duty on white diesel for boats will be the same as the full rate paid on white road diesel in the UK. This means that the present so called '60/40' fuel duty split will disappear but commercial vessels, such as fishing boats, will still be able to claim a rebate on the full rate through their 'Marine Voyages Relief' scheme.

RATS welcomes the clarification on the use of white diesel which should make it more conveniently available throughout the United Kingdom from marinas and ports as they will have to supply all marine vessels with one colour of diesel. The bonus will be that sailors can continue to fulfil the SOLAS V regulations for sea voyages and no longer have the concern of the presence of red diesel in their tanks when visiting EU Maritime States.

Read the news story in full at https://bit.ly/3bD3B0M

JAPANESE GOVERNMENT CONSIDERS INTEGRATING 15 YARDS TO FORM SHIPBUILDING SUPER GROUP

Japan is currently exploring the possibilities to integrate 15 major shipyards in the country under a so-called All Japan Shipbuilding merger plan, following similar steps by neighbouring shipbuilding rival countries China and South Korea, local financial newswire Nikkei is reporting.

The merger plan comes after Japan's two largest shipbuilders – Imabari Shipbuilding and Japan Marine United (JMU) – declared in December they would form an alliance and enter into a capital tie-up.

To move forward with the tie-up, Imabari and JMU recently announced that they would form a joint venture by March 31, 2021, to integrate sales and design business for bulker and tankers. Imabari and JMU will hold 51% and 49% shares in the joint venture respectively.

The All Japan Shipbuilding merger plan is led by Japan's Ministry of Land, Infrastructure, Transport and Tourism (MLIT), which has entered preliminary discussions with some domestic yards.

Besides the tie-up between Imabari and JMU, Mitsubishi Heavy Industries also announced a plan at the end of last year to sell one of its largest yards to compatriot Oshima Shipbuilding. Another two major Japanese shipbuilders Mitsui E&S and Tsuneishi Shipbuilding both have a shipbuilding presence in China and the two entered into a business partnership for commercial shipbuilding back in 2018.

Japan is currently the third largest shipbuilding nation in the world after South Korea and China. It had been the largest shipbuilding nation in the world through to the turn of the century at which point cheaper neighbouring rivals expanded at its expense.

Last year, the two largest shipbuilding groups in China – CSSC and CSIC – started a merger by creating China Shipbuilding Group, while two major South Korean yards – Hyundai Heavy Industries (HHI) and DSME – are also in the process of merging.

In February, the Japanese government filed a petition at the World Trade Organization (WTO), questioning the legitimacy of the merger between HHI and DSME.

Read the news story in full at https://bit.ly/2VOQsLj

PILGRIM, THE REPLICA SHIP, SINKS IN DANA POINT HARBOR

One of the first times the replica ship Pilgrim was mentioned in the Los Angeles Times, it was under the headline "Vagabond Youth." It was 1974, and a group of young Southern Californians had answered an ad in the paper from Capt. Ray Wallace, who offered them the experience of a lifetime if they'd pay $1,000 and fly overseas to help him on a boating trip from the Spanish and Portuguese coast all the way back to Monterey — maritime experience recommended but not necessary.

After nearly 40 years anchored in in Orange County's Dana Point Harbor, where hundreds of thousands of kids since 1981 have toured the vessel and spent overnight field trips on it, the adventure is over, at least for now. For reasons still unclear, the vessel began taking on water sometime over the weekend and keeled over, its hull partially submerged in about 10 feet of water and leaning to one side.

The boat is so old and fragile that its current owner, Dana Point nonprofit the Ocean Institute, isn't sure it will be able to save the vessel. Workers spent Sunday evening ensuring that no hazardous materials leaked into the harbor and stabilizing the boat so it could be floated and the hull inspected, said Wendy Marshall, president of education and operations at the Ocean Institute.

Read the news story in full at https://bit.ly/2x1OnTT

AN APOLOGY FROM THE EDITOR

IIMS would like to apologise to John Dolan. The article in the March Report Magazine entitled 'Misdeclared cargoes and the booking process' was written by John, Deputy Director of Loss Prevention at the Standard Club. We forget to credit John and to include his biography as part of the article, for which we apologise.

John is a master mariner with senior officer experience on oil major tankers and bulk carriers. He has ten years' technical and commercial ship management experience at General Manager and Director level. He has been involved in providing marine and technical due diligence and asset protection consultancy services to major shipping finance institutions. He joined Charles Taylor in April 2015 as Deputy Director of Loss Prevention and has been a member of the Standard Club Safety & Loss Advisory Committee for over nine years.

IGNITION OF FUEL LEAKING FROM THE GENERATOR FUEL SUPPLY LINE IN THE ENGINE ROOM CAUSED SINKING

NTSB has published its investigation report about the fire onboard and subsequent sinking of the fishing vessel Ariel, while in Sheep Bay, Alaska, in August 2019. The investigation identified ignition of fuel leaking from the generator fuel supply line as key cause of the fire.

On August 26, 2019, the fishing vessel Ariel was transiting Sheep Bay, Prince William Sound, Alaska, when a fire broke out in the vessel's engine room. The four crewmembers aboard the Ariel attempted to fight the fire, but they were unsuccessful and abandoned ship into the vessel's skiff. The Ariel continued to burn and subsequently sank. Good Samaritan vessels rescued the crew, who returned to port uninjured. About 500 gallons of diesel fuel was aboard the vessel when it sank. The Ariel, valued at an estimated $600,000, was a total loss.

Probable cause: The National Transportation Safety Board determines that the probable cause of the fire aboard the fishing vessel Ariel was the ignition of fuel leaking from the generator fuel supply line in the engine room.

Analysis: The Ariel was not salvaged, thus investigators could not inspect the machinery or hull to determine an exact cause of the fire. However, the engineer stated that when he first opened the engine room hatch to investigate smoke, he saw flames in the vicinity of the generator located on the port side aft in the engine room. The long delay in the heat-sensor activation of the Halon fixed fire-extinguishing system, located on the forward bulkhead of the space, further indicates that the fire started aft in the space.

The fluctuating rpm of the diesel engine generator observed by the captain just after the fire was discovered was likely the result of fuel starvation, which suggests that the fuel line to the generator's engine was breached.

The fuel hoses that ran between the manifold, fuel filter, and generator met Coast Guard material specifications; however, over time a hose could have become worn from contact, its connections could have loosened through vibration, or it could have otherwise failed, allowing fuel to leak into the engine room.

Leaking fuel or fuel vapor may have then come into contact with a hot surface, igniting the fire. The vessel was fitted with manually operated fuel oil shut-offs in the lazarette and engine room; there were no remote emergency shut-offs. The crew was not able to close the manual shutoff valves before abandoning the vessel.

Lessons learned

- Closing Ventilation During Fixed Fire-Extinguishing System Activation
- Fixed fire-extinguishing systems in engineering and other hazardous spaces require a minimum concentration of extinguishing agent to either halt the chemical reaction producing the fire, displace the oxygen feeding the fire, or effect a combination of both.

Download the report in full at https://bit.ly/2VQ2dkH

REPORT bites

Jenny Matthews and Natasha Ambrose are embarking on an unusual world tour, encouraging girls to consider careers as superyacht captains.

Global industry advocacy group World Forum Offshore Wind has created a new working group - the Floating Offshore Wind Committee - to promote the acceleration of commercial-scale floating offshore wind.

UK Sailing Academy, the non-profit maritime training charity based on the Isle of Wight, has announced it has been pledged a $1.9m donation, enabling them to expand facilities with a new accommodation centre.

Commenting on the removal of the red diesel subsidy, Lesley Robinson, CEO at British Marine, said: "It is particularly disappointing to see the subsidy on red diesel being removed across some sectors. This subsidy is of huge importance to our members in the recreational and small commercial boating sector which is heavily reliant on the use of red diesel to power recreational craft and many larger vessels."

"If I had a £1 for every time a manager has asked me how they can ensure that their staff are 'doing the right thing' I would be a rich man by now", said Capt Andy Moll, MAIB

"The new solar boat is a popular attraction on the waterfront," says the Deputy Head of the port of Capbreton. "Our passengers love the experience of gliding silently through the harbour under electric power."

The entry into force of IMO's Cape Town Agreement on fishing vessel safety will be crucial for improved safety at sea for fishers and will support the fight against illegal, unreported and unregulated fishing. The Torremolinos Declaration on fishing vessel safety and combating IUU fishing has now reached 51 signatories.

Safety Briefings

TOTAL LOSS OF POWER WHILE UNDERWAY LINKED TO POOR CREW FAMILIARIZATION

Transport Malta has published its investigation report on the total loss of power of the bulk carrier MV Leopold LD following the failure of the auxiliary engines and the emergency generator while underway in March 2019. The investigation identified lack of crew familiarization with the correct operation of the compensation damping tank.

MV Leopold LD was en route from the port of Saldanha Bay, South Africa, to Hamburg, Germany, carrying iron ore. On 14 March 2019, the only running auxiliary engine of the vessel tripped and the emergency generator automatically cut in.

Attempts by the crew to restart the tripped auxiliary engine and to start the other auxiliary engines failed and on the next day, the emergency generator also stopped, resulting in a total loss of power.

The vessel was towed to Freetown, Sierra Leone. One auxiliary engine and the emergency generator had sustained extensive damages. It was also found that the fuel compensation damping tank was empty and that the drain valves of the diesel oil service tanks were blanked.

Conclusions

- The failure to start the A/E following the black related to an inadequately charged fuel oil compensation damping tank;
- The crew members were neither familiar with, nor aware of the correct operation of the compensation damping tank;
- The crew members accepted the risks involved with having two out of three generators out of service while only one was operating on full load;
- Time was lost due to a missed, open drain valve in the compressed air system;
- The condition of the Vee belts on the emergency generator was compromised with cracks in the material;
- Water was present in the fuel lines of A/E no. 1 and A/E no. 3;
- Water could not be drained from the fuel tanks because of blocked drains.

During the course of the safety investigation, the Company has taken the following safety actions:

- The SMS has been amended and the maintenance schedule for the radiator fan belt has been reduced to six months from the 12 month interval. The second engineer (Senior Engineer) is now assigned to this critical job; A 14-day routine to drain the fuel and ensure build-up of 100% air cushion has been added in the vessel's PMS and included in the ship-specific familiarization checklist.

Download the digest in full at https://bit.ly/2VuwhTI

ROHAV: LACK OF SECURING DEVICES ON HATCH COVERS LEADS TO DEATH OF A CREW MEMBER

On Monday 10 September 2018 Rohav had just been unloaded and was waiting for instructions for the subsequent order. In the meantime, the motorman was to prepare the holds for new cargo.

Before preparing the hold, he planned to replace a hose in the hydraulic system that operated the cargo hold hatch. When the motorman disconnected the hose, the oil leaked and the hydraulic pressure dropped, making the cylinders lose their load capacity. The cargo hatch closed and crushed the motorman against the hatch frame.

First aid was quickly given by the crew on board. The vessel went to Skaland to transfer the casualty to air ambulance, but his life could not be saved.

This work had not been agreed with any of the other crew members, and nobody noticed that their colleague was trapped under the hatch cover before it was too late.

Probable cause
The investigation showed that the hatch covers were not any equipped with any securing devices. The ship's safety manual was incomplete with regard to work tasks involving the hatch covers. Such tasks had never been identified as a potential hazard, nor had risk assessments been carried out.

Download the report in full at https://bit.ly/3cBuJwU

MAIB SAFETY DIGEST 1/2020

The UK Marine & Accident Branch has published a compendium of 25 cases it has investigated over the past months, with details of the incidents and their outcomes.

An extract from Chief Inspector of Marine Accidents, Andrew Moll's introduction is as follows:
"Only a year ago, I wrote in my introduction about safe means of access, and that the MAIB had just started two investigations into fatal accidents. One accident occurred as a crewman was attempting to leave his vessel to receive mooring lines, and the other as a crewman was trying to board having just let go the lines. Unfortunately, we have just commenced yet another fatal accident investigation, this time involving a workboat landing a crewman ashore. In common with the previous accidents, the workboat was not effectively secured against movement when the crewman stepped off. They say that bad things come in 3s, and I hope this is the last time someone dies because either the mooring/unmooring operation has not been properly thought through, or a shortcut has been taken.

The investigation report into this latest accident will be published later in the year, but in the meantime may I again encourage you to review your procedures for berthing/unberthing and the passing and letting go of mooring lines to ensure your operation is not putting anyone's life at risk.

If I had a £1 for every time a manager has asked me how they can ensure that their staff are 'doing the right thing' I would be a rich man by now. There are no simple answers: if there were, people would not be asking me the question. However, the rapport that the 'office' has with the 'coal face' has a lot to do with developing a good safety culture. Office-based personnel, no matter how experienced, will not always draft workable procedures. Consequently, it is up to those trying to get the job done to provide them with constructive feedback. Back in the office, the task is then to take on board the feedback and react positively to it. Saving a few minutes here or a few pounds there can seem pretty smart at the time, but it is unlikely to convince the next-of-kin. Plan > Do > Review; it works.

Download the digest in full at https://bit.ly/2yFidhy

REPORT bites

Experts in cyber security and maritime operations are forging ahead with the creation of a first-of-its-kind research facility at the University of Plymouth.

Amazon's pink dolphins are being treatened by the end of the fishing ban. "We don't want the dolphins to become just a legend of Amazonia," Vera da Silva, a biologist, said.

The wreck of the MV Alta which came aground west of Ballycotton was proving to be an "insurmountable bureaucratic obstacle" to any practical steps to deal efficiently with the situation, according to Captain Neil Forde.

Wärtsilä says it has decided to reorganize its marine business into three independent businesses: Marine Power, Marine Systems and Marine Voyage. They will be operational as of July 1, 2020.

IMO's gender programme is launching a photo search to build a bank of images of women in maritime. The new IMO image bank will serve as a one stop shop for external audiences to source quality, realistic imagery of women in maritime, for use in news stories, reports, social media posts and brochures about shipping and the broader maritime world.

Jotun claims to have "solved the problem of biofouling once and for all" with the launch of Hull Skating Solutions (HSS). It combines a high performance antifouling, SeaQuantum Skate, with proactive condition monitoring, inspection and proactive cleaning, high end technical service, and performance and service level guarantees. A primary component of Jotun HSS is the ground-breaking, onboard Jotun HullSkater hull cleaning robot.

The International Tank Container Organisation has published its 8th Annual Tank Container Fleet Survey. This year's Survey estimates that, at 1 January 2020, the global tank container fleet had reached 652,350 units worldwide.

Safety Briefings

MFV SUZANNE II: MCIB PUBLISH REPORT ON THE FIRE AND LOSS

Ireland's Marine Casualty Investigation Board (MCIB) has released its investigation report on the fire and loss of MFV Suzanne II, east of Arklow, in May 2019. While the exact source of the fire is unknown, the report highlights that the quick response of the crew and their knowledge on when to abandon ship was key to their successful rescue.

On 2 May 2019 the MFV Suzanne II, a fishing vessel, was stopped 30 nautical miles east of Arklow and the crew were taking a break between fishing activities when a crew member observed smoke coming from an engine room vent. The skipper went to investigate the source of the smoke and soon realised that there was a serious fire in the engine room.

He made an attempt to fight the fire but the level of smoke hampered his efforts. The smoke and fire very quickly engulfed the vessel's accommodation and wheel house. The crew retrieved the vessel's Emergency Position Indicating Radio Beacon (EPIRB) and abandoned ship to an inflatable life raft.

Probable causes

The source of the fire on the MFV Suzanne II is unknown. It started in the engine room and rapidly got out of control. Once the fire was well established it engulfed the vessel and being of timber construction it continued to fuel the fire until the entire vessel was ablaze. Had it been possible to contain the fire by closing dampers and access hatches this might have starved the fire of oxygen and allowed the crew more time in preparing to abandon the vessel. It is, however, unlikely that a fire of this ferocity could have been fully contained and extinguished by the vessel's crew.

Whether the fire detection system did sound but was not heard or whether it failed to alert the crew is unknown. Most likely the fire detection system did not sound as it is improbable that it would not have been heard. Not sounding could have been due to a recent defect or a longer standing one that would have been picked up if there was a monthly check, or damaged by the fire itself before it could sound. There is no record as to when the system was last tested or inspected as the vessel's onboard records were lost in the incident.

Recommendations

MCIB advised the Minister for Transport, Tourism and Sport to issue a Marine Notice reminding owners, skippers, officers and crews of fishing vessels of the following:

- the requirement for all crew to have basic safety training as per S.I. 587 of 2001.
- their obligations as per S.I. 640 of 2007 with emphasis on ensuring that fire alarms are regularly tested and maintained in an operational condition. The Marine Notice should include guidance on the inspection and testing of fire detection systems onboard fishing vessels of 15-24 metres in length.

The Minister for Transport, Tourism and Sport should review Actions No. 9 and No. 29 of the Maritime Safety Strategy in relation to their implementation and specifically for pre-2007 fishing vessels in relation to the matters raised in this report.

Download the report in full at https://bit.ly/2XQ32fG

JET BOAT ACCIDENT STRESSES NEED OF PROPER MAINTENANCE OF MECHANICAL EQUIPMENT HIGHLIGHTS REPORT

New Zealand's Transport Accident Investigation Commission (TAIC) has published its accident report on the contact of the jet boat 'Discovery 2' with Skippers Canyon wall while operating on the Shotover River in February 2019. Passengers onboard were injured. The incident highlighted that jet boating is a high-risk activity that leaves very little margin for error when navigating at high speeds in narrow channels and rivers.

On 23 February 2019, the commercial jet boat Discovery 2 was operating on the Shotover River in the vicinity of Skippers Canyon with nine passengers onboard. The boat was on its return leg when the driver was required to negotiate a series of bends in a section of the river about 10 metres wide. Approaching a left-hand bend, the driver tried to turn the wheel over to the left, but it would not move. The driver then tried to reduce speed by operating the reverse bucket, which also wouldn't move. As a result, the jet boat continued on its headingacross to the opposite side of the river where it made contact with a rock face. The speed of impact was estimated to be between 20 km and 30 km per hour. On impact, one passenger was thrown partially overboard and suffered a broken leg, while the remaining passengers suffered minor lacerations and bruising. A rescue helicopter was on the scene about 20 minutes later and evacuated the passengers.

Probable causes
The driver lost control of the jet boat due to a mechanical failure of the jet unit steering and propulsion system. An inspection of the jet unit showed that three of the four stud-bolts securing the tailpipe assembly to the steering nozzle had suffered fatigue cracking, rendering the unit ineffective.

It is highly likely that the fatigue cracking was because the nuts on the stud-bolts were not tightened to the manufacturer's recommended torque. As a result, there was insufficient pre-tension in the stud-bolts. The operator's hazard identification system had not identified the failure of the steering and propulsion system as a hazard, focusing more on operating conditions and driver training.

Key findings
- The actions of the jet boat driver were not contributory to the accident.
- The jet boat driver lost control of the Discovery 2 because the stud-bolts fastening the steering nozzle assembly to the tailpipe of the jet unit broke and rendered the steering and control system ineffective.
- The stud-bolts fastening the steering nozzle assembly to the tailpipe of the jet unit failed due to fatigue cracking caused by insufficient pre-tension on the stud-bolts.
- Insufficient pre-tension on the stud-bolts resulted because a torque wrench was not used during routine maintenance to tighten the nuts on the stud-bolts to the specified value recommended by the manufacturer of the jet unit.
- The operator's maintenance system did not ensure that the maintenance of systems crucial to the safe operation of the boat were carried out in accordance with the manufacturers' specifications.
- The operator's hazard identification and mitigation system had not identified that the failure of the propulsion and steering system was a risk to the safety of the jet boat operation. As a result, there were no risk mitigation measures in place when the jet unit failed.

Download the report in full at https://bit.ly/3ellagD

REPORT bites

Dutch yard Heesen Yachts has announced the official opening of its newly expanded in-house interiors facility in Winterswijk.

To promote the use of Condition Based Maintenance technology, classification society ClassNK has released CBM guidelines that explain the society's revised rules for using CBM in class surveys.

A stormy early 2020 prompted 52 major rescues across the UK's inland waterway network. River Canal Rescue's team of four rescue specialists and 12 engineers attended an average of six incidents per week from their bases in Chester, London, Manchester, Nottingham, Oxford and Stafford.

A group of companies has come together to develop a better understanding of the practical realities involved in using ammonia as a fuel for ships. Ammonia is one of a number of options to be a marine fuel of the future. One of the key elements in the group's approach is to look at the broader spectrum of implications for many ship types and different operational requirements, including bunkering and port operations.

Capt. Alan Bernstein asks, "Have you attended a meeting of your association or industry organization recently? There is no better way to learn than at these types of gatherings. It is a great way to keep pace with our fast-paced, ever-changing industry."

The actions of ISU members prevented 2.3 million tonnes of potential pollutants from 214 ships from entering the environment in 2019.

The UK's Maritime and Coastguard Agency recently announced that it was suspending vessel checks for compliance with low sulphur fuel regulations in order to keep freight moving, although it made clear that it will still inspect vessels where information is received indicating that an inspection would be appropriate.

Safety Briefings

POOR HULL MAINTENANCE LINKED TO FLOODING OF TOWING VESSEL TOM BUSSLER

The National Transportation Safety Board (NTSB) has published an investigation report on the flooding and sinking of towing vessel 'Tom Bussler' on Tennessee River in January 2019. The incident stressed issues associated with poor hull maintenance and repair. On January 7, 2019, about 2030 local time, the towing vessel Tom Bussler was transiting in light boat condition (no tow) upbound on the Tennessee River at mile 15 near Calvert City, Kentucky, when it began flooding and quickly sank in the channel. Both crew members aboard abandoned the vessel into the river and were rescued by a Good Samaritan vessel. No pollution or injuries were reported.

NSTB has determined that the probable cause of the flooding and sinking of the tugboat Tom Bussler was the company's poor hull maintenance and repair program, which resulted in flooding into the bow voids and engine room through fractures in the hull.

The vessel had last been drydocked in January 2018, about a year before the accident. No hull repairs related to watertight integrity were scheduled or completed. Throughout 2018, multiple issues with the hull were reported by crew members. However, attempts to find the leaks were unsuccessful, and the reported issues were not resolved. Instead, portable pumps were used to control the water ingress.

The post accident survey showed seven pre-existing hull fractures that compromised the integrity of the bow voids, the centerline aft void, and the engine room. When the vessel was pushing a barge ahead, its bow was protected from the bow wave by the barge ahead, and the pre-existing fractures in the hull therefore remained above the effective waterline.

Although the crew knew about and reported several hull leaks to management in the months prior to the accident, the lack of hull repair evidence and daily pumping of the towboat's voids indicated that management did not address issues with the vessel's watertight integrity in a timely manner.

Lessons learned – Effective Hull Inspection and Maintenance

- To protect vessels and the environment, it is good marine practice for owners to conduct regular oversight and maintenance of hulls, including between drydock periods.
- Regardless of inspection requirements, owners are obligated to ensure vessels are properly maintained, equipped, and operated in a safe condition. Issues with watertight integrity and wastage should be addressed immediately.

Download the report in full at https://bit.ly/34Nf5ft

POOR DECISION TO REMAIN AT SEA DURING CONTINUOUS FLOODING CITED AS MAIN CAUSE OF SINKING

The NTSB has published its investigation report on the flooding and sinking of the commercial fishing vessel Pacific 1 while in the Bering Sea, Alaska in February 2019. The report identified the master's decision to remain at sea with continuous flooding as key cause of the sinking.

About 0330 local time on 15 February 2019, Pacific 1 was engaged in cod fishing in the Bering Sea near Kashega Bay, Unalaska Island, Alaska, when the vessel began to take on water at the stern. The five crew members abandoned the vessel and were rescued by the nearby Good Samaritan vessel Kona Kai. There were no injuries, but there was an oil sheen. The vessel sank and was considered a total constructive loss, valued at about $720,000.

Probable cause
The NTSB report says that the probable cause of the sinking of Pacific 1 was the captain's decision to remain at sea with continuous flooding in the lazarette from an undetermined source, which accelerated and eventually led to progressive flooding.

Findings
Pacific 1 had several modifications in the year since its last stability analysis, which may have altered its stability characteristics. Although the owner stated that changes were "likein-kind," technical analysis would be required to confirm that the modified vessel met published stability guidance for the vessel.

Owners and operators should maintain an active awareness of vessel stability issues at all times, including the need for qualified individuals and naval architects to update stability instructions and booklets when structural changes are made to a vessel, other equipment or operational gear is changed, or their placement is altered. In doing so, owners and operators should take into consideration that operating personnel in the commercial fishing industry do not typically have specialized stability training. Meanwhile, investigators could not determine whether the bilge pumps were functioning at their rated capacities.

Based on crew statements, including those describing the vessel as being low and eventually sinking by the stern, the source of the flooding that led to the sinking of the Pacific 1 was within the lazarette area. Additionally, the engineer stated that he observed seawater entering the engine space through a bulkhead penetration (electrical conduit pipe) between the lazarette and the engine room, indicating that the initial flooding was in the lazarette and progressive flooding occurred.

The crew stated that the high-water bilge alarm system functioned a few days before the sinking. However, on the night of the sinking, there was no audible or visual high-level bilge alarm indication. Had the alarm sounded, the crew would have been alerted to the flooding in the lazarette area and engine space and may have been able to act sooner to pump out the spaces.

Lessons learned - Maintenance and Operation of Bilge Alarms
Automatic high-water bilge alarms are intended to provide crews with an early warning of vessel flooding.

Manual detection often occurs only after rapid flooding is underway, leaving little time for mitigating action.

In inaccessible spaces, or small spaces with limited means or ability to inspect underway (such as a fishing vessel's stern compartment, or lazarette), bilge level-monitoring alarms are often the sole means to alert operators of space flooding.

Operators should periodically test bilge high-water alarms and follow best marine practices and manufacturer recommendations for inspection and maintenance.

Download the report in full at
https://bit.ly/2Y0MSAi

REPORT bites

Bureau Veritas Marine & Offshore (BV) has opened its first remote survey centre, located in the major maritime hub and port city of Rotterdam. Laurent Leblanc, Senior Vice-President, Technical & Operations, said: "This is a new and important milestone in the Bureau Veritas global strategy of Digital Classification using digital technologies to transform the operating model of classification for the benefits of its clients."

Thales has selected Centrik to manage the operational development of its Maritime Autonomous Systems (MAS) programme at its UK Maritime Autonomy Centre based at Turnchapel Wharf in Plymouth.

The Offshore Marine Service Association has announced the institution of the Robert J. Alario Distinguished Achievement Award, named after former Chairman and President Robert Alario, who received the inaugural award in a ceremony in New Orleans.

The International Maritime Organisation (IMO) and the Food and Agriculture Organization of the United Nations (FAO) have formally signed an agreement to move forward and jointly implement the GloLitter Partnerships Project to prevent and reduce marine plastic litter from shipping and fisheries.

According to The Guardian, a Dutch government scientist has proposed building two mammoth dams to completely enclose the North Sea and protect an estimated 25 million Europeans from the consequences of rising sea levels.

North P&I, celebrating the 160th anniversary of its foundation in Newcastle upon Tyne, has seen owned P&I tonnage reach 160 million GT.

Recent visitors to a beach in Cornwall have been "left speechless" by the amount of plastic washed up in Spring storms. While walking along Whitsand Bay, Amy Gosney and Harry Dennis said they found "insane amounts of plastic", according to the BBC.

Safety Briefings

EXPOSURE TO LETHAL GAS LEVELS CONTRIBUTED TO FISHERMAN'S DEATH

The factory trawler Nordstar was on its way to Ålesund after fishing in international waters west of the Reykjanes Ridge. The vessel was to be made ready for fishing for another type of fish during the voyage, and the crew had finished cleaning the factory on the morning of 10 June 2018.

The factory supervisor started to prepare the tanks at about 11 o'clock. There was water in the tanks, but the amount is uncertain. He started by pumping all the water out of the forward starboard tank, then filled it with 40–50 m3 of water, before emptying it again. The factory supervisor did not have time to finish before the watch changeover at 14.00, but the forward starboard tank had been emptied.

Shortly before 15.00 the factory manager and two fishermen went to start rigging the fan in the tank. The plan was to use a rope to lower the fan into the tank. In order not to blow the air from the tank directly into the factory and the ship's interior, an attached plastic hose would be used to lead the air back through the factory and out into the open air.

The factory manager measured the oxygen level in the tank by lowering an oxygen detector on a string. The oxygen detector did not sound an alarm, and the factory manager therefore deemed it safe to enter the tank. Before the factory manager went down into the pump room, he left the oxygen detector with one of the two fishermen who took part in the work.

The other fisherman started rigging the fan and hose. When the equipment was ready, the fisherman who had the oxygen detector said that he would go down into the tank to place the fan correctly. He had a torch and a portable oxygen detector with him when he entered the tank. After climbing part of the way down, the fisherman shouted to his colleague who remained on deck that there was a lot of silage residue left in the tank; he then proceeded down to the bottom of the tank. His colleague has stated that he could tell from the look on the face of the fisherman inside the tank that something was wrong, before he said that 'there is no air here'. The fisherman inside the tank jumped back onto the ladder and climbed a few steps before he suddenly fell backwards and landed at the bottom of the tank, where he lay face-down in the silage residue.

Probable cause

It is likely that the fisherman was quickly exposed to immediately lethal levels of gas as he climbed down to the bottom of the tank. It was a demanding job to get the fisherman up from the tank.

The investiation also showed that the risk of gas being formed during the production and storage of silage had not been identified as a hazard in the shipping company's safety management system.

Download the report in full at https://bit.ly/2KEDP0h

IIMS UAE BRANCH ONLINE COVID-19 SEMINAR ATTRACTS 400 PLUS DELEGATES

The recent second IIMS UAE Branch webinar on COVID-19 practical effects on "Claims handling and Surveys" – are they here to stay? attracted 436 registrations from 43 countries. The initiative was well-received by the community and there was excellent feedback by attentive listeners at the peak of the participation. The initiative taken by the IIMS UAE Branch to bring value to its local and international members was evident by the community coming together for this free to attend seminar for everybody.

The webinar attracted three prominent panellists who were Chris Moxon, Senior Claims Executive at Standard Club, Joe Balls, Director at Omni Corporate Solutions Ltd and Alexander Gray, Manager at P.L. Ferrari: Specialist P&I Insurance Broker. All three candidly expressed their thoughts and views on their areas of expertise.

The P&I club perspective was given by Chris Moxon indicating their points of view. Chris has wide experience of representing owners and charterers while in private practice, including in relation to cargo contamination, shortage, off-hire, and charter party termination matters. The audience directed most of the questions to Chris, which indicated the value he brought to the webinar.

Alexander Gray from P.L Ferrari, London, a lawyer, also contributed his thoughts from a broker's perspective. Being a solicitor in England and Wales with the Standard Club and Ince & Co Monaco SARL, Alex worked for the P&I club in the past. He supported the panel discussion very positively in short and precise answers to the questions directed to him and lastly Joe Balls being the director at Omni from the UK brought in the much-needed seniority. With over 30 years in the business he spoke liberally on the hull and machinery aspect of the changes that COVID-19 era has brought into the broking style. The age-old face to face interaction which was the crowning glory of a successful broker is now seemed to be replaced by either web calls or telephone calls which is seen as the new normal. Joe is a member of the Chartered Insurance Institute and has been broking since 1963. He brought all that experience and heritage to bear as he spoke with conviction.

The changes that were discussed during the webinar by panellists are here to stay at least for the foreseeable future and perhaps longer. In all it was a very valuable hour and a half. Eventually all questions and answers were answered by the three panellists.

Some of the questions were:

– "Is force Majeure clause approved by English law? If not is this important to keep the clause in the CP agreement"
– "Current challenges/ survival issues, adaptive and technological transformation and future prospective of survey market" – "How do the surveyors go onboard during COVID-19 situation?"

IIMS UAE Branch thanks all the online participants and the panellists. Last but not the least to meet the minimal cost of the webinar operations Lockton Group, P.L Ferrari & Co. and Omni had picked up a small sponsorship commitment as an annual support member for the IIMS UAE Branch and were duly acknowledged by IIMS President, Capt. Zarir Irani, who moderated the webinar in his usual confident manner. There were no technical glitches nor any interruptions. The question and answers were brought in by those participants who actually pre-registered the questions and had only positive remarks to give at the end of their questions being answered to the point.

RECENT NEW IIMS MEMBERS

Full members

Nicolas Bialystocki	*MIIMS*	Israel
James Bailey	*MIIMS*	USA
Muhammad Samian	*MIIMS*	Malaysia
Richard Hewson	*MIIMS*	Australia
Srikant Ayyer	*MIIMS*	Singapore
John Lee	*MIIMS*	UK
Scott Kennedy	*MIIMS*	Canada
Femi Awofbade	*MIIMS*	Nigeria
Ward de Prest	*MIIMS*	Spain
Francis Deegan	*MIIMS*	UK
Sushil Mathur	*MIIMS*	India

Associate members

Siddhartha Sen	*AssocIIMS*	
Leon Gilby	*AssocIIMS*	Australia
Tim Bell	*AssocIIMS*	Spain

Graduate members

Vangelis Leontopoulos	*GradIIMS*	Greece

Technician members

Augusto Migliorini	*TechIIMS*	Italy
Miroslaw Jakubek	*TechIIMS*	Poland

Corporate Supporting members

Strategic Technical Services	*CorpSuppIIMS*	Qatar
Waarith Consulting	*CorpSuppIIMS*	Nigeria

Affiliate members

Syed Ahmed	*AffiliIMS*	UAE
Engin Mardin	*AffiliIMS*	Turkey
Ross Keeble	*AffiliIMS*	USA
Carl Grass	*AffiliIMS*	USA
Vitaly Plugatyr	*AffiliIMS*	Russia
Terrance Govender	*AffiliIMS*	South Africa
Jonathan Toomey	*AffiliIMS*	Australia
George Malhiot	*AffiliIMS*	USA
Stuart Richardson	*AffiliIMS (Upgrade)*	UK
Richard Thompson	*AffiliIMS (Upgrade)*	UK
Graham Saward	*AffiliIMS (Upgrade)*	France
Tom Willis	*AffiliIMS (Upgrade)*	UK
Hrvoje Marinovic	*AffiliIMS (Upgrade)*	

IIMS congratulates a student who has completed their studies:

IIMS Professional Qualification in Yacht and Small Craft Marine Surveying - Vangelis Leontopoulos

PROGRESS ON THE PURCHASE OF MURRILLS HOUSE

A statement by Mike Schwarz.

"It is two years since IIMS members voted in favour of looking to acquire a freehold property as the Institute's permanent headquarters. I gave an update at the last AGM which confirmed we had managed to secure and agree a deal on Murrills House, the scenario by which we become owners of the property and our current landlord, Casson Beckman, becomes our tenant.

I reported last year an agreed purchase price for the freehold. Further negotiation ensued on the back of the formal valuation survey resulting in a reduced price acceptable to both parties. Having been given sound advice by brokers and financial experts about the ease of securing a business mortgage, this became a major stumbling block when we came to test out the theory in January 2020! We did secure an initial offer of funding, but on very unfavourable terms. We walked away from that one. Finally the NatWest Bank (a well-known and recognised UK financial institution) agreed to provide the mortgage finance.

The pandemic has slowed everything up. The legal wheels are not turning as fast as they might in normal times. But at the time of writing, we are close to completion. All we need to do has been done and we are preparing to take ownership of the property once completion happens. But we have also required to have a final survey carried out into the wooden window rot to the side of the building. This is an unwelcome, last minute intervention and will cause further delay. Given how this project has slipped timewise, I am not keen to forecast when we may complete!"

ONLINE SEMINARS AVAILABLE TO PURCHASE

During the period of COVID-19 pandemic lockdown, which has affected so many countries and most surveyors in recent months, IIMS has come up with a first classs programme of online seminars that have attracted large audiences. The subject matter has been diverse, each delivered by an expert in their field. The programme so far has ranged from giving expert witness to gathering evidence and from inspecting critical equipment on CTVs to how to conduct a rig and mast survey.

All the presentations have been recorded and none will be published free on the internet. IIMS has however made them available to download at an affordable price. **For more details go to https://bit.ly/2Ssv6Td.**

There are more online seminars to come including:

- Report writing online seminar on 18th June 2020
- Moisture Meters, new Tramex and osmosis on 29th June 2020
- Multiple Echo Thickness Measurement on 21st July 2020
- Surveying and Inspecting Small Craft Engines on 4th August 2020

For more information about these online seminars and to reserve your place go to https://bit.ly/35an0n8.

HANDY GUIDE NUMBER 23 PUBLISHED – 'WHAT A MARINE SURVEYOR NEEDS TO KNOW ABOUT ON-OFF HIRE CONDITION AND BUNKER SURVEYS'

IIMS has published the twenty-third guide in its series 'What a marine surveyor needs to know about', this one covering the important topic of on-off hire condition and bunker surveys.

Capt Allen Brink, a Past President of IIMS and a marine surveyor with many years' big ship experience, has authored this impressive handy guide, now released for sale. Allen was a driving force in the early days and was one of those who worked hard behind the scenes to get the Institute off the ground nearly 30 years ago.

Running to 232 pages, this comprehensive handy guide takes the surveyor through the main parts and requirements of conducting on-off hire condition and bunker surveys. The handy guide contains examples of a number of templated reports which the surveyor can adapt for his/her use. There are photos to assist, diagrams and examples of the certification and documentation the surveyor needs to inspect too.

The handy guide also contains the most comprehensive appendix with a selection of marine terms to assist the marine surveyor when conducting inspections of ships for charter purposes.

The publication is offered for sale at £30 in paperback (plus postage and packaging) or as a downloadable pdf ebook at £28. For more information and to purchase a copy of this, or other handy guides in the series, go to **https://bit.ly/2KlN5WM**.

The first person to review this new handy guide said, "This is a labour of love and reflects Allen's immense knowledge and experience. I can't think of a more valuable piece of work, not only for the survey industry, but for the maritime industry as a whole. One of the hardest thing for lawyers is to deal with reports which are not logically set out or written in English which judges and other lawyers can understand. So well done! This will add great value to the industry."

WHAT PRICE YOUR PERSONAL SAFETY AGAINST COVID-19?

"I wanted to share with you a situation that left me feeling sick. I recently received an email from a highly experienced marine surveyor and eCMID Accredited Vessel Inspector, who had carried out something very similar to the advice that has been published by IIMS and other organisations as far as keeping safe in the pandemic is concerned. The response he received was shocking and a disgrace. Identities have been removed for obvious reason to protect those involved. Your thoughts are welcome."

Mike Schwarz

"I am a Master Mariner, eCMID AVI and AFNI. I have been employed in the maritime industry for almost 40 years. I am no longer at sea, for 20 years I have been a Marine Consultant/Surveyor and regularly perform services for numerous companies. Recently I was contacted by a company based in mainland Europe who requested my services to conduct a loadout survey on a vessel in a North East Scottish Port. I agreed to do the work scope and we agreed the terms for the job.

As I am a self-employed limited company I considered it prudent and responsible to draft what I thought were fairly standard safety procedures against COVID-19 that should be used and adhered to for the protection of all involved in a loadout survey. This document was prepared taking into account current guidance as is in the public domain from the UK Government, IMO, OCIMF, IMCA, IIMS and so on. I sent a copy of this document to the survey company and requested that this be sent to their client and/or the vessel so that we could be prepared for the survey and take into account the precautions required. Within minutes of sending this document, I was called and questioned why was I sending out such a document I was told that I could not make contact with their client under my own company logo, nor could I contact the ship and make "demands" on how they conduct their business. I was also told that we could not expect them to have a risk assessment in place. I challenged all of this and suggested that my document could be used by them on their own company note head to make clear how they wanted to conduct their business and protect their employees, associates and contractors against COVID-19. I was further told this was "Impossible" and that it was not my place to dictate to their clients or their ships how we conduct our business.

I was then advised that "they didn't know what to do" with my memo and needed time to consider it. I was told I would be called back later in the day. I received an email from them advising that I was no longer required for the survey. In a career spanning almost 40 years, I have never before been removed from a job. Not least for what I perceived to be a responsible and appropriate attitude to safety and one that could have highlighted and enhanced this company's status and reputation for their own attitude to safety and their personnel.

It is clear to me that despite this situation around COVID-19, this company has little regard for the control of this pandemic and only has their commercial interest as a priority. I question their entire ethic and culture around safety and welfare of their personnel."

Anon

NOTICE IS GIVEN OF THE FORTHCOMING IIMS 2020 ANNUAL GENERAL MEETING

The 2020 IIMS Annual General Meeting takes place on Tuesday 16th June at 14.30 (UK London time) and will be like no other the Institute has held before. The online only AGM will be open and free for all to attend, but you will be asked to pre-register your attendance. Only those who are entitled to vote will be able to do so using an online mechanism.

Venue: Online via Zoom only due to the COVID-19 pandemic

To register your free place at the online AGM go to https://bit.ly/3dPvDXu

AGENDA

1) Apologies
2) Minutes of previous AGM held in June 2019
3) President's Report
4) Chief Executive Officer's Report
5) Directors' Reports
6) Elections
   a) Management Board
   b) New Deputy Vice President
7) Voting on
   a) Proposed fee structure for 2021 membership
8) Incoming President's Message
9) Fellowship Awards and Honorary Membership
10) Any Other Business

IIMS TEAM WORKING FROM HOME

The IIMS team has been working from home since late March and has settled into a rather different daily routine, but it has worked well. Each morning and afternoon, the team has been meeting on Zoom to talk about the day's challenges and successes. It has proved to be a satisfactory way of working. There have even been a couple of quizzes to keep all mentally engaged with prizes offered for the winners.

The IIMS team working hard at home and sending their best wishes to all IIMS members

Combined teamworking has been the only reason that IIMS has managed to keep running and to be able to offer a near full service to our members and the other communities we serve, unlike other similar membership organisations, which appear to be running on a skeleton staff.

INAUGURAL IIMS CANADA BRANCH VANCOUVER CONFERENCE VOTED A GREAT SUCCESS

A group of 40 plus attendees (including online delegates) and marine industry experts gathered for the first full-scale marine surveying Conference to be held in Vancouver by the International Institute of Marine Surveying Canada Branch on 6/7 March. Judging by the positive feedback from those who attended, the event was a great success.

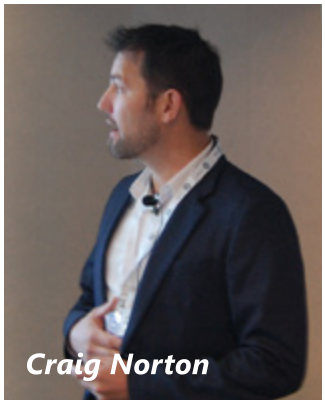
The Lonsdale Quay Hotel in North Vancouver with its quirky market and food stalls on the ground floor proved to be a highly popular choice of venue and their hospitality team worked hard to satisfy everyone with a non-stop stream of coffee, pastries and savoury food.

Unable to join in person for business reasons, Regional Director, Ed O'Connor, said a few words to open the conference, before inviting IIMS CEO, Mike Schwarz, to host proceedings. In his opening address, Mike spoke passionately about the many activities, some highly technological in nature, being undertaken by the Institute. He concluded with an overview of the new worldwide Marine Surveying Practitioner accreditation scheme, now nearing readiness for launch.


Jonathan Naude

Friend of the Institute, Jon Sharland, joined from the UK by video link and gave a thorough overview on the topic of multiple echo thickness measurements and GRP inspections.

Jonathan Naude, Capilano Maritime Design Naval Architects, came to the podium to speak about a complex and time constrained project to design a deliver a shallow draft tug, suitable for use on a remote river in the Yukon. He held delegates' attention as he talked about some of the key project challenges that had to be and were met.


Craig Norton

The personable Craig Norton, President of InspectX, showcased the latest developments with his report writing software, written by surveyors for surveyors. The software is gaining in popularity and it is clear to see why it appeals to many.


Sean Battistoni

Staying with the theme of new technology, Sean Battistoni picked up the batten after lunch. In his informative presentation, he talked about his company's product, Barnacle Monitoring Systems, sophisticated technology designed to protect boats by remote security. Those present were fascinated to hear him speak and to see a live demonstration.


John King

Experienced insurance executive, John King, Senior Vice President with Aon Reed Stenhouse Inc., talked about errors and omissions insurance for marine surveyors. He offered some helpful hints and tips to assist surveyors as far as limiting their liability is concerned.

Jeff Cote

The closing of the first day fell to the effervescent Jeff Cote from Pacific Yacht Systems who proved to be something of a specialist in the areas of electrical and battery technology. He livened up and energised the audience at the end of the day as he imparted a wealth of knowledge to those who were in attendance.

Conference delegates enjoyed a pleasant cocktail party and supper at the venue that evening.

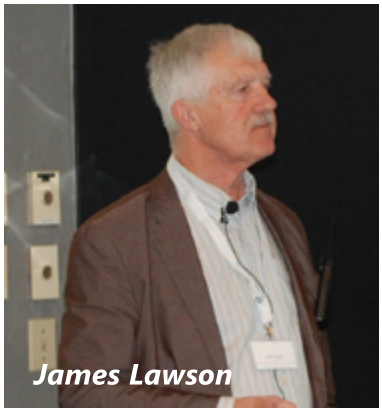
Day two dawned bright and early with the local Branch Annual General Meeting taking place. Lachlan MacKenzie, a yacht and small craft surveyor based on Vancouver Island, was voted in as the new branch Chairman.


Mike Schwarz, Stan Bowles and Lachlan MacKenzie

Ed O'Connor was once again on hand by video link to open proceedings. Before handing over to the first speaker of the day. Mike Schwarz invited North Vancouver based surveyor and consultant, Stan Bowles, to accept an award as an Honorary Member of the Institute. He thanked Stan for his unstinting work for IIMS over many years. During that time Stan has been responsible for authoring modules for the IIMS Diploma in Commercial Ship Surveying as well as marking students' papers and assignments.


Capt John Malool

Mike handed over to and introduced Capt John Malool, also sadly not able to be at the event in person due to a last-minute incident. Presenting live from New Jersey, John displayed his wealth of knowledge as he talked about a subject that surveyors often push to one side – atmospheric hazards and protecting the marine surveyor. John left those present in no doubt of the importance of health and safety in their workplace.


James Lawson

James Lawson was next to speak. He presented an introduction to IMO and Port State Control on behalf of Said Nassif, Canadian International Bureau of Shipping Ltd. James went to great length to talk about the history that has led to the various international conventions that now exist.

A slight change of plan was required in the final spot before lunch with one presenter calling in unwell. A recently videoed lecture given by corrosion expert, Jeffrey Casciani-Wood, on the subject of microbiological attack on steel was played to delegates and was well received.


Jerry Makarawicz and Huxley Witts

Lithium batteries are still considered very much new technology and conference was joined by Jerry Makarawicz, assisted by Huxley Witts, from local company, Britmar Marine. As well as tackling the topic which was simply entitled 'What you need to know about lithium battery technology', Jerry had also brought a selection of batteries for delegates to see.

Once again due to missing speaker, there was a need to flex the schedule at short notice. Mike Schwarz took to the stand and gave an insightful presentation entitled 'Non-technical tips and advice for writing an effective report'. He explained some of the things that go wrong in reports and offered practical tips to help surveyors avid unwanted litigation! Mike wrapped up the event with a short presentation entitled '19 tips for business success'.


Sarah White

IIMS Canada Branch Treasurer

Recently elected Branch Chairman, Lachlan MacKenzie, closed the event. In his closing remarks he offered warm thanks to Sarah White, Branch Treasurer, for her enthusiasm and tenacity in assembling such an informative range of speakers and the wider IIMS Canada Branch Committee. He applauded those who came to present and share their knowledge and thanked IIMS members and others who had taken part in what turned out to be a memorable event.

REGISTERED MARINE COATINGS INSPECTOR STANDARD FIVE YEAR REVALIDATION GETS UNDERWAY

Until the Registered Marine Coatings Inspectors (RMCI) standard was introduced in late 2014, there were no specific qualifications for marine coatings Inspectors – especially in the superyacht, leisure and pleasure vessel sectors. Over that period more than 120 industry professionals have achieved the qualification.

The formal RMCI qualification is a collaboration between the International Council of Marine Industry Associations (ICOMIA) and the International Institute of Marine Surveying (IIMS), in conjunction with the SuperYacht Builders Association (SYBAss) and managed by the Marine Surveying Academy (MSA). The course, the qualification and the certification system were produced in response to the request from these bodies and industry.

Following a meeting of these key stakeholders, the process of RMCI revalidation was discussed and agreed.

The purpose of the revalidation process is to ensure Inspectors are competent to continue as an RMCI. To achieve revalidation, there are two requirements which are based on 1) a review of professional activity and evidence and 2) the completion of a mandatory online refresher.

The RMCI course and the certification of suitably experienced and qualified inspectors has been welcomed and supported by many in the superyacht coatings sector, including in newbuild and refit shipyards. Considerable feedback has been forthcoming to demonstrate that the RMCI qualification has greatly improved the standardisation of coating inspections across the sector.

Udo Kleinitz, Secretary General of ICOMIA, said, "RMCI is part of a framework to introduce objectivity to the inspection of coatings by introducing assessment acceptance criteria. Once the parameters for scientifically accurate and repeatable assessment of large yacht coatings are in place, the RMCI standard serves as an assurance that inspectors are qualified to do the job. The last 5 years have been a positive development since we have seen an increasing number of stakeholders (yacht management companies, owners and their representatives) requiring the assessment of coatings on a Large Yacht to be carried out by an RMCI inspector."

Theo Hooning, Secretary General of the Superyacht Builders Association (SYBAss), said, "We have made good progress, but it is crucial that we continue our collaboration to find the broad support that this valuable initiative deserves. SYBAss is therefore pleased to continue to participate in the development of qualification programmes to further professionalise the industry. Both shipyards and clients benefit from mitigating risks through a more transparent coatings process, including an objective assessment."

Mike Schwarz, CEO of the International Institute of Marine Surveying, the awarding body for the RMCI qualification, said, "I recall sitting as an observer at the RMCI pilot course held at Portchester Sailing Club in late September 2014. It was a testing week; but as I look back over the time that has elapsed since it is with a degree of pride. The standard has made an impact in the superyacht coatings sector and is recognised and valued. Knowing that RMCI is acknowledged within the industry and acceptable as an appropriate standard in the ISO is testament that we have come a long way."

SYVR MATCHMAKING PLATFORM AND THE INTERNATIONAL INSTITUTE OF MARINE SURVEYING ANNOUNCE JOINT INITIATIVE

After many months of discussion, SYVR, the first open worldwide matchmaking platform between clients and marine surveyors and the International Institute of Marine Surveying (IIMS), the leading global professional body for marine surveyors, have announced a joint working initiative.

The two organisations in parallel have been pushing technological boundaries for the marine surveying industry over the past two years. Both organisations are driven by the desire to increase marine surveying standards and to ensure that only those surveyors who have appropriate skills are engaged by clients to carry out surveys, meaning transparency for all. The smart SYVR App, launched in 2018, uses algorithms to assess a surveyor's experience and specialism, then matches them to the client's requirements when a request for survey is made. Over the same period IIMS has launched three Apps, including the Marine Surveyor Search App.

How SYVR automated application works:

- The marine surveyor creates an account at no cost and submits their CV with their areas of specialism via the online portal
- A basic company registration/CVR/name and compliance check is performed
- The CV, education and professional experience are broken down
- SYVR AI automatically calculates the marine surveyor's seniority and experience from level 1-5

Originally launched with the commercial ship surveying sector firmly in mind, as part of this joint initiative, IIMS has scoped out key small craft specialisms which have been added to the SYVR platform and algorithm. IIMS will promote and recommend the SYVR platform to its members with the aim of further populating the platform. Additionally, those who decide to join the programme will be recognised with the IIMS logo on their listing to show they are a member of one of marine surveying's most prestigious membership organisations. SYVR launched its first version in June 2018 and handled its first online instruction the month after.

Henrik Uth, SYVR Managing Director said, "By entering into this joint initiative, SYVR is confident it can increase its reach and penetration in the marine surveying sector. Our technology and matching process is working effectively. This initiative will allow us to take things to the next stage."

IIMS Chief Executive Officer, Mike Schwarz, commented, "IIMS is delighted to be working with SYVR. As I have got to know Henrik in the past 18 months, it is clear that we share a common goal to drive up standards across the marine surveying sector. The coming together of two like-minded organisations that share a common goal is exciting, beneficial to both, to instructing clients and marine surveyors."

Visit the SYVR web site at https://syvr.org.

Born to Danish and Norwegian parents in Saigon, Vietnam, Kim is preceded by three generations of seafarers, fishermen and explorers. His first yachting job was building GRP sailboats in polyester chopstrand in a small boatyard on Antwerp docks.

Kim has worked full-time in the marine industry since 1979, initially as a yacht skipper and ocean racer and he has sailed almost 150,000 blue water miles. Tired of globetrotting, Kim took a diploma in Marine Surveying and established a surveying business in Spain delivering a range of survey and consultancy work to clients worldwide.

As well as speaking on this subject at IIMS events, Kim has also authored 'Rig Basics - How to Look After Your Mast, Rigging and Sails'. The book provides a concise, informative and clearly-written outline of what an owner or operator must take into consideration when looking after the mast, rigging and sails. It is also a highly useful guide to what a surveyor should be looking at when surveying a rig.

HOW TO SURVEY A MAST, ITS RIGGING AND SAILS

by **Kim Skov-Nielsen** MIIMS

When asked by a prospective client 'what do I look *at* and what am I looking *for*?' - I answer that I look at *everything* and I report on what I have seen.

©TB

Clearly the best way to survey a mast and its rigging is with it unstepped, lying on trestles; while equally obvious is that inspecting sails is best done when sailing, so we have to do one before the other.

1

STEP 1 – Research the rig - what is it? Is it an old telephone pole scavenged from a ditch? Who built it? Is it steel, alloy, carbon or wood? Is it a Schooner, a Cutter, or a Ketch? Are they swept-spreaders or straight-across spreaders? Is it steel wire, steel rod, carbon fibre, or Spectra™ standing rigging? Most importantly - how old is it, when was it last unstepped for inspection, and when was the rigging last replaced?

2

STEP 2 – Define your objective. Why are you inspecting this rig? Is it for insurance renewal? For Pre-Purchase? Is there damage? Or is it a daily/weekly/monthly/annual inspection?

I believe that what we want to know is whether it is "Fit for Purpose". Or in other words, can the client go sailing, can he/she cruise the Med, or cross the Atlantic?

3

STEP 3 – Once onboard we start with a visual inspection of everything we can see from turnbuckles to toggles, clevis pins, split-pins, turning blocks, winch leads, mast collar, mast base, the condition of the running rigging, poles and boom-tangs, the setup of the mast (is it tight or slack?), is it straight, or 'in column', and above all, is everything appropriately sized?

Specifically we inspect the swages, terminals and turnbuckles for cracks and for broken strands; we look to see if the deck is lifting or buckling around the mast; we check for ***anything*** out of the ordinary. Running cotton wool up and down the rods and wires identifies burrs, cracks, chafe, bulges and broken strands. Anywhere the cotton wool catches there is an issue that must be investigated further.

We also inspect the chainplates – forestay, backstay and running backstay chainplates included – looking for appropriate sizing, displacement and/or movement, water ingress, leftover sawdust and anything unusual. Ian Nicholson has written in his book "Surveying Small Craft" that one should be able to lift the whole boat from just one chainplate, just as the wind heels the boat by kanting the windward chainplate to leeward.

4

STEP 4 – Go up the mast with careful consideration. Never go up when the yacht is ashore or in a dry dock. Never go up if you're not happy with the equipment, or the people helping you for your life is in their hands!

It is acceptable to state in your report that you "didn't go up the mast"; because you don't. But *do* explain what you did; for example "I inspected up to my eye level". Don't forget to mention invoices and rig inspection reports you have seen.

A few things to keep in mind before going up the mast. Be wary of electric winches as they ***can*** fail to stop; think about how you will communicate with those below; test radios ***before*** ascending; agree on hand signals! Do you need a downhaul onto your chair? Do you want a second halyard for safety? Is there an extra pair of competent hands to handle it? Warn people not to hang around immediately below.

Up the mast we are looking for cracks in the tube, cracks around fittings – especially anything welded to the mast tube - and also anything that sits in a hole cut into the mast section such as tip-cups. There may be stress cracks around the cut-out, especially at the loaded corners! We are also looking for signs of rust and corrosion of the terminals and fittings not visible from deck level or hidden ***inside*** spreaders, ***inside*** mast walls, ***behind*** plates or goosenecks – such as under this winch pad here (right).

©KSN

SS (Stainless Steel) fittings will crack on the inside of any curve or bend - especially strap toggles and T-tangs. T-tangs rely on a rubber stopper in the hole to stop the T-tang jumping out, which it can (and does). We look at sheaves and leads, wear and tear, bent shackles and missing washers.

Carefully check out the spreader tips which should be smooth and clean – not covered in leather and tape. Any fore and aft movement of the spreaders will bend the spreader bar and crack the spreader itself around any locating pins, or where the diagonal stays are seated. Remember to check the spreader bases – especially if welded to the mast; or if in a collar around the mast, under which corrosion will be rampant.

Anything on a boat can unscrew itself. Roll-pins ***will*** loosen and drop out, set-screws will disappear over the side – this is the nature of boats. The only thing on earth that vibrates ***more*** is a helicopter! So expect to see things that surprise you. Towards the end of a Trans-Atlantic race in '89, one whole side of rigging unscrewed itself overnight because a single set-screw had dropped out; so that the leeward side of the Whitbread maxi mast was completely unsupported, the stays flapping in the breeze! We just had to get to the finish line without tacking.

Once aloft take as many photos as possible. They will serve to remind you when you are back at your desk of how good, or bad, it really was. Sometimes it looks worse in the photo than how you remember, even just a few hours ago. Go with that and – a shocking picture is worth a thousand words!

If you see something that you are unhappy with – a cracked rod like the one in the picture here below for example – you are entirely within your right to suspend the aloft inspection and recommend the removal of the rig immediately for replacement of the standing rigging. Sometimes there is just no doubt!

If you find a single broken wire strand, or a single ***candy-striped*** rusting wire, or a single cracked rod as in the previous photo, then the whole set of standing rigging is all suspect and all due for replacement! You cannot replace rigging one shroud, or one stay, at a time!

Once back on deck, you must ignore the owner or vendor or buyer who wants an immediate answer. Everything you have to say will have to be carefully worded and with caveats. Make some notes on what you have seen, write an immediate list of defects found and then tell the owners or buyers that you want to review the photos on a big screen before you make any statements. You can prevent this clamour for a statement by explaining to everyone beforehand how you will conduct the survey and when you will be making statements and to whom you will be addressing them – your client first and foremost, *I hope!*

© C. Keeble

In the photo of a carbon fibre mast (right), can you tell if it was a crack in the laminate, or just in the paint? If in the paint – why?

No? This is a common issue – being unable to say anything with any certainty. Sometimes it's just not that clear! Do you recommend the mast be unstepped and placed ashore for further investigation? Being a carbon fibre mast section there is perhaps only one avenue of NDT (Non-Destructive Testing) open to you – Infra-Red Thermography or Thermal Imaging – and that too may be inconclusive.

©KSN

5

STEP 5 – Inspection intervals. It's really simple – unstep it for inspection (and NDT) every five years and unstep it to replace the standing rigging every ten years. Like a mantra, if you repeat it often enough it becomes an immutable law of nature. And it should be. In New Zealand it is!

For rod rigging IT IS immutable as the cold heads on the intermediates, or diagonals, must be NDT tested with penetrating dye at five years as they will almost certainly need re-heading. Penetrant-dye must be applied by trained professionals.

At left below we see probable crevice corrosion where the dye is darkest. At right below it is obvious even without the dye that there is a problem!

In the days of galvanised steel wire rigging, 'meathooks' in the wire shredded your hands to tell you it was time to change the stays. Today, for SS wire rigging, strands often break just inside the swage and will bulge out a little bit just above the swage. Unstepping the mast eases the tension and often this is enough to allow broken strands to pop out, or bulge out, of the swages.

Carbon rigging must be removed for NDT every four years! And not because the carbon is likely to be deteriorating or failing, but because the hi-tensile steel end fittings need to be NDT tested. The steel is not as strong or long-lasting as the carbon! The holes in the eyes elongate or deform, the thimbles crack and other failures of the hi-tensile steel are common after just four years! Apart from checking invoices to see when it was last unstepped for NDT; we look carefully for any damage to the protective covers.

Kevlar™ capshrouds and martingales on catamarans, or Kevlar™ running backstays on bigger sailing yachts, must be replaced every 5 years! Period - no discussion.

©RSB

©Basic

Spectra™, or UHMWPE (Ultra-High Molecular Weight Polypropylene), is the future – and it's here now. Many boat owners have found out they can splice it themselves, rig it themselves and replace it all by themselves – making riggers obsolete! It is clear that the weight-saving, stretch properties and lifespan make UHMWPE ***very*** attractive.

To recap on intervals – a sailing yachts rig should be inspected daily if racing, weekly if cruising full time, monthly if cruising casually from a set point, and annually ***at the very least!***

An ***'old-fashioned'*** SS wire rigged mast has to come out for inspection every five years and for replacement of the rigging every ten years. Rod rigging must be NDT tested at least every five years, so the mast has to be unstepped every five years. Carbon rigging has to come out for NDT testing of terminals every four years. And UHMWPE needs to be replaced only when it becomes 'furry'.

Some riggers replace rigging piecemeal – one shroud or stay this year, one next year - which is *totally* wrong and suggests someone who is just looking to sell you a complete new mast.

Replace rigging before any long Blue-Water passage. Always replace lifelines and steering cables at the same time. Always replace turnbuckles when you replace the rigging, and always buy the best turnbuckles you can afford - be wary of cheap copies.

A quick word on sails – where possible have them all removed from their bags and hoisted in place for you to see shape, wear and tear, and any patches – this is laborious and requires some fit crew but, just like placing the mast ashore, it is the only way to be sure. Otherwise you have to state you haven't seen them hoisted and therefore cannot vouch for their condition. Just looking at the luff and leach in a bag in the forepeak isn't enough. Sails are the engine of a sailboat and as such they need to be efficient, not just for show. Racing sails that are even just one season old are 'training sails' and it matters little that the vendor is trying to tell you otherwise. Canvas is either new, or 'due for replacement'.

6

STEP 6 – Write a factual, informative, concise report in the past tense. Report on what you have seen, not what you expected to see, or wished you had seen. Your job is to report the facts and to back it up with evidence (photos and invoices). Advice and recommendations are consultancy, not surveying.

A last word on riggers. There are no national or international standards for training riggers, so there are huge variations in standards and knowledge of good working practices. In an excellent article in The Report in Sept 2010 on "Rigging inspections", our colleague Chris Kessel MIIMS wrote that "most riggers do not make good rigging inspectors" as they "might be good at the mechanics of rigging replacement but not at the nuances of a proper inspection". I agree and emphasize that they are also not trained in report writing.

So that leaves us, trained mast and rigging surveyors, as those best qualified to carry out and report on a thorough rig survey.

Stay safe!

5 Five ways in which shipping is using AI to enhance performance management

AI-assisted technologies are changing the way shipping operates, helping to shed light on vessel performance, while cutting costs and reducing risk to human lives. Shipping companies such as CMA-CGM, Maersk, and Stena Line have deployed AI-assisted technologies to gain greater insight into their ships' performance, while both established companies and start-ups are finding new ways to push the boundaries of AI.

1 Here are a few examples of how AI is being used to assist shipping operations.

1. REMOTE INSPECTION

Artificial intelligence (AI) can be used to help remotely inspect or maintain difficult to reach places onboard ships, reducing risk to human life and cutting additional costs.

Drones are one example that are being used for remote inspections. Remotely operated and autonomous drones can reduce the need for human inspectors and lower the cost of inspections by eliminating the need for things like scaffolding that might be needed to inspect hard to reach places. Drones can reduce the time needed for inspections, thus improving efficiency and deliver faster reporting and decision making.

A project by classification society DNV GL called ADRASSO (Autonomous Drone-based Surveys of Ships in Operation) is using autonomous drone-based surveys, offering a safer and more efficient alternative to human ship tank inspection. The drones fly themselves into ships' cargo or ballast tanks, and use AI to detect detect rust, cracks or poor coating conditions.

AI can also be used by robots to maintain vessels as well as inspect. Norwegian companies Kongsberg and Jotun have developed a robotic hull cleaning solution known as HullSkater that remains onboard a vessel at all times, and using big data and an intelligent analysis system, determines when its underwater surfaces might need cleaning. It then cleans using no divers or brushes to reduce risk to human life and ensure non-damaging cleaning.

For subsea inspection, maintenance and repair (IMR), a snake-like self-propelled robot like Eelume can be deployed to carry out IMR in confined spaces not accessible by conventional underwater vehicles.

2. FUEL EFFICIENCY

AI can also be used to improve the fuel efficiency of vessels by providing greater insight into ship performance.

Swedish ferry operator Stena Line has successfully used AI to predict the most fuel-efficient way to operate a vessel, reducing fuel consumption by 2-3 per cent per trip. The project began in 2018 onboard Stena's Scandinavica vessel on the Gothenburg – Kiel route. The AI software, named Stena Fuel Pilot, will be installed on five more Stena Line vessels during the autumn. The ambition is to do a complete fleet wide roll-out on all 37 vessels in Europe during 2020.

Another Swedish firm, technology company Lean Marine, is also using AI to help manage fuel consumption. The company announced last month that its propulsion automation system FuelOpt had become AI-ready, allowing it to play a key role in enabling automated propulsion optimisation onboard AI-assisted vessels.

FuelOpt is also being used by Stena Line to help optimise propulsion in real-time based on AI commands on required values of power combined with the possibility for the operator to set limitations on fuel consumption and/or speed.

Japanese shipping company MOL is assessing the effectiveness of AI technology to help accelerate safe and environmentally efficient operations through the Ishin MOL Smart Ship Project.

3. NAVIGATION and AWARENESS

AI is also being deployed to help identify objects, reducing the risk of navigational hazards and improving safety at sea. According to Yarde Gross, CEO of start-up Orca AI, object identification capability is the backbone to autonomous operations, which we are seeing a rapid growth of in the maritime industry.

The Israeli company Orca AI is collaborating with other industry players including NYK Japan, Shell, Wärtsilä, and DNV GL to enhance navigation and enable the captain of a ship to improve his or her capabilities with the assistance of AI technology. The company created an algorithm that learns what to do as a result of continuous data that is collected and fed to it.

Shipping company Mitsui O.S.K. Lines (MOL) and Japan's SenseTime announced a collaboration late last year on a new vessel image recognition and recording system using AI. The system's graphic recognition engine was developed by applying artificial intelligence (AI) deep learning technology, allowing it to recognise surrounding vessels. The image recognition technology, which can be used even at night or during other periods of poor visibility, can detect small vessels that are not recognisable by vessel automatic identification systems (AIS).

Start-up Shone, which is headquartered in San Francisco and was formed in 2017 by three French engineers, has collaborated with shipping company CMA CGM to deliver AI-assisted voyages. Shone is accessing the shipping line's vessels to develop its AI systems for container ships. According to the companies, CMA CGM's AI-assisted voyages will help assist in decision support, safety and piloting assistance.

4. PREDICTIVE MAINTENANCE

AI also helps support predictive maintenance, enabling the early detection of equipment failures before they happen. Predictive maintenance is "all about the fleet management optimisation strategy," says Rajan Vasudevan, CEO of OceanManager. "It's about maintaining the weakest link."

Predictive maintenance enables gains in operational efficiency to be achieved as the risk of equipment or vessel downtime is reduced by constant monitoring and alerts delivered from onshore experts. OceanManager's vesInsight is an augmented intelligence solution that provides AI tools to enhance decision making for the management of vessel maintenance, supply, procurement, crewing and safety.

Another technology that uses AI for predictive maintenance is Wärtsilä's Expert Insight. Leveraging AI and advanced diagnostics, equipment and systems are monitored in real-time. When anomalous behaviour is detected, it is flagged to specialists at Wärtsilä Expertise Centres, allowing them to support the customer proactively with an appropriate resolution to the issue.

5. REMOTE MANAGEMENT

Last year, Maersk announced the launch of Captain Peter, an AI virtual assistant to help customers remotely manage their containers and gain greater insight into their cargo's voyage.

The Remote Container Management (RCM) technology monitors the conditions inside the container from when the goods are locked inside, right up to when they are delivered to the final destination. Captain Peter keeps an eye on the container's temperature, humidity, and CO2 levels, and notifies the customer if something needs attention. The data is now cloud-based for increased agility and can be easily shared as well as configured to the customer's specific needs.

Excellence in Marine Surveying

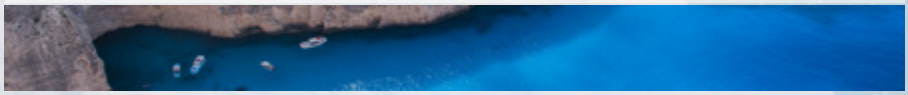
What does it mean, why it matters and how we achieve it

Part II

4. Presentation

As James says on his website, he is a "guy that lives and breathes boats". Even his hobbies are marine related, with yachting, wind surfing and boat building featuring highly among them. Based in New Zealand, James, who holds an IIMS Diploma in Marine Surveying, became inspired over the 2019 Christmas break to write an article about excellence in marine surveying based on his own personal experiences in his relatively short career as a surveyor. It is an honest and well written article, which IIMS is keen to share with readers of The Report Magazine. This is Part II. Part I can be found in the March 2020 Report Magazine.

by JAMES NEWCOMBE AssocIIMS



"Cleaning and organizing is a practice, not a project." Meagan Francis

During my training as a surveyor, I was mentored by several well regarded, professionals that had been surveying for many years. One that stood out though, was not for his cleanliness, his expertise, or attitude. He had been surveying for a long time and therefore had a name, however also had the reputation for liking the odd drink! On the day of survey, he turned up in an old, unregistered, beaten about, rust filled utility, which looked as if was about to break down at any time. Then the surveyor climbed out of the utility wearing an old fishing top full of holes, with old blood and entrails from previous fishing expeditions. He had his favourite pants on which he proudly called his "painting pants", which were covered with such, and to finish off, an old pair of gumboots which he said were not only good for surveys, but ideal for gardening! This was his surveying kit.

I drove away from that experience vowing to never present myself or my business in such a way. In reality clothes are not too expensive. And cleanliness, and presentation also not hard to attain. Sure, presenting one's self may cost initially, but you are the face of your business. What will a client think if you dress poorly and turn up to survey a multi-million dollar, motor yacht? Or, alternatively, what will the client who is buying a $20,000 classic yacht think if you turn up to his survey dressed poorly?

We are all adults, but sometimes you would think some people just don't get it. Here is a brief list on presentation.

A. PERSONAL GROOMING

Brush your teeth. Just like your mother taught when a pre-school child. Nothing is more off-putting than talking to someone with dirty teeth and a foul breath.

Wash and Bath. Again, like taught by your mother. One or two showers per day is critical to excellence. Poor odour, dirt, grime, are not the way to present as an excellent surveyor.

Hair Cuts. Above the shoulder and off the ears. Do not style with long, pony tailed hair, mohawks, or colour. You are a surveyor, not a freak show! Keep clean shaven. An early morning shave everyday to present well. If you do decide to have a beard, keep it nicely trimmed and clean. Remove food waste and such. Maybe your client will provide something for morning tea break.

Tattoo and Piercing. Again, you are striving for excellence. Cover the tattoo's and remove piercings. You have a professional image to upkeep, don't create distractions.

B. FITNESS AND HEALTH

As a surveyor, just about every survey requires stamina, a level of fitness, and the ability to squeeze into smaller spaces. Examples of the above can include, surveying for long periods of time without breaks, the ability to move heavy objects which are hindering the survey, clearing lockers, and moving heavy mattresses at awkward angles. Small spaces must also be inspected therefore, it is quite common to squeeze into anchor lockers, storage compartments, and engine compartments.

The marine surveyor is not expected to be a contortionist or an Olympic athlete, but a relative standard of fitness should be expected. The excellent surveyor will watch their diet, by eating good, healthy food as much as possible, watching their alcohol intake, and by not smoking. Fitness can be obtained by walking or running up to 5 kilometres per day if time allows. If possible, getting into the habit of carrying out 20-30 push ups, and sit ups per day, which will also be beneficial. Of course, this will be dictated by available time, but the fitter the surveyor is, the easier the job becomes and the standard achievable is higher. Besides easing surveying, this small fitness regime may even prolong the surveyor's life span!

C. CLOTHING

Buy nice clothes. Not expensive. Just nice. I typically wear long pants, a polo shirt, and boat shoes. I also have a nice water proof jacket that presents well in most occasions. If hot, I change the long pants for cargo pants or similar type, but still present tidy. Of course, if crawling around dirty bilges, coveralls are great, but I find these restrictive. I will carry spare clothing for the commute home if required, and change after the survey. Never wear the same clothes two days in a row, and never, keep using if they start looking tatty and tramp-like. You're a professional in your craft. Excellence is well dressed.

D. TRANSPORTATION

Surveyors travel. Transportation must be reliable. If your vehicle breaks down there will be; your client/s, the vendor, the broker, the engineer, the yacht rigger, the electrician, the boat yard workers, and the travel lift operators, standing and waiting for you. They will not care that you have broken down. And even if you are twenty minutes late, they will not care for your excuse. What they will do, is stand waiting and vocalize negative comments towards you. They will berate your un-timeliness, your business, and your lack of excellence.

When I originally started surveying, I could only afford a cheap, older, utility. And it broke down. Two hundred kilometres from home. And even though I eventually arrived home after midnight in a rental vehicle, one factor remained. I broke down after my survey. Lucky.

The next day, I went to the nearest car yard, paid a deposit, and bought a brand, new utility. Sure, I had to pay monthly instalments. Sure, I was in debt. But because I was committed with my business, instead of taking five years to pay the vehicle off, it only took two years. Because it is a newer vehicle, the safety rating is high, the fuel economy is low, and the ride is very comfortable. Considering I regularly drive over four hundred kilometres in one day, this is very advantageous. In fact, it is excellent. Besides, I clean the vehicle religiously, inside and out, so driving into a boat yard, my professionalism is displayed immediately.

And, hand on heart, I have never been late to a survey in eight years of business. The secret? Always plan to arrive an hour early. Take your time, don't rush. An early arrival gives you time to have a coffee and something to eat before work, go for a walk, and scope out the survey site. Several times I have arrived early to find owners doing quick repairs, or running the engine early, or removing equipment that should be on the inventory. Timeliness is excellence.

E. ETIQUETTE

Again, simplicity in etiquette makes the man (or surveyor). An excellent surveyor will stand tall and proud. Do not walk like a body building ape or with a sloped, bent, back. Just stand tall with a straight back, and upright with no slouching. Look your client, the vendor, and broker straight in the eyes when talking, and give good strong, handshakes. With your nicely cleaned, clipped, hands.

On this point, always shake your client's hand and introduce yourself to him or her first. They are paying the bill for your excellent services. Respect.

The surveyor should speak clearly and not mumble. Do not spit or lick your lips, or touch your face. Speak clearly.

Do not lie. Do not exaggerate or tell amazing stories (you think), about yourself. The clients or customer may look interested but actually, they are not. They want you to do your job and survey the boat. The only disregard for this, is if they ask about your previous experience and back ground. They may also want to know about previous vessels surveyed, but again, do not exaggerate or talk about past clients, brokers, or boat owners. Stay to the facts. If you say too much, your client will be thinking, "well what will he say about me to his next clients?"

Do not swear or curse. Uneducated, illiterate, unprofessional, persons swear. Swearing indicates laziness and this will immediately reflect on yourself. An excellent surveyor will not swear. He will be courteous, respectful, and polite at all times.

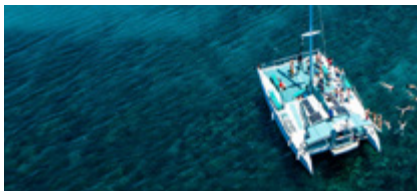
At the same time, listen. Open your ears and listen to your client. The day of survey is stressful but enjoyable for him or her. It will be one of the biggest investments of their lives. They may want to ask questions, talk about the boat and why they want it, they will talk about their personal lives and jobs, and their current circumstance. Listen to them. Comment politely if required. The excellent and intelligent surveyor observes and listens.

F. TOOLS AND EQUIPMENT

So, you have arrived at your survey on time, in your clean vehicle. You showered and shaved, this morning, and even brushed your teeth. Your clothes are clean and crisp, and you are standing tall and proud. You are excellence.

But what about the tools of trade? Your ladder, tools, and carry bags?

The surveyor should have a solid platform to work from. An extendable platform ladder is preferable. Fold-out and collapsible ladders are preferable to stow away in a car for transportation. Never rely on a boat yard to supply a ladder. If using your own, at least you will know it is in good, serviceable condition.



A surveyor has limited tools, but these must be in a serviced, well maintained condition.

Tools will include:

- A plastic or nylon-based hammer for topsides percussion testing so as not to damage the cosmetic finish of the vessel.
- A steel tipped hammer. A nice light-weight steel hammer. These are used for the under-water sections of the vessel. These can also be used on the topsides as long as care is taken not to damage cosmetic coatings. Especially relevant for older, timber vessels.
- A spike or knife for testing for rot, or delamination. Some surveyors even use screw drivers. The author prefers a smaller fold-out type knife for safety and slightly only intrusive damage.
- A good torch that is preferably water proof. Many are on the market and can be impact proof as well as water proof with LED bulbs.
- Various screw drivers. Again, must be maintained in a good, serviceable condition.
- Chalk or masking tape. Used for marking defects for photographs. Remember, all chalk or markings must be removeable.
- Rags. Not just for cleaning oneself, but for cleaning areas to be inspected if required.
- Moisture meter. Several are on the market and of good, quality. Make sure the unit is durable, functional, and calibrated.
- Ultra-sonic testing equipment. Again, a wide range of equipment is on the market. Research what is applicable for your situation, receive qualified training, make sure the equipment is calibrated and certified, and most important, insure, the equipment is of such quality, as to be accepted for evidence in a court of law.
- Spare batteries for torch, camera, moisture and ultra-sonic testing equipment.

Always make sure the equipment is clean, lubricated, and well maintained. Also check battery levels and electrical equipment functionality before use. An excellent surveyor will not turn up to a survey with rusty, tired, malfunctioning equipment. Make sure the tools are stowed an a nice presentable tool box with spare parts. The author has a small stainless steel tool box which is extremely rugged and has so far, lasted eight years of daily use, and still presents well. A modern back pack is used for clip board, paper work, pens, water, and wet weather gear.

A final note on survey equipment. Make sure that foot wear has clear or white soles to prevent marking the vessels deck. Some surveyors even carry separate shoes to wear on board the vessel that will leave no markings. Most boat yards are extremely dirty and unfortunately vessels can be easily marked by residue.

The author always removes foot wear when surveying the interior of vessels. This will guarantee no marking of upholstery. Also watch for zips, studs, or items of clothing that can damage a vessel. A vessel owner will probably ask for reimbursement if his nice upholstery is damaged.

5. The Survey

After presentation to the survey with tools and equipment, the surveyor will make acquaintance with all parties present. This will include the purchaser/client, the vendor, the broker, an engineer, and possibly a yacht rigger. Always introduce yourself to the client first, and then others present. He is the person paying for your services, and the one who trusts you to complete an unbiased, ethical survey for them.

An excellent surveyor must take control of the survey. The broker or vendor must not dictate the terms of survey, timing of survey, or access for survey. The lifting of the vessel for inspection should be arranged prior to the survey date, and all times arranged. Do not be distracted under any circumstances, including, offers of food, hot drinks, stories being told, or even compliments. Never, ever, under any circumstances, accept offers of alcohol or beer, even after the completion of the survey. Remember, if ever taken to court for litigation, everyone will remember the surveyor who was drinking at the survey date. Under all circumstances, again, take control and maintain the survey and appropriate standards.

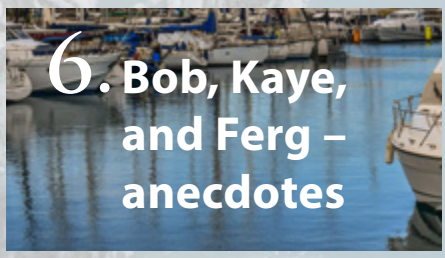
Once the vessel has been slipped for survey, insure all anti-foul coatings have been cleaned and excess marine growth removed. Make sure the vessel is propped properly and in nil danger of falling over. Then commence with percussion testing the underwater and topsides sections followed by moisture meter testing. The writer likes to start at the port aft quarter and work clockwise around the vessel. Each surveyor will have their own order of survey. Be meticulous and more importantly, take your time. Hull skin fittings, shafts, propellers, anodes, paint condition will be checked at this stage.

Once the exterior hull is complete, survey the decks. Again, starting from port aft in a clockwise direction. Then the coach house, cockpit, and boarding platform. Finally survey the anchor locker and lazarette. A vessel can quickly be assessed by the condition of steerage and anchoring equipment. Of course, the exterior survey will also include spars and rigging, life lines, safety equipment, dinghies, life rafts, sails, navigation equipment.

Once satisfied with the exterior inspection, the surveyor will then proceed below decks. Again, a methodical order to the survey is required. The writer usually

surveys the engine compartment first. The reason is simple. If the vessel is to be sea trialled, the last thing to be surveyed would not be the engine compartment, due to a build-up of heat. The engineer will want to spend time in this compartment, so if possible, survey first and move on. Once complete, start either at the stern or the bow of the vessel, and work though each cabin concisely without missing any section. Again, the writer has a detailed inspection check sheet that disallows any section of the vessel to be missed. Make sure any removeable panels are taken off and inspected behind, and make sure all floor boards are taken up and inspected under. An excellent surveyor will inspect every single nook and cranny that is physically possible to inspect, and take great pride in doing so. The day a surveyor gets lazy, cannot be bothered emptying a locker, rushes through the inspection, is the day he or she opens themselves up for litigation.

As per the forward part of this article, an excellent surveyor is passionate about their job, prides themselves with thoroughness, and never rushes the contract through.



6. Bob, Kaye, and Ferg – anecdotes

"Luck is what happens when preparation meets opportunity"
Seneca, Roman Philosopher

Robert John and Kaye Patricia, or Bob and Kaye, are the author's parents. Excellence is acquired from your forebears, teachers, masters, training institutions and mentors. The following anecdotes explain the authors commitment and reasons for the attempt of excellence in marine surveying.

A great deal of time must be taken to learn your craft. The authors father Bob left school at the age of fifteen, and for the next fifty years, painted coaches, trucks, airplanes, and marine vessels of every size and description. The last thirty years in particular were spent in the marine sector. Beside him, every day, the authors mother, Kaye, was also, painting, sanding, preparing boats for painting. Their work ethic was astounding. As time was money, and being self-employed, they would often work for twelve hours a day, seven days a week, for two to three months at a time to complete a job. They then maybe would take two, or three days holiday, and then move on to the next job. Of modest means, resources, and education, their work ethic and commitment were astounding, and definitely recognized in the marine sector. In working hard, they were mortgage free, owned an investment property, have a nice yacht, and raised three children.

When the author started his boat building business in his late twenties, the advice given by his parents was simple. "Do not do anything in business that will not allow you to sleep at night". This meant; no compromise to work standards, no bad workmanship, timeliness, keeping to your quote, and not fraudulently charging the client. No gossiping about local persons, being cheerful, and being respectful. This advice does not just apply to boatbuilding, but is advice that can be directly related to any business, and especially in regards to this article, excellence in surveying. Very simple, humble, advice, but once said, never forgotten.

"The Ferg Factor"

When the author first started his boatbuilding apprenticeship, he worked under a tradesman called John Fergus, or "Ferg" as he is well known. This man has built, input to designs, managed boatbuilding yards, and sailed many races, throughout his long career. However, unless you asked him, you would never know this. This anecdote explains the art of being humble.

On the author's first day of work, Ferg asked for help in feeding out of a timber thickness machine or, planer. The author grabbed the timber, pulling it every which way, twisting turning, and basically turning the job from ease to problematic. First lecture from Mr Ferg. *"Boy, at the moment you are a table. You do not have to move, or do anything with the timber. All you have to do is put your hands at table height and be that. A table".*

Over a friendship of twenty-five years, the author learnt that Ferg had originally attended university to study mathematics, but had given this away for his love of boating and boat building. Following this were businesses and work involving all numbers of vessels and designers. Ferg even gave advice to designers when the need was warranted for improvement. And this was respected and taken into account by the designers. He also built several high-class vessels of his own that anyone would want to own. But again, he would never mention this unless asked. He would rather talk about family, fishing or yacht racing.

As the aforementioned timber working quote, Ferg believed in proper qualifications, trade and time served boat builders. He knew when someone was not suited to the trade. He would tell me if he thought others were extorting clients or not boat building to a high standard.

Another quote from Ferg, *"a good, tradesman boatbuilder ties his shoe laces as a boatbuilder. He sweeps the floor clean as a boat builder. He dresses as a boat builder. And he works to a standard of a boat builder. He is born and trained as a boat builder".*

This can be applied immediately to the profession of surveying in the authors opinion.

"An excellent surveyor dresses as a surveyor, he conducts himself as a surveyor, he inspects a vessel as a surveyor, he writes his reports as a surveyor, and he is always humble as a surveyor"

Enough said.
Go out and be excellent surveyors.

Marine market is urged to reinforce its support for the average adjusting profession

A London seminar earlier this year celebrated 150 years of the Association of Average Adjusters. Delegates heard a call for the marine insurance market to encourage the new generation of average adjusters so that a vital problem-solving resource will remain secure.

Speakers emphasised the need to ensure the profession maintains a robust demographic through market support for the training and development of claims professionals. Speaking to a substantial audience, Stelios Magkanaris and Joseph Shead, both Fellows of the Association, hailed the important industry role the Association plays, as it has done since its foundation in 1869.

Mr Magkanaris called marine insurance law ***"a living mechanism and an intelligent mechanism,"*** declaring: ***"The famous Marine Insurance Act of 1906 constitutes the alphabet, the platform, the canonical rules, the basic solid guidelines on which this construction is based. It is by no means perfect, nor easily comprehensible, it is sometimes confusing and, in some points, draconian; however, it remains the law and has served the industry for over a century and continues to do so."***

The legislation remained unchanged until the Insurance Act of 2015. ***"What has changed, is our perception of the practice of the law. Our practice has evolved on how to apply the Act. We have evolved in how to draft and interpret new tools that aim to serve the business needs of our time."***

Updating of marine cover was driven by the mechanisation of the vessel in the late 19th century, but this could be a long process. For instance, the Inchmaree case of 1887 initiated a major revolution by the addition of a homonymous clause which extended coverage to include losses caused by unseen defects in hull and machinery, and negligence of ship's master and crew. It took almost a century for marine insurance practitioners to fully comprehend the application of the clause. Another big change was wrought by the Torrey Canyon disaster, after which a ship could with an owner's consent, under insurance cover, be destroyed to mitigate an environmental disaster.

Measures to prevent pollution forced the general average rules to change. ***"In 1994, the new XI(d) Rule was introduced to the York-Antwerp Rules, which allows the cost of measures to prevent pollution at a port of refuge."***

Worldwide concern about the impact of polluting vessels on the marine environment led in 1989 to Article 14 of the International Convention for Salvage. It was not until 2019 that the Scopic clause on expenses was tested against the provisions of the law on constructive total loss which were already 113 years old.

At the time of 'the good old Morse code,' underwriting was a difficult task based on a small fraction of information relating to the risk, which meant the Marine Insurance Act had to be draconian in relation to warranties, disclosure of information and absolute good faith.

In today's flood of information, the underwriter cannot claim to be so ignorant when information can be made available with only a few 'clicks'. This led to the complete revision of warranty and disclosure requirements.

New challenges lie ahead with cyber-attacks, arctic voyages and autonomous vessels. ***"Have we thought of the challenges of a general average or a salvage operation in the arctic regions?"*** asked Mr Magkanaris, who concluded: ***"Evolution is learning from mistakes, and marine insurance evolves as every other living being."***

Mr Shead reviewed the course of general average since the York-Antwerp Rules were devised to meet mercantile needs in the 19th century, up to their revision to help casualty management today.

"The role of the average adjuster has evolved over time, as has the form that their work takes," he said. ***"However, at its heart the profession is simply that of a service provider to the shipping world and those that insure it. In other words, we are just a resource that can be called on to resolve difficult points of marine insurance law and general average and one that is not bound to take an adversarial role in an industry where commercial relationships are king."***
Perhaps nowhere was the role better demonstrated than it had been in navigating the difficult path towards drafting a universally accepted set of rules governing general average.

The concept of general average had been recognised in virtually all seafaring nations for centuries, but the form could vary dramatically. Amid what was in contractual terms a 'Wild West' legal environment in the mid-19th century this was untenable, and the various parties wanted a level of uniformity. The stronger parties (normally the shipowners at that time) could include wide-reaching exclusions ***"and effectively have their cake and eat it."***

Whilst it might seem that the competing interests of ship and cargo owners needed to strike a balance, the reality is that most property afloat is insured. Hence it was property insurers that first began to call for a unifying set of rules to govern general average. Intermingled with the stakeholders were average adjusters, or 'men learned in maritime law' as they were then known.

The Rules required constant caretaking (at least every 20 years or so) in order to ensure that they were fit for purpose. Periodic reviews brought new versions to reflect changing technology, and to tease out unintentional consequences, so that as little as possible was left to doubt. ***"So far, the rules have stood up to the challenge. They work,"*** insisted Mr Shead. Adjusters, and on occasion lawyers, tested the Rules in the course of their practice and every so often the courts scrutinised these practices to check that they matched what the Rules said.

Over the years, adjusters had become prone to rely on 'practice', about which the former Supreme Court judge Lord Sumption had said there was a tendency for adjusters to lose sight of the basic concepts expressed in the Rules. Mr Shead said that while this criticism did not do justice to the amount of thought and study that goes into developing adjusting practices, ***"there is certainly some truth to Lord Sumption's comments."***

Mr Shead continued: ***"The effort and time that goes into each version of the Rules is immense, and without support from the various stakeholders, the inclination of suitably informed professionals to become involved in such an arduous task will diminish. However, at present we have a robust, tried and tested mechanism to deal with the fallout from marine casualties.***

"Over the years there have been various calls for general average to be abolished, but the rebuttal to this is always and replace it with what?

"The calls to do away with general average have often been in the context of casualties involving very large container vessels. However, nowhere are the Rules better stress-tested than under these circumstances. And so far, I would argue that they have not been found wanting. The underlying principles which govern such situations, in terms of general average, remain the same. That said, the caretaking process must continue, and the Rules must adapt, but it would seem to me that the adjusting profession continues to be in a good position to assist in this process."

Mr Cornah said that in 1946 the then chairman JR Danson expressed concern about the future of the Association because of falling membership numbers and various uncertainties, ***"but happily I am able to report that today the membership has never been larger, more diverse, and younger."*** Mr Danson had forecast that ***"adjusters will soon have nothing to do"*** because advanced radar would make collisions and stranding near-impossible. Since then, casualties have continued to occur, some of which have been attributable to new technology rather than being prevented by it, and the need for a principled but non-adversarial approach to claims is as strongly felt now as at any time during the last 150 years, emphasised Mr Cornah.

What's required to construct a new vessel type packed full of innovations?

Q-West has built many boats of many types, but Vanguard is the first mussel harvester to be launched from its yard at Castlecliff, Whanganui. Constructed over 12 months, the 30-metre aluminium vessel incorporates several features new to the mussel industry.

In 2018, Scott Gillander of New-Zealand-based company MacLab met with designers and builders to discuss a potential new vessel for its mussel farming operations. The new vessel would be loosely based on the design of previous harvesters, but Scott and his team had requirements that took the new vessel into a new, evolutionary phase.

MacLab does not sell mussels for human consumption, but instead harvests New Zealand green lipped mussels and extracts the bioactives for use in health products.

The vessel was to carry 80+ tonnes of product and equipment, had to be robust and as efficient as possible, and to provide good comfort for the crew.

MacLabs has acquired large new farming areas in Golden Bay, which is open to the ocean swells coming in from the Tasman Sea, and this has caused problems in the past. The company wanted to expand its fleet to reduce its reliance on chartered harvesters.

Mussel farms have what they call "backbones", which are like ropes that run horizontal to the water surface in a tub of water and that might run for a kilometre or more. And then they have ropes that are tied to this backbone that drop vertically down into the water.

A farm has rows of these lines, approximately five to eight metres apart. They might have 10 or 20 of these backbones, and then off them they have a "dropper" that runs down maybe five or six metres and on that dropper is where they grow the mussels.

Those backbones are tied with anchors to the ocean floor. The ropes have buoys on them that are threaded through, which hold the line up and hold the weight of the mussels. Harvesters have davits that hang over the edge, and the davits lift the backbone and the boat "walks" along it. As it comes to a dropper, it lifts the line and puts it through a machine that strips all the mussels off.

The harvesters built to work in the Marlborough Sounds need to be shallow to access the shallow waters of Havelock, so the vessels tend to be beamy and shallow, which suits the sheltered water of the sounds. But these vessels when light are prone to rolling and pitching in the rough sea conditions experienced in open water, making work on deck tiring and sometimes dangerous.

It has been found that after loading twenty or so bags of product the motions of the vessel slow down and working conditions on deck improve, therefore, Scott asked about the possibility of water ballast tanks. Designer Oceantech had discussed the idea in the past, and was keen to incorporate them into this vessel.

VESSEL SPECIFICATIONS

Type of vessel:	Mussel harvester
In survey to:	Maritime New Zealand
Classification:	MNZ Part 40C
Home port:	Nelson, New Zealand
Owner:	MacLab NZ Unit Trust, New Zealand
Operator:	MacLab NZ, New Zealand
Designer:	Oceantech Design, Australia
Builder:	Q-West Boat Builders, New Zealand
Construction material:	Marine Grade Aluminium
Length overall:	30.6m
Length waterline:	28.7m
Beam:	8.8m
Draught:	2.5m
Main engines:	2x Scania DI13 073M, each 405 kW
Propulsion:	2 x Veem fixed pitch propellers, 99 cm
Generators:	Zenith 6BG1QW with a Stamford alternator UCI224G
Steering:	Fluid Power Systems
Driveshaft:	Beattys Driveline
Exhaust system:	Halyard, fabrication by Q-West and lagging by Mount Insulation
Cruise speed:	12 knots
Hydraulic equipment:	Fluid Power Systems
Other equipment:	Ansco harvesting equipment
Electronics supplied by:	Simrad (Advance Trident)
Compass:	Ritchie (Advance Trident)
Inverter:	Massine Ultra (BEP Marine)
Winches:	Muir VRC4500 (Lusty and Blundell)
Anchor:	Sarca
Air conditioning/demist:	Daiken (Freezetec)
Paints/coatings:	Antifoul: Azko Nobel NZ/DR Marine Vinyl coating: Boat Coat
Windows:	Windows West
Doors:	Windows West
Deck hatches:	Kontrail
Seating:	KAB Seating
Lighting:	Hella Marine
Fire insulation:	Fyrewrap Pyrotek
Fire suppression:	FirePro
Panelling:	Ayres
Safety equipment:	RFD Survitec
Liferaft:	RFD Surviva
Fuel capacity:	12,000 litres
Ballast tank capacity:	24,000 litres
Freshwater capacity:	2,000 litres
Crew:	9

The ballast tanks are based on the mass moment of inertia theory. To be the most effective, the required ballast (24 tonnes) was to be located as far as possible from the axis of rotation (the vessel's centreline). The fact that MacLabs wanted a vessel of 8.5 metres beam made this even more effective. As the vessel is loaded up with mussel bags, the crew starts pumping water off to maintain the balance.

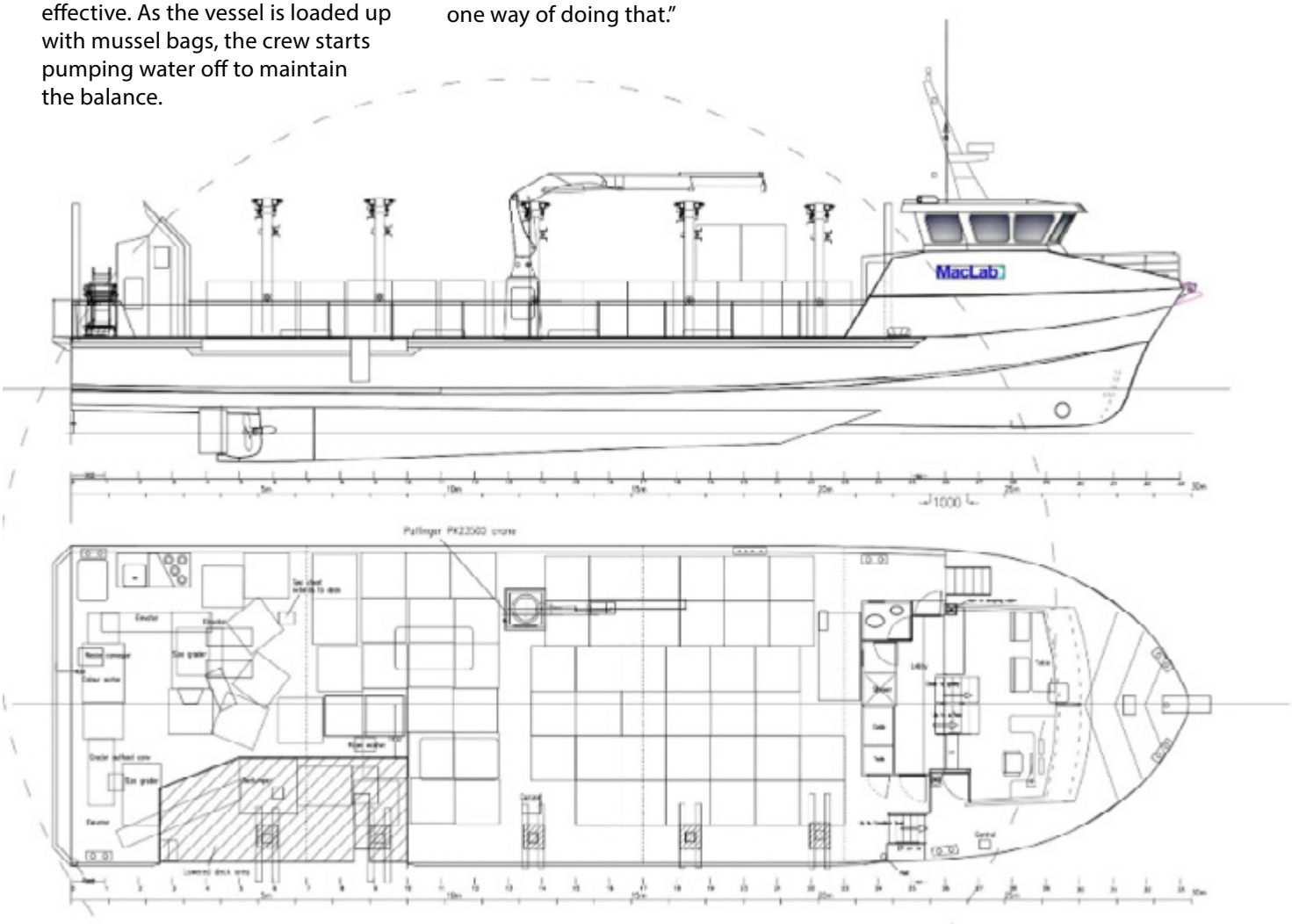
Another attribute of the ballast tanks is the extra longitudinal strength they provide. The ballast tanks caused some interesting construction and plumbing challenges, which were solved, and the system has turned out to be very effective.

"It's an effort to provide a better platform," commented Colin Mitchell, CEO of builder Q-West. "If you look back some of them have tried building catamaran mussel harvesters. There's a few now that some of them are building that have a central well where all the bags get put down into. They're always developing or innovating and trying to make the boats more stable in the water when they're working on them. And this was just one way of doing that."

In the past, many harvesting operations would load the boat all day, stacking the bags on top of each other, which sometimes resulted in the product being crushed. The way Vanguard was designed, it can take eighty-five tonnes on one level, and then the crew will steam those mussels back to unload at Nelson and go out again.

From the dock, MacLab takes the product to its factory where the process is to put them though other machines to sort them. As the active compounds can be degraded by heat or exposure to air (among other things), MacLab's processes are highly engineered to prevent degradation occurring, thus maintaining the bioactive properties of the product.

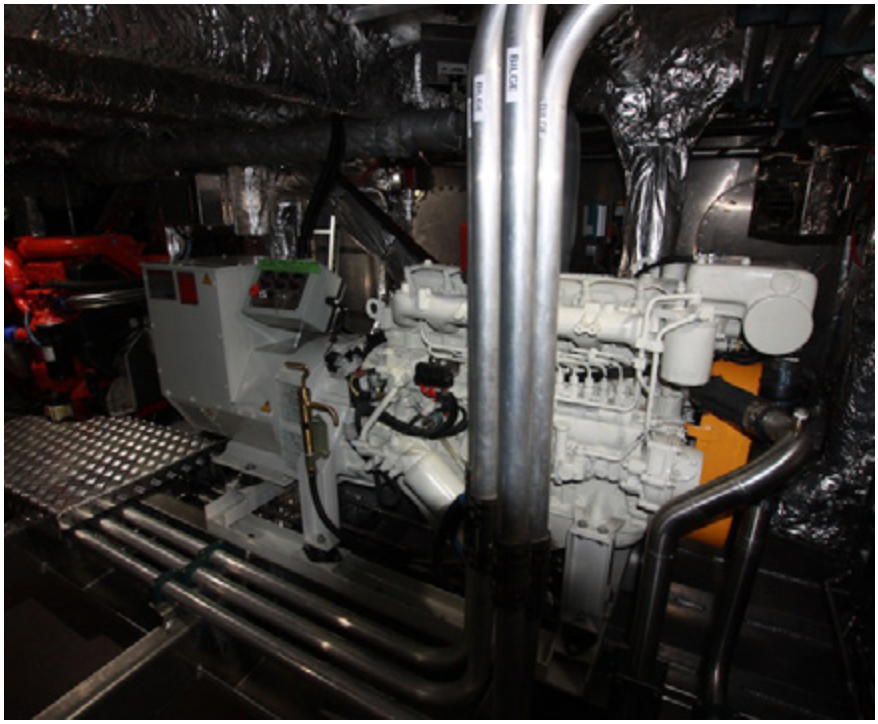
Vanguard's machinery layout is fairly conventional, with two 13-litre, six-cylinder Scania DI13 073M main engines rated at 405 kilowatts driving ZF 360A 2.609:1



reduction gearboxes and 39" (99cm) Veem propellers. The drive shafts are provided with thrust bearings.

A Scania DI13 071M auxiliary engine rated at 285 kilowatts powers the hydraulic and water pumps, and an Isuzu 70kVA genset supplies all the electricity requirements.

"You've got two propulsion engines, you've got one large genset and then you've got one engine that's dedicated to hydraulics which is the same size as the propulsion engines," said Q-West CEO Colin Mitchell. "So you've got a lot of machinery in there and these things run all day every day. These guys will be out there fishing, pulling the mussels, steaming home, unloading, and then go back out again, back and forth."



The fitting of a colour grader on deck necessitated the fitting of two large air compressors and air tanks below, but room was found for these and all the water ballast plumbing without over-crowding.

Once aboard, all the muscles get sorted because you get a mixture of blue and green mussels and the blue mussels have no value. The mussels all drop in front of the lasers in the colour grader and compressed air sifts the blue ones out of the way, sending them over the side while the green ones then go into bags and get stored on the boat.

"The boats might be simple looking on the outside, but below decks you have the hydraulics, compressor units, the water pumps etc.," Said Q-West CEO Colin Mitchell. "So that was a real challenge for us to get our head around, especially when costing it and deciding what we needed to do in terms of building. It's something we've never done before."

Mitchell said Q-West also worked hard to make the boat easy to service and maintain, with additional systems and materials to minimise corrosion and maintenance, and an emphasis on easy accessibility in the engine room.

"The builders at Q-West and the engineers from Fluid Power hydraulics did a great job of economically fitting all the machinery and connecting pipe work while still providing easy access everywhere," added Oceantech's Jon Kemp.

The general layout of the vessel is similar to recent harvesters, with accommodation forward, followed by the tank room, engine room then lazarette. The harvesting machinery is aft on deck, with a lowered section of the deck keeping the pick-up and declumper closer to the water. Because the vessel will be used for a wide variety of work, it has been fitted with five davits instead of the usual four.

The bridge and accommodation are air conditioned and feature KAB seating. Accommodation is provided for six crew with a complete galley down below.

Vanguard left Whanganui fully operational and was hauling mussel lines within days of arriving at Port Nelson. On its third full day it went out, it did an 80-tonne harvest in Golden Bay and delivered it to Nelson.

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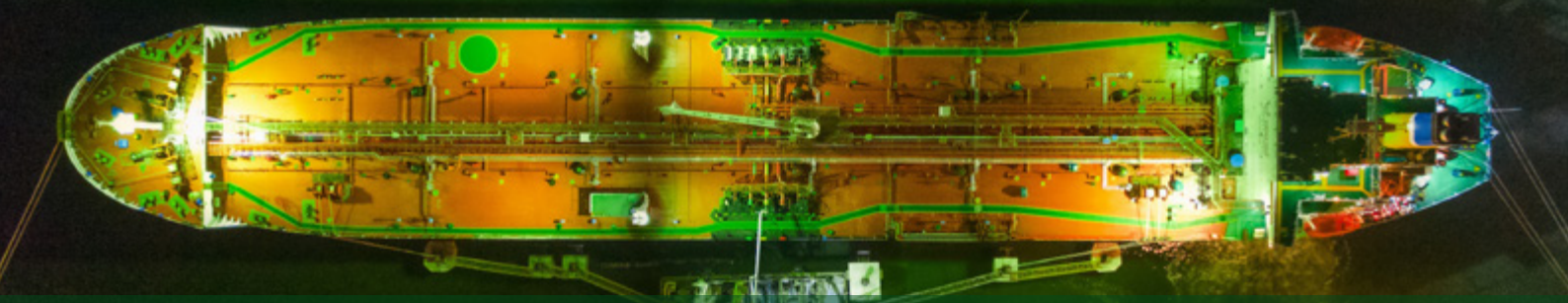
THE SHIPPING INDUSTRY MUST ADAPT IF IT'S TO SURVIVE IN THE MODERN WORLD

by **Alex Katsomitros**



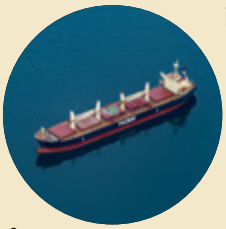
A host of technological, environmental and geopolitical challenges will test the resilience of the maritime sector over the coming decades writes Alex Katsomitros.

Cheap, clean fuel is an asset that can make or break a shipping company's balance sheet. Consequently, firms have increasingly turned to liquefied natural gas (LNG) to reduce their impact on the environment. But while LNG is less harmful than traditional alternatives, such as heavy fuel oil, the cost of installing the necessary equipment is often prohibitive. What's more, the heavy metallic tanks used to store the fuel reduce the volume of freight LNG-powered vessels can carry.

Ocean Finance, an Athens-based business development and consulting firm that operates across the maritime and energy sectors, may have a solution to the problem. In partnership with Cimarron Composites, an American advanced composite structure manufacturer, Ocean Finance is building a carbon-fibre tank that is up to 90 percent lighter than conventional tanks, borrowing technology and techniques from the aerospace industry.

"We were searching for green solutions for high-speed vessels and we came across equipment that NASA uses to launch rockets into space," Panagiotis Zacharioudakis, Director at Ocean Finance, told World Finance. "Every gram counts in this process, which is quite relevant for the shipping industry." The tank, which has already received preliminary approval from the American Bureau of Shipping, is expected to become available this spring. It can also be retrofitted to store liquefied hydrogen, a fuel considered to be the greenest solution for the shipping industry moving forward.

Not all in the same boat



Such moves are imperative for an industry that accounted for approximately 3.1 percent of carbon dioxide emissions globally between 2007 and 2012, according to the International Maritime Organisation (IMO). The IMO wants the maritime sector to cut its greenhouse gas emissions by at least 50 percent by 2050 compared to 2008 levels. At the beginning of the year, it imposed new regulations that limit the sulphur content of marine fuel to 0.5 percent mass by mass, effectively increasing fuel costs for most shipping companies. Only ships equipped with exhaust gas cleaning systems are exempt from the regulation.

"The target… is ambitious," Harilaos Psaraftis, a maritime logistics professor at the Technical University of Denmark, told World Finance. "The IMO process is way too slow, mainly as a result of political obstacles." In response, several organisations representing the industry submitted a proposal in December to form a collaborative research and development programme aimed at finding green solutions, with participants providing funding of around $5bn over 10 years.

The transition to greener technology poses a conundrum to shipowners, though, as they are forced to make investment decisions without having a clear picture of the industry's future needs and regulatory framework. "A ship ordered in 2025 will still need to be operating in 2050, if the owner is not to face substantial losses," Pyers Tucker, Head of Strategy at Hapag-Lloyd, a German international shipping and container company, told World Finance.

"Companies that are fortunate enough to place their bets well will survive; the rest will struggle – or go under – with assets that will have devalued much faster than their worst-case business plans. Any new ships we order in the next few years will almost certainly be LNG-capable… [But] the shipping industry will not be able to solve this [problem] on its own."

For an industry notorious for its aversion to change, ditching carbon fuel will be highly disruptive. When container shipping appeared in the late 1950s, it revolutionised the sector by creating unprecedented economies of scale. Companies transporting crude oil from the Middle East to the manufacturing powerhouses of the developed world thrived, but the demise of fossil fuels now threatens to unravel these global supply chains.

The maritime sector's traditional affiliation with the energy industry makes planning a risky business for shipowners. In 2018, fossil fuels accounted for more than a third of the cargo transported by ships globally. With commentators earmarking peak oil – the hypothetical point at which global oil production hits its maximum, before falling into terminal decline – to be reached within the next two decades, a significant portion of the sector may face an existential crisis.

Steve Saxon, a partner at McKinsey & Company specialising in shipping and logistics, told World Finance: "Demand for large-scale crude tankers will taper off and ultimately may decline. More interestingly, we see the product mix shifting. With the growth in refining in the Middle East, we see more demand for product and chemical tankers, which appear bright spots for shipping."

All hands on tech

One way the industry can adjust to the new era is by embracing automation.

Autonomous cargo ships have long been touted as the next big thing, combining cost-efficiency with green credentials. Two Norwegian companies, Yara International and Kongsberg Maritime, expect to launch the world's first autonomous, zero-emission container vessel this year, but many in the industry are sceptical. "We don't see autonomous cargo ships as more than a short-distance gimmick," Tucker told World Finance. "For deep-sea services, we can envisage remotely piloted cargo ships – perhaps with small maintenance crews helicoptered on/off – as… a more realistic future."

As with driverless vehicles, the advent of autonomous technology in the shipping industry poses a series of legal and ethical questions, from liability to insurance costs. The industry's presence across multiple jurisdictions adds extra complexity. Philip Damas, Head of Drewry Supply Chain Advisors, the logistics arm of UK maritime research consultancy Drewry Group, told World Finance: "The question is whether governments, regulators and insurers around the world will be willing to accept – and coordinate – such a dramatic switch in a worldwide industry like global maritime transport."

According to Stuart Neil, Communications Director at the International Chamber of Shipping, the technology is not currently advanced enough to have a significant impact on the industry: "If we look at the automotive industry, driverless technology took decades to develop and has yet to impact the job market. We see no reason as to why autonomous technology for shipping will be markedly different."

Some think that autonomous ships may fill a gap in niche markets such as short-haul services in territorial waters, where proximity to land and high labour costs could push shipowners to experiment with new solutions. However, Saxon believes the same cannot be said for ocean-going cargo ships: "Crew costs are a relatively small part of the cost base of a shipping company, maybe one to five percent… Second, the range of things [that] can go wrong and need attention is broad. The ships are often days from the nearest port; the risks of fully autonomous [vessels] are too high."

The maritime sector has long been riddled with arcane bureaucracy and complex supply chains

As a traditional business-to-business industry, shipping has so far evaded the dangers of 'platformisation' – a trend that has disrupted many customer-orientated industries with online marketplaces, eliminating the need for intermediaries. That said, some platforms are beginning to gain traction in niche areas such as freight forwarding. Online freight forwarder Flexport, for example, uses data to automate manual processes and integrate fragmented supply chains.

Jan van Casteren, Flexport's vice president of Europe, said: "It can take up to 18 different companies to get a single shipment from point A to point B. Today, logistics professionals have to deal with each of these challenges separately because there is no end-to-end solution to move, finance and make better decisions about freight." Another platform, Freightos, operates as an online marketplace for small exporters and importers, allowing users to compare freight quotes from several forwarders and track their orders.

In response to the emergence of new players, many container lines have created digital platforms. In February, Evergreen Line, one of Asia's largest container lines, announced the launch of GreenX, a digital platform that provides customers with seamless booking and trade services. Freight forwarders are also rushing to set up customer-facing websites: Kuehne and Nagel, the world's largest

ocean freight forwarder, launched a platform that provides booking and quoting services in April 2019.

Many start-ups remain customers of incumbent shipping companies, but Saxon believes they may pose a bigger threat to established players in the future: "The question for shipping companies is whether they can innovate and reinvent themselves fast enough, or lose the customer relationship to new platforms."

Chain reaction

The hype surrounding blockchain, the ledger technology underpinning cryptocurrencies, was not lost on the maritime sector, which has long been riddled with arcane bureaucracy and complex supply chains. According to Saxon, an estimated $19bn is wasted in the container shipping value chain every year due to a lack of communication and suboptimal use of capacity. Despite this, practical uses of blockchain in the sector remain modest.

As Damas explained, "The noise around the predictions that blockchain will… revolutionise global transport and global trade has decreased in the past three years. At present, efforts are concentrated on data standards and governance, without which blockchain cannot work."

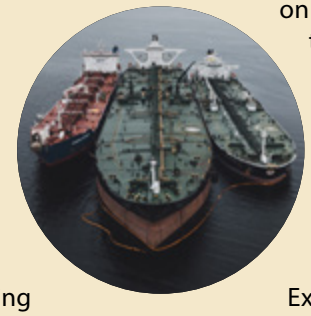
Nearly all major shipping firms have been involved in blockchain initiatives and consortia. Maersk, the world's largest container ship and supply vessel operator, has partnered with IBM to create TradeLens, a blockchain-based digital tracking system that enables members to track freight transportation in real time. Since its launch in 2018, the platform has attracted some of the world's largest overseas shipping companies, including Hapag-Lloyd, ONE, CMA CGM and the Mediterranean Shipping Company.

Damas believes further innovation lies ahead: "Because global maritime transport is notoriously fragmented, with numerous documents, stakeholders and hand offs, we believe that blockchain cooperation, centralisation and smart contracts could deliver enormous benefits to providers and users of international transport in the long term. Today, these activities employ thousands of employees among exporters, importers, traders, transport companies, ports and banks engaged in international trade."

The increasing use of sophisticated technology will pose significant challenges to ports, many of which lack the necessary infrastructure to accommodate blockchain-enabled solutions. Neil told World Finance: "Blockchain can help improve efficiency, but this requires all ports to have the appropriate facilities to make use of this technology, as well as regulatory changes, which will be difficult to implement."

According to Research and Markets, the global smart port market will be worth approximately $5.3bn by the end of 2024, driven by initiatives to make the transport of goods cheaper and faster.

Choppy waters



Currently, shipping is the dominant mode of transporting goods, with more than 90 percent of world trade being seaborne. According to the UN Conference on Trade and Development (UNCTAD), vessels transported 11 billion tons of goods in 2018, a 2.7 percent increase on the previous year. However, the industry is vulnerable to strong headwinds in global politics.

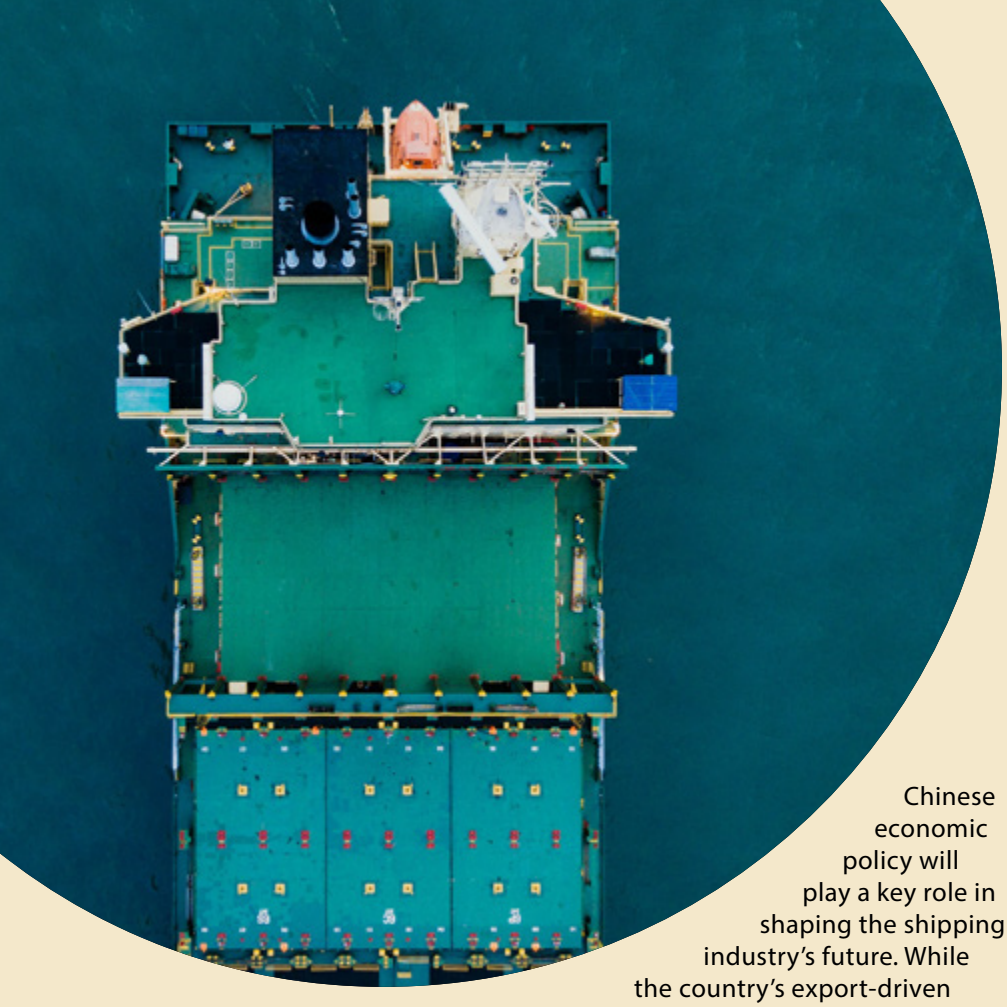
Populist politicians in Europe and the US often point to international trade as one of the reasons for increasing inequality, questioning the rules-based status quo that was established after the Second World War. Global foreign direct investment (FDI) dropped for a third consecutive year in 2018 while many multinationals are reportedly scaling back their global supply chains. Experts fear that fragmentation will ensue, with trade blocs becoming increasingly insular and relying on sheer power to promote their interests.

Tucker believes such a move would be catastrophic for the shipping industry, which has benefitted enormously from globalisation in the past. He said, "'Might' is becoming 'right' again. This is likely to constrain global and regional trade in unpredictable ways. It will likely dampen overall global trade growth and make shipping more risky and expensive."

Others, however, think the sector will find ways to adjust. Dr Martin Stopford, Non-Executive President at Clarkson Research Services, a provider of data and market intelligence for the shipping sector, told World Finance: "In future decades, the focus is likely to be on regional rather than global trade… China is no longer cheap, and the developing countries are no longer willing to do deals for raw materials or to import foreign goods – they want to build their own economies."

Experts fear that trade blocs will become increasingly insular and rely on sheer power to promote their interests

Peter Sand, Chief Shipping Analyst at BIMCO, a Copenhagen-based shipping association that represents shipowners, told World Finance: "BIMCO doubts that the agreed… volumes will be reached, given the huge increase, but any boost to volumes will benefit the shipping industry, especially given the long sailing distances between



the US and China, boosting tonne-mile demand."

The trade war has pushed many firms in the two countries to think laterally. Some Chinese manufacturers have shifted production to nearby countries such as Vietnam to avoid sanctions, while imports from the US have been partly replaced with increasing volumes of trade from Brazil and Australia, among other nations. Chinese exporters have also turned their attention towards Northern Europe as an alternative destination market.

Simon Heaney, Senior Manager (Container Research) at Drewry, told World Finance: "The current situation is probably a blip in the long-term trend, and normality will resume once the main actors are consigned to the history books. However, the world is likely to remain volatile, so the risk of isolated trade disputes flaring up will be a constant, which will contribute to more diverse manufacturing sourcing strategies [that] spread the risk."

Chinese economic policy will play a key role in shaping the shipping industry's future. While the country's export-driven boom has enormously benefitted the sector over the past three decades, China's GDP growth rate slowed to 6.1 percent in 2019 – its lowest rate since 1990 – and trade with the rest of the world has been steadily declining. This is in line with the government's policy of transitioning from an export-driven economic model to one focused on domestic consumption and services.

"As the Chinese economy continues to mature, an increasing proportion of this GDP growth is actually due to the expansion of service industries, rather than manufacturing or infrastructure development, which does not generate the same demand for shipping," Stuart explained to World Finance, "A lot will depend on how China manages any slowdown."

The COVID-19 crisis will also test the resilience of the Chinese economy. In January, the Baltic Capesize Index, which tracks freight costs for dry bulk commodities, slipped below zero for the first time. "The current coronavirus outbreak has highlighted the danger of being over reliant on one source," Heaney said. "I believe these factors will lead to less China-centric shipping in the future."

A new course

In the long term, radical changes to industrial production may affect the role of shipping in world trade. New technology, including robotics, artificial intelligence and 3D printing, is expected to boost localised manufacturing, reducing the need for long-distance trade. A recent study by Research and Markets predicted that the global 3D printing market would more than triple in value by 2024, reaching $34.8bn.

Sand told World Finance: "Container shipping on the major trades – from manufacturing nations in the Far East to Europe and North America – relies on manufacturing continuing to take place away from the consumption regions. Anything that threatens this, including 3D printing and nearshoring, threatens container shipping. The industry is… already feeling the pain from the changing nature of economies around the world, with growth recently focused more around services, rather than the sectors of the economy that promote the physical trading of goods".

Shorter distances and lower trade volumes, combined with the push to cut gas emissions, may benefit the industry by forcing it to reinvent itself. As Stopford told World Finance: "Shipping would focus much more on local business-to-business services, using the new generation information technology to provide reliable sea transport to outlying ports. Some analysts are doubtful about this 'Uber of the seas' philosophy, but Uber's great achievement was to bring cab services to areas that previously did not have them, generating growth. Maybe ships can do the same."

Article authored by Alex Katsomitros and reprinted from World Finance
www.worldfinance.com

Managing the most extreme remote workers

by **Pip Hare**

"In 2020, I will enter the world's toughest single-handed yacht race with the ambition to break the current female record. Over ten years of preparation have led me to this point and the journey has not been easy." **Pip Hare**

As Pip Hare begins her final preparations for the Vendée Globe, scheduled to depart France in November 2020, she has written a blog in which she talks about the detailed preparation necessary, including meticulous risk management, for her adventure and how she will be remotely monitored and the backup that is available to her.

About Pip Hare

- Pip is an athlete who holds two world first endurance records
- Pip is the winner of multiple international yacht races
- Pip has twenty years of experience ocean racing

When not racing her yacht, Pip is:

- An inspirational, motivational and engaging speaker
- A print and online journalist with international readership
- A spokesperson - on message and passionate, experienced in TV and Radio, able to give interviews in English, French and Spanish
- A blogger, revealing the human story behind extreme sports
- A professional coach who trains international sailors for world class events
- An author and presenter of online videos, including 'Sail Faster Sail Safer'

"When I race around the world in November this year, I will be navigating my 60ft IMOCA, alone, through the most remote waters in the world. It is said that at some points in the Southern Ocean I could be nearer to another human being on the International space station than on any terrestrial land mass. This is extreme geographical isolation, but I will not be alone. Alongside me will be 33 fellow international competitors, overseeing us all will be the race committee at their HQ in France and on the shore I will have my team, watching my progress and ready with support.

The race will be managed remotely by the Vendee Globe Race committee, they are responsible for adherence to rules, crisis management and the sharing interactive and engaging race coverage with the outside world. A huge part of the race committee's risk management strategy, is a solid and regular communications process. It is only through direct communication with each of the 34 skippers that the committee are able to build an accurate picture of what is happening on each of the boats and use this information to tell the story of the race, keep audiences

engaged, forecast and mitigate problems before they escalate and in the worst-case scenario co-ordinate rescue and recovery.

As many of us world over settled into an extended period of staying at home, and with businesses are now adapting to the management of remote workers I thought it may be interesting to compare how the race committee and shore teams manage communication with skippers while we are racing and how as I skipper I separate and manage my comms when time is limited and voice call cost £5 per minute.

Daily check ins - the drum beat

The drum beat of this communication is the daily check in, this can be done by phone and via text or email. It's a scheduled communication to establish my welfare, to get the 'heads up' for any problems I may see arising in the future.

The Race committee will check in regularly with all sailors on the water, for the entire duration of the race. It allows them to 'health check' the fleet and build a picture of how the race is developing and what might happen next. This will be used to direct external communications and to provide vital information for forwards planning and management of risk.

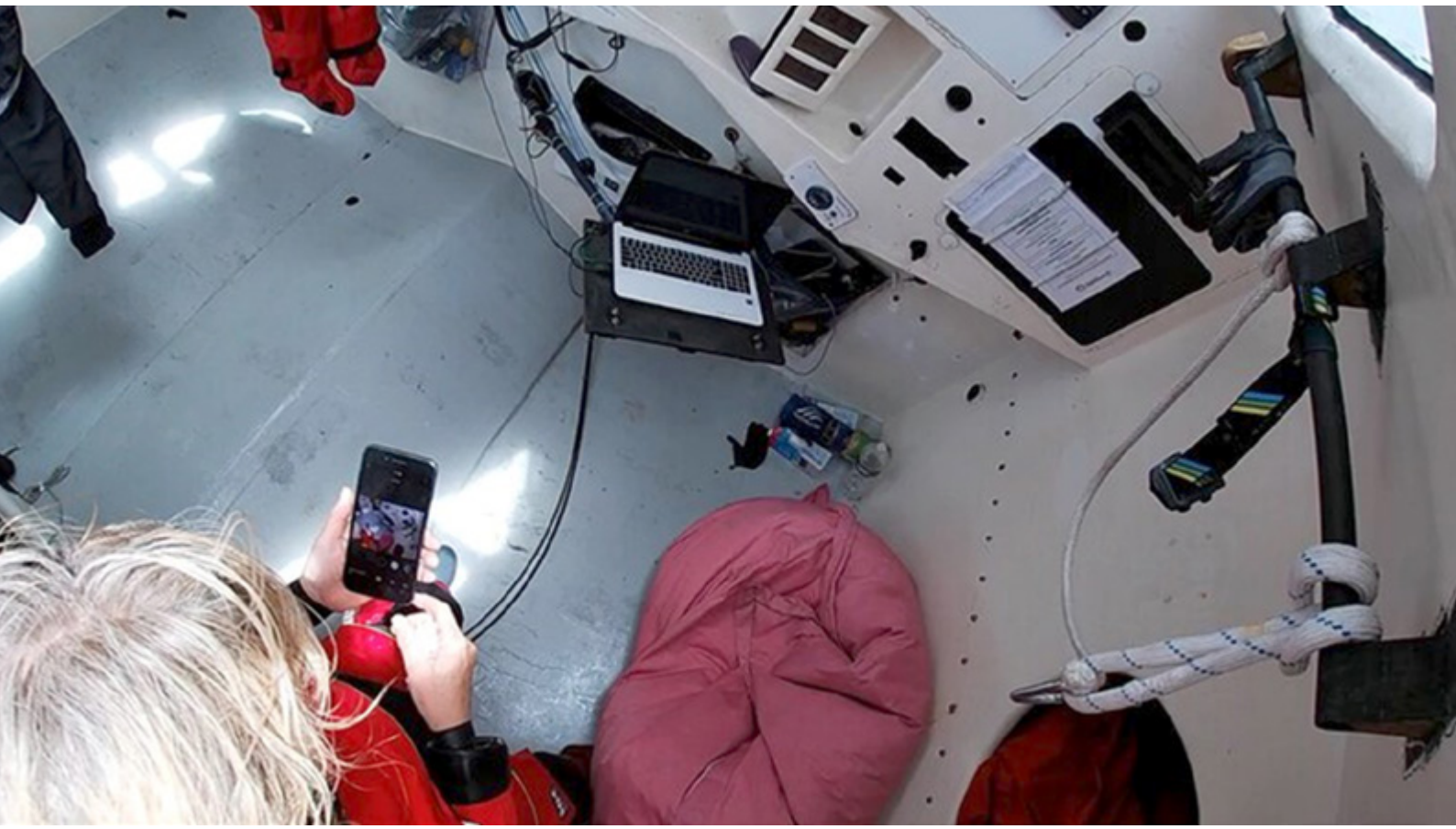
I choose to check in with my shore team once a day by phone. We schedule the calls one week in advance, to reflect the time zone I am traveling through and ensure we are both ready for the call.

I manage routine voice calls on two basic principles: honesty and focus.

HONESTY:
Both my team and the race committee rely on me to tell the truth about the situation on board every time I check in. From a risk management point of view it is better for the committee to know that I had a problem and fixed it, than for a problem to escalate.

Pip Hare OCEAN RACING

FOCUS:
Quite often there will be little time to convey information. The satellite signal may be weak or something may happen on the boat which requires immediate attention. In these situations, we need focussed and efficient conversations. The objective of the call is to establish my welfare and the current status conditions on board; this is always done in the first few minutes of the call. My team have set questions to ask and once this is finished we can move onto 'any other business' which adds colour to the picture. At times when I am not able to stay on the call, I can confirm everything is ok then add information later using email or text message. We use messaging systems such as What's app to great affect via satellite. The ability to send photos, videos, voice recordings and text messages takes a lot of the leg work out of sharing information quickly and simply.



Reporting Problems

Race control will be watching our trackers 24 hours a day and monitoring weather forecasts, using experts to predict the routes any competitor might take, allowing for the age of the boat and the current status of skipper and vessel. Our performance will be monitored and any unexpected course changes or drops in speed will raise a flag to race control. If I don't check in to explain drastic changes in performance the race committee will try to call me and contact my shore team to see if they have any information.

It is down to me to report to the Race committee any problems on board which affect my performance – this can be done directly by me or relayed through my shore team. Once reported the committee will assess the level of risk and advise a further communication plan going forwards, involving the shore team. I will inform someone ashore of any actions I intend to take which will involve and increased personal risk during the race. Examples of this could be climbing the mast, the need to go over the side of the boat – to check damage or make repairs or if I am ill and need to administer first aid or medicine to myself. In this event I will report both to my team or the race doctor, I will tell them what I intend to do, how long I expect it to take and we will agree a schedule of communication going forwards. If we agree a communication schedule it is my job to stick to it, reporting progress and confirming all is ok. Failure to communicate, either for me to answer or to make a scheduled call will be considered as an escalation of the situation.

Crisis Management

Communication between my boat and the shore changes very little when a problem is escalated to 'crisis' level – there is simply more of it. However, when a crisis occurs, the wider communication must be addressed, this includes:

Other competitors: Those within close geographical range may need to be alerted and on standby to provide help if necessary.

Rescue Services: In extreme cases race management will need to work with Maritime Rescue Co-ordination centres to divert rescue services or commercial shipping to help.

The Media: Details of any emerging crisis will need to be communicated in an appropriate way to the press, with content and time lines agreed both by the Race management PR team and the PR teams from my own team and sponsors. At the start of the race there will be a crisis management protocol in place, nominating the individuals who will should be notified and will be consulted in the event of a crisis.

Problem Solving - remote help

Despite being single handed I am allowed to receive help and advice to help me fix problems on the boat. This advice is limited to the fixing of equipment or medical support but it cannot stretch to performance related advice. When I have a problem, I am not able to fix alone I will reach out to my shore team and network to help me find a solution. Satellite data and call charges are expensive, so it is important for me to be precise and concise in my communications. Before reaching out for help I consider the following things.

Speak to the right person

Who is the best person to speak to about this problem? Who is an expert with this piece of kit, type of repair? Who has experience or understands the limitations of working alone on a moving boat? Do they know what tools I have available? I may need to speak with more than one person, but the responses should be co-ordinated to avoid going over the same ground or conflict of instructions.

Pre-load information

What information can I collate and send to help them understand the situation?

I like to 'preload' information before making a call, I will use videos, photos and will normally set out my issues in an email, this way I can ensure all information is given and can be understood before I speak in person to anyone. Including information about what I have already tried or my own hypothesis for a solution.

Timing

I need to set out my time line, including expected response times from the team. This considers, the rate at which a problem is escalating, current weather, other immediate issues in my own environment, business hours to get hold of experts in different places around the world, and daylight hours if this is important to my work. Once initial contact has been made the team will set out a schedule of comms to help manage a quick solution and ensure I do not miss a call.

Escalation

Once again this is down to me to report. If damage starts to get worse, or if I am ill or injured and other symptoms start to develop. I must communicate any escalation to the team ashore to ensure everybody is working from the most up to date information.

Problems solving - emotional support

Being alone is something I am very comfortable with. I actually enjoy it and when I am absorbed in the everyday business of sailing my boat I don't often feel the need to chat. That said, there is something very comforting in knowing that another human being is there to listen after a particularly hard day, when facing disappointment or when I am scared.

This type of communication is less structured, it's a getting it off your chest offloading of emotion. I don't need or want to speak with an expert at these times. Instead I will choose one or two people to speak to when I need to offload. The importance here is that the person on the end of the phone is able to understand the context of my situation and not to panic if things sound bad. Sleep deprivation has a massive impact on emotional response, things that are said during an 'in-the-moment' outpouring, may seem entirely irrelevant after a 30-minute cat nap and a hot cup of tea. Often a response is not needed, just an ear to listen. It's a tough job to be this person on the end of the phone, it's exhausting to hear someone else's problems and it's hard to know whether to be concerned or frightened on my behalf. It is important that my 'emotional support' person is able to stay calm,

to have broad shoulders and if they have genuine concerns that they themselves know who to talk to.

I don't often feel the need to reach out in this way. Many of my previous races have been communication free, with no contact allowed between shore and boat so I have had to adapt. When communication is allowed I am often restricted by budget so lengthy sat phone calls were out of the question. When I am struggling emotionally I try to write things down, I'll write an email to an unknown recipient, detailing why I am struggling, getting it all down on paper. More often than not by the time the email is written I no longer feel the need to share it. Somehow the action of writing it down, then reading it makes everything feel less oppressive. It allows me to gain perspective and to work through my own emotions alone. I know that the Vendee Globe is going to push me harder and further than ever before. Sailing in the Southern Ocean alone will, I have no doubt, be terrifying; three months at sea will be the longest I have ever been alone and so despite my learned self-reliance I fully expect I will need this emotional support during the next race.

Sharing the good times

In order for our race to be successful we need to share the story in a consistent and engaging way throughout the entire duration of the race. A vital part of my job afloat is to get my story off the boat. This will be communicated through video, written pieces and in telephone interviews. This type of communication is uniquely me, I will be really trying to share my experience in way that can be understood by everyone. Yes I am a sailor, taking part in an elite sporting event, but I am also a human being and to be alone for three months, sleep deprived, pushing myself physically and mentally, dealing with the challenges alone, being knocked down and getting back up again, smiling, laughing, crying – these are all experiences we can relate to and this is what I intend to share."

About the Vendée Globe race

The Vendée Globe is a single-handed (solo) non-stop yacht race around the world without assistance - 24,000 miles in distance. The race was founded by Philippe Jeantot in 1989 and since 1992 has taken place every four years. It is named after the Département of Vendée in France where the race starts and ends. The Vendée Globe is considered an extreme quest of individual endurance and the ultimate test in ocean racing.

The race is open to monohull yachts conforming to the Open 60 class criteria. Prior to 2004, the race was also open to Open 50 boats. The Open classes are unrestricted in certain aspects, but a box rule governs parameters such as overall length, draught, appendages and stability, as well as numerous other safety features.

Since its inception in 1989, fewer than 100 international skippers have completed the race. By comparison, that is less than 3% of the total number of people who have climbed Everest! Only 7 women in history and fewer than 10 British skippers in total have ever finished the race.

WHAT SURVEYORS OUGHT TO KNOW ABOUT FASTENINGS

PART I

BY **EUR. ING. JEFFREY N. CASCIANI-WOOD**
Hon FIIMS

If all else fails, use ******* great nails
Traditional shipwright's working rule - Orchard Dock, East London.

Among shipwrights and boat builders in the United Kingdom items such as treenails, nails, screws, spikes, bolts, drifts, dumps, rivets *etc.* are called fasten***ings*** whereas clips, hooks and eyes, toggles and press studs are called fasten***ers***. American practice is to call them all fasten***ers***. The marine surveyor should be aware of the difference. The fastenings are the weakest part of the structure of any wooden boat and must be carefully examined particularly in the ends or butts of individual planks as they can often be the cause of the plank splitting and those splits will then become the entry point for all kinds of defects including worm and soft rot. That is especially so if the timber is of poor quality.

Mechanical fastenings should be chosen for their suitability for the intended service. Ferrous fastenings, ideally, should be hot dip zinc galvanized but may, as a good substitute, be Chinese or Swedish galvanized. Brass is never acceptable where it may come into contact with salt water as it will de-zincify and, in any case, is inherently weak and soft. Care should be exercised in selecting fastening materials because of the problem of galvanic action which can arise when different metals are placed close to one another in wet wood. A careful selection of fastening materials will significantly reduce the incidence of corrosion and, thereby, extend a vessel's service or working life. Marine applications of stainless steels are subject to both contact and crevice corrosion and may corrode at an alarming rate particularly if used to fasten wooden planking below the waterline. If the stainless steel is unable to form natually a thin film of chromium oxide – a process called passification – to shield it from attack, then corrosive liquids such as sea water are able to establish electrolytic cells with chloride ions and corrosion often in the form of deep pits takes place. The best stainless steel to use in marine applications is grade 316L due to the 3% molybdenum in its chemical make up. To enable stainless steel to be used under seawater the following conditions should be met:

- **the metal should be Grade AS316L austenitic.**
- **the fastening should not pass through wet wood.**
- **there should be ample luting under the head and between all mating surfaces.**
- **the item to be fastened should be less noble that the stainless steel; *i.e.*, all copper alloys and, with a slight risk of hole enlargement, iron and steel.**

Fastenings are manufactured from many different materials and the marine surveyor must be aware of the differing corrosion characteristics of these – See Table 1.
As an approximate guide the marine surveyor should note that bronze fastenings are regarded as a mark of quality, copper nails are common practice and perform well, brass should never be used except, perhaps, on interior joinery as it rapidly dezincifies and iron always rusts and can cause softening problems on such timber as oak.

Most fastening are put in straight *i.e.*, with their centreline square to the face of the timber but when two fastenings are put into a piece such as either side of a wide plank they are often fitted at an angle to each other and are then said to be dovetailed. Fastenings through planking to the vessel's timbers are often fitted alternately splayed inward and splayed outward. It makes the plank less likely to spring. The fastenings are of eight main types with various sub types as discussed above.

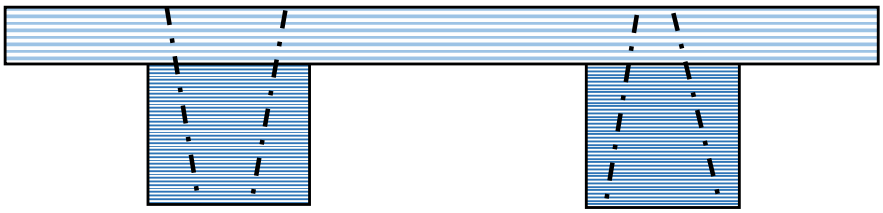


Figure 1 - Dovetailed Fastenings

Copper Boat Nails

This is the commonest method of fastening planking to the timbers, particularly in the smaller boats. They may be either clenched or turned. Clenched nails are driven through the planking/timber joint from the outside and, using a rove punch, a copper washer, rove, roove or burr depending upon which part of the country the reader is in, is driven hard over the point of the nail, the surplus copper of the nail is then cut off and the nail end is then riveted or clenched or burred hard over onto the rove. The hole through the planking should not be drilled out but a guide hole is put through the wood in the desired place using a piercer. A three inch length of suitable diameter welding rod with the end flattened to form a diamond and then filed to make a sharp point forms an excellent piercer. The author still has half a dozen or so of these among his collection of tools. A clenched nail forms a permanent fastening but can weaken with age as the timbers work during their life. The little bits of copper cut off the end of the nail were regarded as the apprentice's perks. The money made from a bucketful of little bits of copper sold to the local scrapyard made a useful addition to the pittance that the apprentices were paid. The nails should be flat not rose headed.

In older boats the nails are sometimes hardened up and that is usually a sure sign that the boat has been leaking. Hardening up can be detected by the fact that the burr on the hammered end of the nail (not the rove) on the inside is rather larger than usual. In cheaper built boats, particularly the hire cruisers built on the Norfolk Broads and the Cumbrian Lakes, the ends of the nails protruding through on the inside of the timbers are simply turned or bent down by hammering. In some versions of the turned nail procedure a rove is fitted over the nail before turning the end. Turned nails are faster to drive and finish than clenched nails or rivets but must be of the correct shape with a chisel point. They are difficult to turn and must be made into a staple and not simply bent over and hammered into the wood. The nails may be turned either across or along the grain but those turned along the grain, however, tend to split the timber. It is the usual practice when clenched nails are to be used to drive all the nails first then go back and clench them whereas with turned nails it is easier to turn them as they are driven. In America clenched nails are referred to as rivets and turned nails are said to be clenched. Another case of two countries separated by a common language. It is reasonably effective but in older boats (say over fifteen years) must be considered to be very suspect and such nails must be very closely examined. Nails driven through the boats timbers are called timber nails and on good class boats the heads of the nails outside the hull are countersunk below the plank surface and the hole stopped or fitted with a dowel. Nails that are driven into timber such that they can be neither turned nor clenched, for example through the hooded ends into the apron, are called dead nails and, where possible, they should be dovetailed. The lead holes for copper boat nails may be about ¾ of the nail diameter or its square sided width without causing loss of strength. If possible, nails should be loaded across the shank and not in the withdrawal direction especially if used in end grain wood. The spacing, end and edge distances of the nails should be such as to prevent splitting of the wood. Those driven through the planking in the open space between the timbers are called land nails and those through the timbers, timber nails.

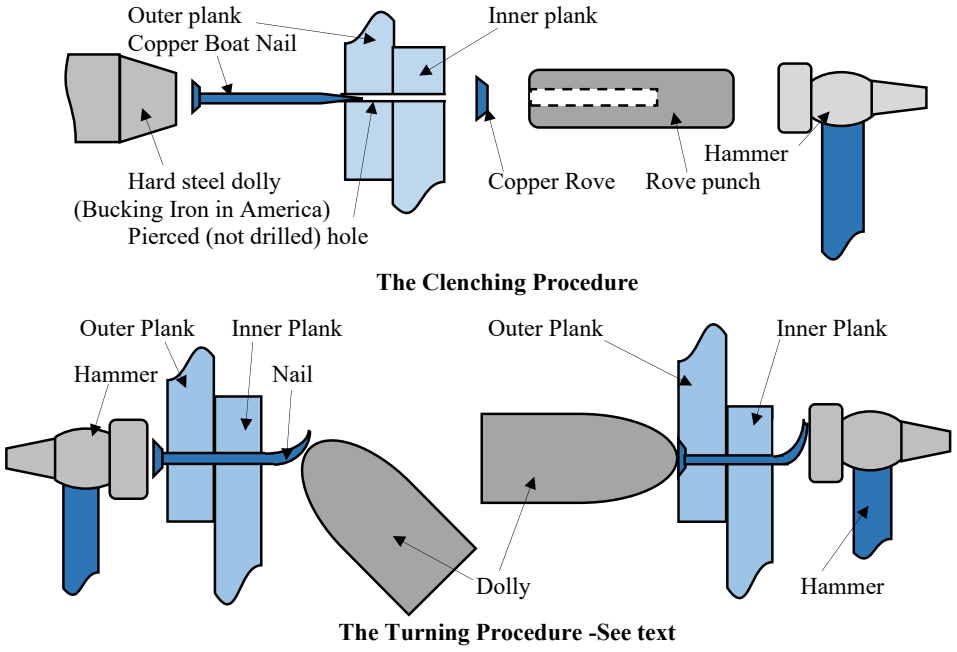


Figure 2 - Clenching and Turning Copper Boat Nails

Spikes and Dumps

In the bigger commercial boats such as fishing boats over about 12 metres (40 feet) length the above method becomes cumbersome and expensive and planking is often secured to the timbers by black iron nails. If these have a head and are of flattened form with, in effect, a pointed end they are called spikes but if of round form throughout they are called dumps. They are usually of ferrous manufacture and should be either galvanized or Chinese/Swedish galvanized. In the cheaper built boats it is often not done and the marine surveyor should look for nail sickness in such boats particularly if they are built of oak. Such nails should be put in at different angles to the surface of the plank (dovetailed) as that increases their holding power. When the author was serving his time, spikes or wrought nails were often, among the older men, called rose head or rose nails from the shape of the head of the spike after it had been driven. Before driving a spike the timber needs to be pre-drilled with a hole diameter about ¾ of the width of the spike face. With a dump the hole needs to be about 7/8ths of the dump diameter. Dumps should be driven with a twist of oakum under the head to stop them bouncing.

Table 1

Fastening Materials Corrosion Characteristics

Fastening Material	Type	Application	Remarks
Stainless Steel	18/8	Interior fittings and general use on both fresh and seawater vessels.	Should not be used when the joint is immersed in sea water because of severe shielding corrosion effects.
	18/8/Ti	Used for deck fittings, equipment and rigging and should be preferred to 18/8 material.	Timber wet with sea water is particularly hazardous to this material because of shielding effects.
Monel metal	400	A reliable material for fastenings with excellent sea water resistance even when in contact with ferrous metals.	Standard stock material for bolts and wood screws. This is the only suitable materials for use as a fastening for stainless steel items to wood or plastics below sea water.
	K500	Has similar corrosion resistance to the 400 type but possesses a much higher strength.	Stronger, harder and more wear resistant for machine parts, shafts, rigging *etc.*
Bronzes	Silicon bronze	A good general purpose fastening material and particularly suitable for fastenings in sea water.	In standard use for corrosion resistant bolts and wood screws. Resistant to shielding corrosion and not susceptible to dezincification attack.
	Aluminium bronze	A good alternative to silicon bronze for nuts and bolts. Used by the Royal Navy for pumps, valves *etc.*	Marine fouling such as seaweed or mussels never grows on copper alloys.
	Phosphor bronze	Good resistance to sea water but often replaced with silicon bronze.	Insulation with a non-metallic material is essential if used with steel or aluminium alloys.
Brass	Ordinary 68/38	Widely used for fastening wood but should not be used in sea water applications. Can be improved by plating with nickel and chromium.	Corrodes by dezincification in sea or brackish water. Should never be used for submerged joints especially as wood screws.
	Naval 62/37/1	Has better resistance to sea water because of the 1% tin addition. Sometimes used in Admiralty applications.	
Aluminium alloys	N6 Type Al-Mg	This is a light alloy which may be used for fastening aluminium deck and lightly stressed interior fittings.	Copper bearing A1 alloys (Duralamin H15) or free machining grades should not be used. Should never be used to fasten stainless steel because of the low anode-cathode ration. It should never be used in contact with copper alloys.
Gunmetal	Various	May be used as an alternative to silicon bronze as it has good sea water resistance.	Generally a casting alloy and rarely used for fastenings.
Steel	Mild	Has wide use but requires heavy zinc or cadmium plating and must be kept painted.	The life of such anodic (zinc) coatings is proportional to their thickness and cathodic coatings (nickel plus chromium) will rust quickly whenever the coating is damaged. Steel screws or bolts should never be put into holes previously occupied by copper nails or other copper based parts.

Drift Bolts

Where planks or boards are fastened edgewise together as, for example, in rudder blades or hatch covers this is often done by means of steel drift bolts. Such are simply plain rods of steel driven right through a previously prepared hole. Drift bolts are occasionally clenched on a steel washer at each end. They are an effective means of fastening but should be either galvanized or Chinese or Swedish galvanized. Here, again, nail sickness can be a problem. Strictly, the drift is the hole and the steel rod is called a drift bolt. When used to secure large timbers, drifts or dumps often have one end upset over a washer before being driven into the prepared hole which gives them a better grip. To do that, the drift is secured in a machinist's vice leaving about half an inch or so above the the top of the vice's jaws, a plain steel washer with sharp edge down is then slipped over the end of the drift and the drift tip clenched down over the washer using the ball end of a 1 kg (2 lb) engineer's ball pein hammer. The washer should be laid sharp or ragged edge to the wood as that gives a better grip on the wood to be secured. A drift bolt clenched at both ends is called a double clenched drift bolt. The pilot hole for a drift should be 2 mm less than its diameter in soft wood and 1 mm less in hard wood.

Bolts

Bolts are usually used to fasten the timbers forming the main backbone of the boat together *i.e.*, stem to apron, keel to hog, sternpost to inner post. Keel and stem bolts are usually coach bolts of black iron and, if used in oak, should be Chinese or Swedish galvanized. The best material for these uses is one of the bronzes but present day practice is to use a stainless steel. The marine surveyor should be aware that in the acidic, damp, anaerobic conditions around the keel bolts, stainless steel even if of AS316 austenitic type can and does corrode or pit with remarkable rapidity. Bolts may be either cheese headed or snap headed and the nut should be secured over a large size plate washer. When originally fitted they usually have a white lead and oakum grommet under the head but, in time, they rust and leak. Coach bolts are the ordinary bolts usually formed of black wrought iron and are fastened by means of a hexagon nut over an ordinary ring washer. The head of the bolt is usually of snap form and the first quarter of an inch or so of the shank is left square to enable it to gain a grip on the wood it passes through. The washers are punched out of a sheet of steel and have a sharp edge on one side that should always be placed be placed next to the timber. To make them watertight they should be fitted with a string grommet bedded in white lead or similar luting material under the washer. They frequently rust badly inside the timber and have been known to disintegrate entirely. They are often the source of nail sickness especially in oak and, if the washer and nut are on a steel surface, also to crevice corrosion. The hole to take the bolt should be the same diameter as the bolt shank and excessive clearances should be avoided. Equally a tight fit requiring the bolts to be hard driven is not **recommended**. It is correct if the bolt has a machined thread but leaves a loose bolt which can turn in the hole if the thread is rolled. The threads on good quality coach bolts are machined but cheaper bolts have the threads rolled in. The shank of bolts with a rolled thread is slightly smaller in diameter than the thread and a hole bored through the wood to take the thread will leave the bolt loose allowing it to turn and they are impossible to tighten properly. Bolts with rolled threads should not be used in boat building. Deck bolts are galvanized and have a round flat head with a square neck under. Caprail bolts are secured with countersunk head screws through the top plate and round headed screws though the vertical plate. Countersunk headed black iron bolts used to fasten down deck fittings are, in ship and boat building, called settee bolts. The heads are often peened down while fitting to ensure watertightness.

Rolled *versus* Cut Threaded Bolts

The thread on a mechanical fastening, regardless of whether it is a headed bolt, rod or bent bolt, can be produced by one of two processes and the marine surveyor should know the pros and cons of both:

- **cutting**
- **rolling**

As part of his general engineering knowledge, the marine surveyor should know the differences, advantages and disadvantages of each method as described below.

Cut Threads

Thread cutting is a process by which steel is cut away and physically removed from a round bar of steel to form the required threads. A one inch diameter bolt, for example, is produced by cutting the threads in a machine or on a lathe into the full one inch diameter shank of the bolt. The method has few limitations with regard to diameter and/or thread length and bolts of all steel specifications can be manufactured with cut threads. The method's chief disadvantage is that it's significantly longer manufacturing times means that the unit costs are higher.

Rolled Threads

Roll threading is a process by which steel is extruded to form the threaded portion of a fastening instead of being removed as in cut threading. In this process, a bolt is manufactured from a reduced diameter round bar. For example, a one inch diameter bolt is manufactured from 0.912 inch

diameter round bar. This pitch diameter material is approximately the midpoint between the major diameter (peaks) and minor diameter (valleys) of the threads. The bolt is rolled through a set of threading dies which displaces the steel and forms the threads. The end result is a fastener with a full one inch diameter threaded portion but a reduced body diameter of 0.912 inch. Roll threading is an extremely efficient process and often results in significant cost savings. It is sometimes said that a bolt with a reduced body will be weaker than a bolt with a full sized body. That is not so as the weakest area of any mechanical fastening is the minor diameter of the threads. Since the thread dimensions of a cut thread and rolled thread fastener are identical, there is absolutely no difference in strength between bolts manufactured by the two methods. It could actually be argued that the work hardening which occurs during the roll threading process may even make the fastening with rolled threads stronger. Additionally, cut threading interrupts the natural grain structure of the round bar whereas roll threading reforms it. It could also be argued that cutting into the grain of a round bar when cut threading may produce threads which have less structural integrity than a part which has been roll threaded. The chief advantages of the rolling method are that significantly shorter labour times means lower costs and because a roll threaded bolt has a smaller body diameter, it weighs less than its full bodied counterpart. The weight reduction reduces the cost of the steel, galvanizing, heat treatment, plating, freight and any other costs associated with the fastening that are based on weight. Cold working also makes the threads more resistant to damage during handling and rolled threads are often smoother due to the burnishing effect of the rolling operation. In rare wood applications where shear strength is the critical requirement, bolts with a full sized body may be required.

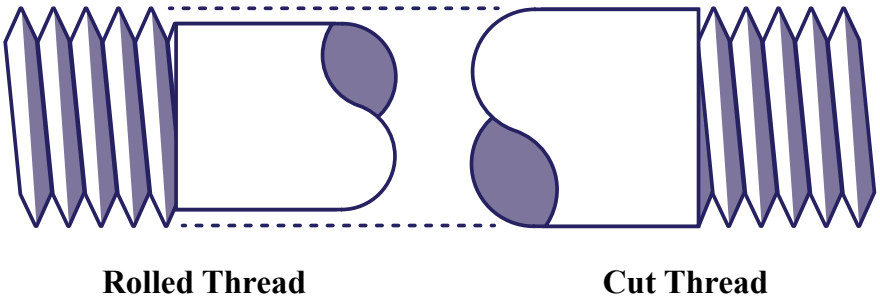


Figure 3 - Comparison of Thread Manufacturing Methods

SURVEYING TIP:
Nuts should be filled with the thread end of the bolt protruding about one turn. Half full nuts collect moisture and corrode internally and can lead to fastening failure.

Spike, Dump and Drift Lead Holes

The lead holes for boat spikes should be the size of the short dimension of the spike and should be drilled into the wood approximately 75% of the spike length. The lead holes for dumps should be a millimetre or so less than the diameter of the dump and the depth of the hole should be drilled into the wood the same length as the dump. The lead holes for drift bolts should also be a millimetre or so less than the bolt diameter and of a depth just over its length. Where possible, spikes, dumps and driftbolts should not be loaded in the direction of withdrawal especially if used in end grain wood. A clench ring or washer may be used under the head of a dump or bolt to spread the load and prevent damage to the wood. Spikes should be driven with the edge of the chisel point across the grain to prevent the wood splitting. The spacing, end and edge distances of spikes, dumps or drifts should be such as to avoid splitting the wood – usually about 2½ to 3 diameters.

Bolt Groupings

The centre to centre distance of bolts fitted in a row should not be less than four bolt diameters. The spacing between rows of bolts should be five bolt diameters for one whose length from under the head to the inner side of the washer under the nut when tightened is six times the bolt diameter or longer. For short bolts, the distance may be decreased but in no case should it be less than three bolt diameters. The distance from the end of a bolted piece of timber to the centre of the bolt hole nearest the end should be seven bolt diameters for soft woods and at least five bolt diameters for hard woods. The distance from the edge of a bolted piece of wood to the centre of the nearest bolt to the edge should be at least 1½ bolt diameters and for bolts whose length is over six times its diameter the distance to the edge may be half that between rows of bolts provided that it is not less than 1½ bolt diameters. For loadings perpendicular to the grain with the joints at right angles the distance to the edge at which the load acts should be at least four bolt diameters. Although, in general, bolts groupings should be symmetrical, it is good practce to slightly offset individual bolts to avoid two bolts being placed in the same grain line.

It is very important to put washers not only under the nuts but also under the heads of bolts especially if these are loaded in tension either by external loads or by swelling of the wood. The weak link in most

metal fastened wooden structure is neither the tensile strength of the wood nor the fastenings nor the withdrawal resistance of the fastening but nearly always the cross grain crushing strength of the wood under the fastening heads. Care should therefore be exercised in pulling the nuts down on the bolts too tightly thereby crushing the wood under the washer. A suitably luted grommet – in America, wicking – should be fitted in way of the faying surfaces of the joint at each through bolt subject to moisture.

Wood Screws[1]

Wood screws are usually used in boat building only when the joint has also been glued or where turning or clenching copper boat nails is impossible – in the hooded ends of the planking for example. They should be of bronze, gunmetal or stainless steel. Brass screws will dezincify in seawater leaving a soft copper shell behind with no strength whatsoever. Dezincification can be easily identified by seeing that the metal has turned a good, deep red, copper colour.

Wood screws are defined by their length and gauge. The gauge of a wood screw is calculated by counting the number of sixteenths of an inch across the length of the slot multiplying that by two and adding two. Thus a screw measuring three sixteenths of an inch across the slot would have a gauge of 3 x 2 + 2 = 8.

The wood screw is a very versatile but fairly recent form of fastening only coming into general use in the eighteenth century when it was adopted by the master furniture makers. The first screws were hand made and inconsistent in quality but, with the arrival of machine tools and the economic pressure demanding the use of metal fastenings in place of the traditional dovetail and mortise and tenon joints with or without pins, wood screws became available in brass, iron or steel at a affordable prices. They began to be used in boatbuildin toward the end of the nineteenth century but have not yet completely replaced the use of copper boat nails or galvanized spikes. Even today, old hands still regard them with suspicion. Iron screws soon showed that they were difficult to remove when corroded and brass screws began to develop dezincification so that by the 1920s screws for marine use were almost entirely silicon bronze or silicon copper as it was called. Silicon bronze was stronger and harder than manganese bronze and resulted in fewer damaged holes or snapped shanks and proved itself less corrodible than yellow brass. The basic specifications of the common wood screw are shown in Figure 4 below. The length of a wood screw is measured from under a round head, from the top of a flat head or from the base of the oval of a raised head to the point at the bottom of the screw. The head diameter is approximately twice the shank diameter and the diameter at the base of the thread – the root diameter – is approximately 70% of the shank diameter and is constant over the thread length. Wood screws, despite the apparent appearance, are not tapered. They perform two structural functions:

- **a tensile function in that they hold piece of metal or wood together.**
- **a shear function in that they prevent pieces sliding past each other.**

The tensile load that a wood screw can carry depends upon:

- **the tensile strength of the screw which is a function of its diameter and the material from which it is made.**
- **the bearing strength of the wood under the head of the screw.**
- **the withdrawal resistance of the threaded section.**

The bearing strength of the wood under the head of the screw is determined by experiment noting that loads likely to cause such failure are proportional to the head diameter. Such failure usually results in the compression and shear of a cylinder of wood equal to the diameter of the screw head. The bearing loads for silicon bronze wood screws in kilograms required to pull the head significantly into the wood after the screw has made firm contact with the bottom of the pilot hole are listed for various common boat building planking timbers screwed into English oak frames (dry or wet) in Table 97 below. The load figures given in the Table vary with the Janka number. The silicon bronze is assumed to have a tensile strength of 4,900 kg/cm2 with stainless steel and Monel metal being about 45% higher. Mild steel and brass have slightly lower figures. The thread engagement lengths are those that, in a proper pilot hole, would develop a withdrawal resistance equal to the tensile strength. The withdrawal resistance of a wood screw can be estimated from the Formula:

$$W_L = 11.16G^2DL \quad \text{kg} \quad (1)$$

where

D	=	the shank diameter of the screw	mm
G	=	the specific gravity of the wood	-
L	=	the engagement length of the thread	mm
W_L	=	the withdrawal load	kg

1. While a recent hypothesis attributed the Archimedean screw to Sennacherib, King of Assyria, archaeological finds and pictorial evidence only appear in the Hellenistic period and the standard view holds the device to be a Greek invention, most probably by the 3rd century BC polymath Archimedes himself. The screw was later described by the Greek mathematician Architas of Tarentum.

The given Formula has mixed Imperial and metric units and should be used with care. It is based on the assumptions that the wood has a moisture content of about 12% and that proper pilot holes have been drilled to take the screw. Withdrawal loads will be slightly lower for green timber and pilot holes should be about 90% of the root diameter for hard woods and about 70% for soft woods. The importance of this Formula is that it shows that the density of the wood round the screw is more important than the screw length or gauge. Screws can fail in a number of ways. For example, if the bearing strength of the wood under the head is sufficiently high, the head after it contacts the wood can be pulled off the shank. With experience this can be felt coming as the driving torque decreases at a time it should be increasing. Any defective screws should, of course, be replaced. Wood screws can also break in torsion. That usually occurs at the top of the thread where it joins the shank and can happen for one of several reasons:

- **the part of the screw in contact with the wood is too long compared with its torsional strength and the resulting frictional torsion resistance is enough to break the screw.**
- **if the lead or pilot hole is too short, the screw bottoms out and the resistance caused by it trying to turn into the undrilled wood is enough to break the screw.**
- **the lead or pilot hole is too small in diameter.**
- **the screw is too brittle which is a not uncommon defect in silicon bronze screws below gauge 12 noting that brass screws are worse in this respect.**

The second defect noted is most often found when trying to pull together two pieces of wood when the depth of the pilot hole in the underneath piece is often short by the amount of the gap between the two pieces. Screw metal quality is a more difficult problem and, because the wire from which they are manufactured is drawn out more and therefore suffers from more work hardening, smaller gauge screws are the worst in this respect. Some boxes of screws will be found from experience to be worse than others.

SURVEYING TIP:
To test a batch of screws, place the threaded end in a vice and grip the head in a carpenter's brace. A good screw will take a full turn of 300 plus degrees before breaking. If the screw breaks before the brace has reached a quarter turn or less, the whole box should be treated with suspicion.

Stainless steel and Monel metal screws are more twist resistant than silicon bronze screws and the country of manufacture appears, also, to be an indeterminate factor. Screws are best driven with a powered bit as they are less subject to the stop-start torques used with a carpenter's brace.

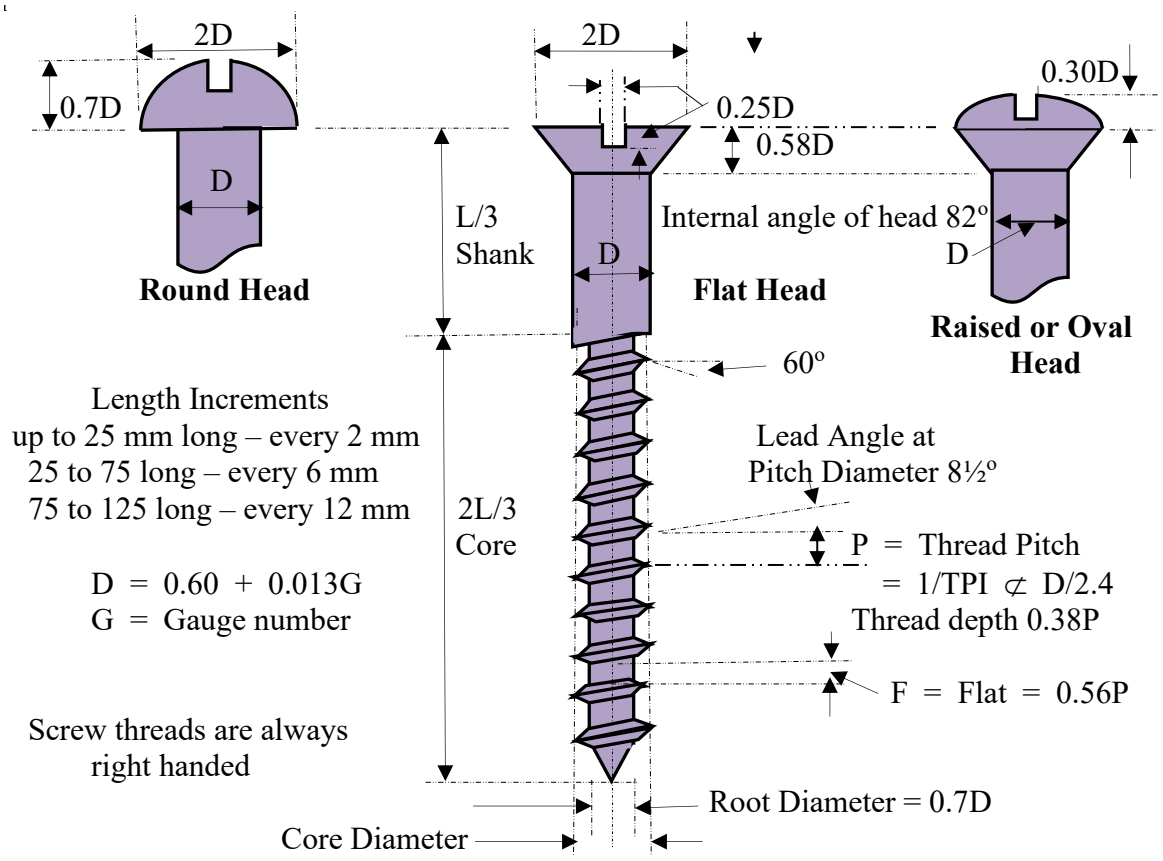


Figure 4 - Details of Wood Screws

The lateral or shear load that a screw can carry can be estimated from the Formula:

$$S_L = kD^2 \text{ kg} \quad (2)$$

where

D	=	the shank diameter of the screw	mm
S_L	=	the shear load	kg
k	=	a constant	-

Table 2 gives the lateral or shearing load in kg required for a joint slip of about 0.25 mm in various common boat building timbers. The Table assumes that both pieces of wood have a similar density and a moisture content of about 15%. The loads are slightly lower for wetter wood or where the screw shank does not cross the joint. Thread engagement should be at least four times the shank diameter. The load required to pull the two pieces of wood apart – the ultimate load – is about four times the Table load. For maximum resistance to complete failure the thread engagement should be at least seven times the shank diameter. Such depth of engagement is usually not possible in boat plank/frame joints.

Screws should, in general, be driven perpendicular to the surface of the joint through which they pass. It is, however, good practice, to splay or dovetail them at the hooded ends as that gives the plank extra grip on the apron. The screw should be set about two and a half diameters in from the edge of the piece of wood – about half the plank thickness in the case of skin planking – and about twice that distance from the end of the plank to prevent the end grain splitting out. For double skin planking the distances should be about twice and four times respectively. The pilot hole through the piece into which the screw head fits should be suitable for the shank diameter all the way through. Even if part of the thread is inside the plank it should not bite into the plank as that prevents the two pieces pulling together by the screw action. The difficulty often occurs in repair work or when fitting a shutter plank. For hard woods the pilot hole should be equal to the shank diameter but for soft woods slightly less than that. Ideally, although this is often not practical, the shank should extend about one shank diameter into the underlying piece of wood so that the shank fits across the faying surface.

SURVEYING TIP
It is good practice to dip the screw up to the end of the thread in red lead primer or epoxy paint. That helps preserve the screw against corrosion and lubricates the driving motion. BEWARE, it is messy. Screws, like all other fastenings, suffer from both forms of electro-chemical corrosion – electrolytic and galvanic - and that can occur all over the hull but most frequently in way of the wind and water strakes.

Wood Screw Lead or Pilot Holes

The lead holes for ordinary wood screws should be about 90% of the root diameter of the screw for hard woods and about 70% for soft woods. For large screws and hard woods, a shank hole of a diameter equal to that of the shank and a depth equal to the shank length should be drilled to ease driving. Where possible, the size of the screw should be chosen so that the shank penetrates the faying surfaces of the joint to maximise the strength, resist corrosion and to ease the pulling

Table 2
Wood Screw Bearing Loads

Gauge	Tensile Strength kg	Thread Engagement mm							
		Dry Oak	Wet Oak	Cedar	Mahogany	Douglas Fir	Larch	Teak	Red Oak
8	320	16	22	180	410	340	250	820	880
10	435	20	32	250	525	430	320	975	1090
12	540	21	32	320	615	525	385	1150	1250
14	690	24	38	385	680	720	525	1350	1320
16	845	25	38	455	820	775	590	1475	1610
18	990	28	44		910	820		1630	1795
20	1265	33	50		1025	910		1825	1950
22	1400	35	50		1110	1025		1975	2150
24	1730	38	57		1225	1090		2045	2350

together of the members of the joint. If conditions prevent the screw shank from extending across the faying surfaces, the shank hole should extend right through the piece containing the screw head to prevent the thread from engaging in that piece. When a thread does so engage, it prevents the two pieces being pulled together and closing the faying surfaces tight. It is a sign of quality boat building that the slot in the head and/or the grain of any dowels fitted over a screw should align with the grain of the wood being secured.

Suitable lubricants such as wax, grease or paint - never soap as it is alkaline - should be used on screws especially where hard or dense woods are in use to make insertion easier and to prevent damage to the screw. Hole penetration for the thread should be at least 7 screw diameters for hard woods and 10-12 screw diameters for soft woods for maximum holding power. If possible, screws should be so sited that they are loaded across the shank and not in the withdrawal direction. The spacing, end and edge distances for wood screws should be such as to prevent splitting of the wood.

Coach Screws

These are large size screws with a square head, which are put into place using a spanner. In America they are called lag screws or bolts. They are usually used to fasten metal items to the boat's wooden structure where it is not possible to get to a nut on the inside. The thread is usually quite coarse and the coach screw is quite frequently found rusted inside the hole into which it is inserted. They should be treated with circumspection as they are not truly secure and frequently work loose. They tend to work loose and are tightened up so frequently that the wood forming the edge of the hole gets torn and will not hold the thread any more. When that happens there are two options for repair:

- **to fit a larger size coach screw which is not very satisfactory and is rarely successful.**
- **to fill the hole with properly mixed epoxy resin and set in a new coach screw of the same diameter as the old one and allow the resin time to set hard which is usually the only practical method of repair.**

Table 3
Wood Screw Shearing Loads

Screw Gauge	Pine Cedar	Larch Mahogany	Teak Oak
10	55	75	105
12	70	100	135
14	90	120	170
16	110	150	210
18	130	180	250
20	160	215	300
24	210	290	400

Occasionally, the marine surveyor may come across a bolt with the bottom end fitted with the same course thread as a coach screw but, instead of the square head, the top fitted with an ordinary Whitworth or metric thread, washer and nut. These are called, for no obvious reason, hanging bolts. Such are sometimes used to secure light weight machines or engines in wooden boats. Screws similar to coach screws but with a conical head are called lag screws.

Coach Screw Lead or Pilot Holes

The diameter of the lead hole for the top of the coach screw should be the same diameter as the shank and for the first three quarters of the threaded portion of a coach screw should be about 2/3 of the shank diameter in English oak and ½ the shnk diameter in Douglas fir or Scots pine with a diameter of ¼ of the shank for the rest of the threaded portion of the screw. Denser woods require larger diameter lead holes and less dense woods smaller diameters. For long screws or screws of large diameter the lead hole should be slightly larger than those **recommended** here. Coach screws should always have a shank hole and are best Chinese galvanized.

N.B. 1 Coach screws should always be inserted by turning with a spanner NEVER driven, even partially, with a hammer. If driven they tear the wood and lose their grip.

N.B. 2 Hot dip galvanized cut boat nails have, in America, traditionally been and are still being used in boat building. Barbed or annular ring nails have been successfully used and are suitable for use on small scantlinged vessels. Smooth, thinly coated or plated nails with small irregular heads and long tapered shanks – often called horseshoe nails – and ordinary flooring cut nails do not provide sufficient holding power and should not be used.

In Part 2 in Issue 93, September's The Report we'll look at

- Wire Nails
  - The Annular or Ring Nail
  - The Clout Nail and Tack
  - The Corrugated Fastener
  - The French or Round Head Wire Nail
  - The Flat Head Nail
  - The Hardboard Pin
  - The Lost Head or Bullet Head Nail
  - The Oval Wire Nail
  - The Panel Pin
  - The Sprig
- Pop or Blind Rivets
- Cut Nails
- Designation of Fastenings
- Fastening Withdrawal Resistance
- Hidden (or Blind) Fastenings
- Washers
- Treenails

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SALVORS SAVE 2.3 MILLION TONNES OF POLLUTION IN 2019

Shipping has improved its safety record with fewer ship groundings and vessels in peril, but the industry should not become complacent in its need for salvors.

by **Martyn Wingrove**

Less ships are encountering issues during voyages and dockings, causing less pollution and placing fewer lives at risk. These trends are underlined by the latest data from the International Salvage Union (ISU) on the volume of potential pollution saved from the environment through swift emergency response in 2019.

ISU members serviced 214 vessels in 2019, down from 224 in 2018 and 252 ships in 2017. This represents a 15% fall in salvage services in two years but is similar to the number of vessels assisted (216) in 2016.

ISU actions prevented 2.3 million tonnes of potential pollutants from 214 ships from entering the environment in 2019. This was a 32% reduction in potential pollutants, from 3.4M tonnes in 2017, and down from 3.2M tonnes in 2018. It is also lower than 2.7M tonnes in 2016.

This data come from the results of the ISU's Annual Pollution Prevention Survey for operations in 2019.

ISU highlighted that fewer crude tankers encountered trouble in 2019 compared with 2018 as part of the reason for reduced potential pollution in 2019. One or two very large crude carrier cases can have a significant impact on the overall numbers. Crude oil pollution prevention through salvage operations in 2019 was 400,000 tonnes, compared to 978,000 tonnes in 2018.

ISU president Richard Janssen says the lower pollution risk is good for shipping but warns against complacency as there will always be risk and calls on salvor services.

"ISU members deliver services that save life and property but, as the results of this survey show so clearly, our members' operations also protect the environment from great harm," says Mr Janssen.

"The numbers, when compared with other years, also show the variability of our industry," he comments.

In 2019, around 43%, or 961,061 tonnes of potential pollution was classed as bulk polluting/ hazardous cargo, up from 743,100 tonnes in 2018, and down from 1.4M tonnes in 2017.

This category includes products such as grains, coal, scrap steel, soya and cement. Several bulk cargoes are not included as potential pollutants. ISU members also provided services to bulkers carrying 229,731 tonnes of non-hazardous dry bulk, mainly metal ores, in 2019, down from 497,973 tonnes in 2018.

The volume of refined oil product cargoes that were saved from polluting fell in 2019 to 278,046 tonnes compared with 324,988 tonnes in 2019.

"We are always transparent with these numbers," says Mr Janssen. "We know not all of these potential pollutants were at risk of going into the sea."

Some cases will have had limited danger, but, "many others will have carried a real risk of substantial environmental damage" Mr Janssen explains.

ISU members also prevented pollution of containerised cargo. Its survey demonstrated a fall in the number of containers involved in ISU members' services in 2019, down to 25,799 TEU, which equates to 386,985 tonnes, using a nominal 15 tonnes per TEU. This is a 57% reduction in containers compared with the 2018 figure, which was 59,874 TEU and 898,110 tonnes.

Mr Janssen notes the growing importance of pollution prevention in salvage operations. "Attitudes to the natural world have changed dramatically in recent years and the environment is now at the centre of political and business decision making," he says.

"It is essential there continues to be global provision of expert salvage services to respond to maritime emergencies," says Mr Janssen.

"In most cases, it is only the professional salvors, members of the ISU, who have the experience and equipment to make those interventions and prevent environmental catastrophes," he adds.

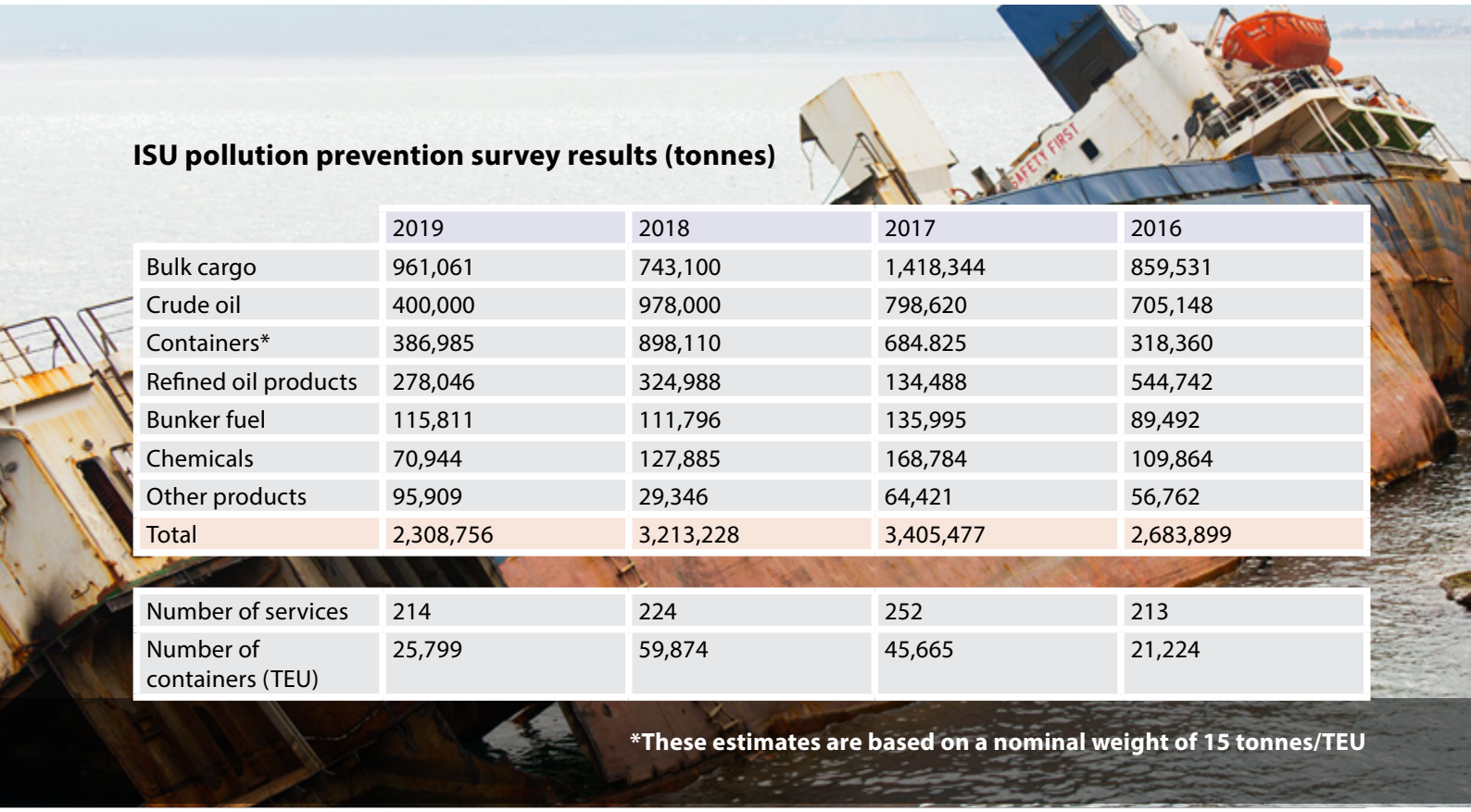
Bunker fuel volumes saved from polluting environments remains consistent at 115,811 tonnes in 2019, compared with 111,796 tonnes the previous year. However, a number of services noted within the ISU total did not record the quantity of bunkers on the vessel or the cargo type.

There was also a significant reduction in chemicals in these potential pollutants, just 70,944 tonnes in 2019, compared with 127,885 tonnes in 2018 and 168,784 tonnes in 2017.

CONTRACT TYPES

Of the 214 vessels rescued by salvors in 2019, Lloyd's Open Form (LOF), which is favoured by salvage companies, was used for just 29 services, representing 13% of the total. The largest number of salvage operations, 73 services, was conducted on day rate contracts while 36 were on towage contracts, 19 on wreck removal arrangements and 12 on fixed price and lump sum services – all these are favoured by shipping companies and insurers. There were also eight services completed on Japanese Form and 7 on Turkish Form (variants on LOF). Other contracts were used in 31 services.

ISU started this annual survey in 1994. Since then, ISU members have provided services to casualty vessels carrying 33.7M tonnes of potential pollutants, an average of more than 1M tonnes per year.



ISU pollution prevention survey results (tonnes)

	2019	2018	2017	2016
Bulk cargo	961,061	743,100	1,418,344	859,531
Crude oil	400,000	978,000	798,620	705,148
Containers*	386,985	898,110	684.825	318,360
Refined oil products	278,046	324,988	134,488	544,742
Bunker fuel	115,811	111,796	135,995	89,492
Chemicals	70,944	127,885	168,784	109,864
Other products	95,909	29,346	64,421	56,762
Total	2,308,756	3,213,228	3,405,477	2,683,899
Number of services	214	224	252	213
Number of containers (TEU)	25,799	59,874	45,665	21,224

*These estimates are based on a nominal weight of 15 tonnes/TEU

SAFETY CASE STUDY

OFFSHORE JACK-UP RIG INFRARED WINDOW RETRO-FIT

Performing electrical thermographic (IR) surveys can often be fraught with danger from electrocution and arc-flash being the most threatening hazards to life and equipment. Critical equipment can often be missed during IR surveys due to their operational or interlocked state. Preventing identification of loose, high-resistance, high temperature terminations likely to fail...

In November 2019 **Geo Therm Ltd** were tasked with performing the first electrical thermographic survey on the Valaris Plc premium Jack-up the JU-123. And requested to assess the number of infrared windows to facilitate the inspection of critical electrical equipment. The asset equipment identified included seven CAT generators (including the emergency generator) and ten plant transformers necessitating a total of #93 infrared windows for installation.

In Dec 2020 Rig management authorised our world class services to procure and install the #93 IR windows whilst the asset remained berthed in Dundee Scotland. As the owners deemed the installation would be more effective when under shore power rather than in an operational state. The CorDEX Type IW3000 Infrared windows with a 75mm or 3" diameter crystal window were chosen. Benefiting from being ABS type approved and arc-flash resistance test rated to 11KVA.

Three IR windows were retrofitted into each of the CAT 3516CHD main engine generator terminal boxes and E-Gen terminal box covers. And twelve into the two main drilling transformers and a range of one to six IR windows were also retrofitted into various rig-wide distribution transformers. The retrofit took the **Geo Therm Ltd** technician six days to complete, aided by the on-board rig electrician.

The benefits of this installation of the infrared windows were:

- **Confirm if loose/high resistance hotspots exist in closed critical systems.**
- **Prevent electrical shock & triggering an arc-flash explosion when needing access**
- **Enable future thermographic, visual and spot-infrared PMR's to be safely realised.**
- **Effective inspections, easier and faster future access without service interruption.**
- **Facilitate PM scheduling when a hot-spot is found, to prevent a breakdown or downtime.**

The JU-123 (Jack up rig) is the newest of the four Valaris Plc 120 series harsh environment Jack-ups currently in operation in the UKCS. And is one of 74 rigs in the owner's fleet, currently the world's largest offshore drilling company.

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By **Harry Hirst**
Managing Partner and
Master Mariner, Singapore,
Ince & Incisive Law LLC

COLREGS: Still Fit for Purpose?

Harry Hirst went to sea after leaving school in 1975 and qualified as a Master Mariner in 1988. A graduate in both Nautical Studies and Law, he qualified as a solicitor in England in 1992 and has spent his entire legal career specialising in Admiralty law. He moved to Asia in 1992 and now has over twenty five years' experience in the region, advising ship owners and their insurers on their maritime casualties.

Harry specialises in all aspects of Admiralty law including collision; salvage, total loss and wreck removal; pollution; fire and explosion; cargo shift, loss and damage; and general average. He has been involved in several of the most serious maritime incidents in Asia.

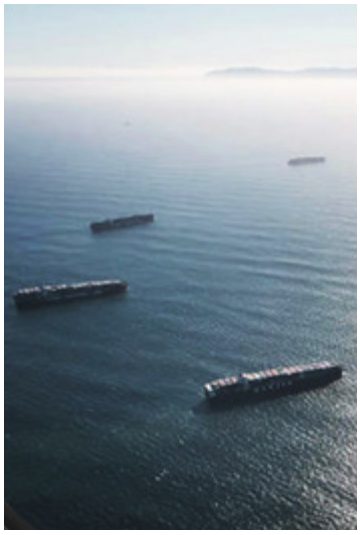
There has been much debate about the COLREGS over the last 12 months or so, with many suggesting that it is now time for not just some amendments but a total revision of the Rules.

So are the COLREGS still fit for purpose?

The future: autonomous ships

Many believe that in the not so distant future, the fundamental changes in the way in which ships will be operated will render the current COLREGS unworkable. This is primarily a reference to autonomous ships, but it is also the case that the increasing use of automation and reducing numbers of crew are likely to result in the bridges of crewed ships in the future being unmanned for some if not all of the time.

It is generally understood that a fully autonomous ship (one with no crew) or any vessel with an unmanned bridge or cockpit (one with no watch-keeper) cannot comply with the COLREGS. That understanding comes from Rule 5 which requires every vessel to "at all times maintain a proper look-out by sight as well as by hearing…" and seeing and hearing in this context have always been understood and interpreted as references to the human senses.



It is worth noting however, that this and the other Rules are not directed at humans but at vessels. So for example, the requirement is for every vessel to maintain a proper look-out, to proceed at a safe speed, and to determine if there is risk of collision; and for the action taken to avoid collision to be large enough to be readily apparent to another vessel observing visually or by radar. Similarly, in restricted visibility the requirement is for every vessel which hears "apparently forward of her beam the fog signal of another vessel...." to reduce her speed.

The actions of "seeing" and "hearing" do not have to be limited to their human functions; they could be interpreted more widely so as to include the electronic "eye" (camera) and "ear" (microphone) as well as the human eye and ear. If this wider interpretation were to be adopted then a fully autonomous ship, or a vessel with an unmanned bridge, which is properly equipped with cameras and microphones should be capable of complying with Rule 5. Indeed, such a vessel may in fact be better equipped for doing so, when one considers, for example, the ability of infra-red and thermal imaging cameras to "see" in the dark and microphones to determine the direction from which a sound is emanating.

Care would be needed to limit the scope of the equipment which can qualify as an electronic "eye." It could not include radar for example, as the Rule for vessels navigating in or near an area of restricted visibility recognizes that a vessel which is not in sight of another vessel may nevertheless detect the presence of that other vessel by radar. A vessel fitted with a thermal imaging camera might similarly be able to detect the presence of another vessel in restricted visibility in circumstances where the human eye could not. The powers of the human eye, however, are well documented, and I believe it should be possible to program the electronic eyes and master computer on an autonomous ship to know when the prevailing visibility calls for the application of Rule 19.

There still remains the issue of seamanship however: how does an autonomous ship, or a vessel with an unmanned bridge, know what "precaution...may be required by the ordinary practice of seamen?" The answer, I believe, will be provided by artificial intelligence (AI). Computers can be programmed to learn (think: Chess; Go), and it would appear therefore, that the technology may already exist to program a vessel computer to know what the practice of good seamanship requires.

I am not convinced therefore, that the COLREGS necessarily require any amendments to accommodate the fundamental changes in the way that ships will be operated in the future, save perhaps, to include a definition in Rule 3 extending the meaning of the words "by sight," "visually," "by hearing," and "hears."

The suggestion that new rules must be written now to take into account both manned and unmanned ships, does of course, beg the question: why? The owners of manned ships have to ensure their vessels comply with the COLREGS whatever they might think about these Rules, which have been in operation now for over 40 years. Why should it be any different for the owner of an unmanned ship?

It is also worth remembering that these Rules, whilst worded differently to their predecessors, prescribe the same basic collision avoidance manoeuvres; for example, when two power-driven vessels are meeting head-on, for both to alter their courses to starboard.

The current Rules have evolved into their present arrangement and wordings through a series of incremental changes and amendments over the years, and as result their entry into force during the 1970's was seamless and largely without incident. Implementing a complete set of new rules especially new manoeuvring rules, or introducing wide ranging amendments to the current Rules, is a potential recipe for disaster. It would also be a time consuming and costly endeavour, being one that will require international agreement and re-training on a global basis. I believe we should proceed cautiously therefore before we seek to totally revise the "rules of the road" for the sea.

The present: collisions are still happening

Collisions at sea are still happening, but whilst the number of collisions each year is not noticeably decreasing the world fleet capacity has increased significantly since the COLREGS came into force.

When expressed as a percentage of the world fleet therefore, the number of collisions is actually decreasing over time and therefore showing some improvement. This said, the number of collisions is still unacceptably high, and it is still very much the case that most all collisions are the result of human error and in particular, a failure to properly implement – or comply with – the Rules.

This however, is not reason to change the Rules. The Rules are not the cause of collisions; the cause of collisions is the failure by mariners to properly comply with the Rules. If, as some suggest, the many technologies designed to improve the avoidance of collisions since the rules came into force are being ignored, then the problem is with the mariners and not with the regulators ashore, or with any disconnect between the two.

No amount of regulation will force a mariner to use a particular piece of equipment or technology, just as no amount of regulation will force a mariner to properly comply with the Rules. Proper compliance with the Rules is a seamanship issue, and seamanship is taught in the classroom and acquired from experience at sea.

The Rules: lack of proper understanding

The cause of collisions is not the COLREGS but how mariners interpret and (mis-) apply the Rules. Too many mariners today, I feel, lack a proper understanding of the Rules and how they are to be applied.

The causes of most all collisions can be broken down into two broad categories –

1. **failure to maintain a proper look-out; and**
2. **failure to take the appropriate avoiding action.**

Proper look-out

With a proper look-out the mariner will make "a full appraisal of the situation and of the risk of collision." Many collisions occur because the mariner fails to do so, and in particular, to properly appraise the risk of collision. This is so notwithstanding the technological advances that have occurred during the last 40 years and notably the development of AIS and ARPA which make the job of detecting other vessels and determining their movements much easier today than it was when the COLREGS first came into force.

I question therefore whether mariners are being properly trained in the use and limitations of these "new" navigational aids, and what is meant by "a full appraisal of the situation and of the risk of collision." An all too frequent criticism of the mariner today is that he or she spends too much time looking at the ARPA and ECDIS and not enough time looking out of the bridge windows. Certainly, very few mariners today it seems ever slow down to allow themselves more time to make a full appraisal.

A full appraisal requires a proper understanding of the three most important phrases in the Rules: "risk of collision," "close quarters situation," and "passing at a safe distance." These phrases are not defined in the COLREGS, and this

is not surprising as their meanings will clearly vary with the prevailing circumstances and conditions of every case.

Too many mariners do not appear to have a proper understanding of the meaning of these phrases and, I believe, are interpreting them too narrowly. Many mariners, for example, are interpreting "risk of collision" to mean the two vessels will definitely collide if no avoiding action is taken; and believe a few cables is a safe passing distance at sea in open waters in all conditions.

Inappropriate action

Even when a proper look-out is being maintained, collisions are still occurring because mariners are failing to take the appropriate avoiding action. Action taken to avoid collision should be "positive, made in ample time and with due regard to the observance of good seamanship." All too often the action taken is too little and too late. I question therefore, whether mariners are being properly taught the meaning of "positive" and "in ample time."

Indeed, I have heard of some mariners using the trial manoeuvre facility on the ARPA to determine what is the minimum alteration of course they have to make to avoid actual collision and ensure the other vessel passes a few cables clear.

Many mariners also do not understand that the overtaking, head-on, and crossing Rules do not apply in restricted visibility when the vessels are not in sight of one another.

No reason to change

That many mariners today appear to lack a proper understanding of the Rules and how they are to be applied is not, in my opinion, reason to change the COLREGS. It might be reason to do so if this lack of understanding arose from the way in which the Rules have been drafted. The COLREGS, however, are simply and concisely worded, and the Rules have been logically arranged; and as noted above, the problem is not with the words used in the Rules but with the meanings of those words.

Summary

For all these reasons I believe the COLREGS are still fit for purpose and there is no need for the Rules to be totally revised, whether to accommodate autonomous ships or to reduce the number of collisions.

There are going to be some fundamental changes to the ways in which ships will be operated in the future but these changes will only require a few minor amendments to the COLREGS to ensure the Rules continue to be workable.

If the shipping industry is serious about reducing the number of collisions it would do better to focus its attention on the way in which mariners are taught the Rules and how to apply them, and not upon the Rules and how they might be changed.

The Inland Waterways Boatbuilding Industry

By **Nigel Clegg**

The majority of marine surveyors that I meet spend most of their time working on sea-going vessels where there are fairly clear cut rules on design and specification laid down by classification societies and other bodies. In any case seagoing vessels are usually designed by naval architects, then built and maintained by shipwrights and marine engineers who know what is what. 'Superyachts', which I spend much of my time on, usually have a team of twenty or more marine professionals managing different aspects of newbuild or refit projects, plus key members of the crew making sure that, as far as practicable, everything is done properly. But there is another boatbuilding industry operating within the UK which has no such regulation, and which even the longest established standards seem to have passed by unnoticed. There is also a widely held view that the fresh water in our rivers and canals doesn't cause corrosion and that protecting against corrosion is unnecessary. This is incorrect, and in fact clean, fresh water is far more aggressive to paint coatings than seawater and also interferes with the proper operation of zinc anodes.

The inland waterways industry has seen significant growth in recent decades, encouraged by the peace and tranquillity of our rivers and the reopening of once abandoned navigations such as the Huddersfield, Rochdale, Kennet & Avon and Basingstoke canals. Such is the appeal of inland waterways that many owners use their life savings to purchase narrowboats or Dutch Barges, whilst some even sell their homes with a view to motoring into the sunset along the Grand Union or even the French canals.

Inland waterways are generally considered fairly safe apart from the obvious risks of falling in. Boat owners have been made well aware of the risks associated with LPG, wood burning stoves and carbon monoxide poisoning but that is where safety awareness ends. We hired a narrowboat for a week long holiday when our children were young. On arrival at the yard we were taken to the nearest winding point for a test drive, told where the fire extinguishers and lifejackets were and shown how to turn off the gas. Somewhat tongue in cheek I enquired about the location of seacocks. With a quizzical expression the Yard Manager laughed and said "oh we don't bother with them on narrowboats; the canal isn't that deep; if it catches fire or something goes wrong you just walk to the side".

Given the number of times that we ran aground I would not dispute that the upper reaches of the Llangollen Canal are indeed very shallow; but a lot of narrowboats are taken onto much deeper and wider canals, rivers and even lochs where simply 'waking to the side' is not an option for us mere mortals. Moving on to Dutch barges, many owners buy these with the expectation of making short coastal voyages and hopping across the English Channel to France or Holland in fair weather. Even some narrowboat owners have been known to venture across the Channel. What could possibly go wrong?

Before answering that question let us start at the very beginning. The majority of those who buy inland waterways craft have little experience of boating beyond perhaps hiring a canal boat for holidays so they tend to approach the process rather like buying a new car or washing machine and assume the builder has done their homework. Inland waterways craft are invariably bespoke designs and yet there is very rarely any form of newbuild Contract or formal agreement, and beyond choosing colours, bathroom tiles, internal layout and perhaps the engine there usually will be no specifications either. It is also extremely unlikely that a Surveyor will be involved at any stage during the build except to issue Boat Safety and RCD certificates before final delivery. Given that many of these craft cost upwards of £250,000 a lot is taken on trust.

Fig 1. This newly fabricated narrowboat is being allowed to rust in the open to help remove millscale. The loosened millscale can be removed by wire brushing before primer is applied. Preparation is not as good as blast cleaning but is preferable to painting over millscale.

All may appear well at first but as build progresses, (or perhaps doesn't), questions often arise about paintwork, fittings and whether the bare steel was primed around the window cut-outs before they were sealed up with copious quantities of silicone. There may also be doubts about whether the inside of the hull was primed before spray foam was applied. Queries raised about these subjects are usually met with silence or nebulous responses at best. Only at this point will the new owners be put on enquiry to the possibility that their new dream boat may not be quite what they were expecting, and with no formal Contract there is little that anyone can do.

Dutch barges and narrowboats are comparatively large vessels by small craft standards, but the vast majority are designed and built by people who are more likely to be sheet metal workers and fitters than naval architects or shipwrights; and therein lies the problem. The inland waterways market is also very price sensitive, which has led to a culture of cost and corner cutting which is often reflected in the processes and materials used. In fact the specifications followed are more likely to be determined by other yards along the same canal than by any formal standards or specifications.

Starting with the bare steel hull, best practice is to buy either 'bright steel' or pre-primed, shot blasted steel from a steel stockholder, but these cost more than unprepared steels. Most inland waterways craft are therefore built from cheaper 'black steel'; that is mild steel with a thin layer of black millscale still adhering to it. Millscale is formed at very high temperatures when the molten steel is rolled into flat sheets at the steel mill and therefore has a lot of latent energy, and oxygen bound up in it. Most lay-people see the hard, bluey-grey millscale layer on bare steel plate and are happy to believe that it protects the steel; but it doesn't. Millscale, like welding scale is strongly cathodic to steel and is also extremely brittle, readily cracking whenever the metal is flexed, shaped or handled. These cracks allow moisture to undermine the millscale layer to form vigorous corrosion cells, even if the steel has been painted.

The next best option is to blast clean the completed steelwork immediately before painting, but grit blasting is a noisy, dirty and expensive operation, and if heavy-handed may distort some bigger sections of flat steel plate. Blast cleaning is therefore usually skipped, or at best only the outside of the vessel will be prepared.

As an aside, the Swedish Steel Preparation Standards or SSPC (usually abbreviated to Sa 2, Sa 2½, etc.) were formalised in 1967, although blast cleaning had been used for many years previously. Rather than relying on wordy descriptions the SSPC uses a series of high quality photographs depicting steel prepared

Fig 2. The forward section of this Dutch Barge hull was being fabricated in pre-primed, shot blasted steel whilst the remainder was fabricated in black steel. Note the lack of access to the flat of bottom and the lack of water freeing ports in the solid steel bulwarks.

by various methods to different levels of cleanliness. The use of pictorial standards transcends language barriers and has led to the Swedish Steel Preparation Standards being adopted in most parts of the world, but not on the inland waterways. Abrasive grinding provides yet another alternative but this is very slow and labour intensive work and so is only suitable for limited areas. Millscale is much too hard to be removed by sanding or 'linishing' whilst etch primers do nothing to alter is corrosive properties.

The performance of paints applied to millscale is invariably poor so the longevity of painting schemes is greatly reduced even if applied to the manufacturer's recommended thicknesses. In practice the thickness of paint applied to such craft is often woefully inadequate with anticorrosive primers in particular usually falling victim to cost cutting. Furthermore if the paintwork becomes chipped or damaged corrosion and rust staining will quickly set in. I mention these points because paintwork and corrosion are two of my chosen specialist subjects, but there are many other pitfalls as we shall see.

Thinking of one particular Dutch Barge; I was asked to examine the paintwork because the boat's new Owner had noticed that there was a lot of rust staining around the bulwark cappings and some breakdown on the coach roof. The Owner also thought the cream finish on the superstructure 'looked a bit different' in some areas to others. When I examined the bulwarks I found there was little or no anticorrosive primer applied over the welds, and that welding scale and weld spatter had not been removed thereby encouraging corrosion. Silicone sealant had been smeared over some of the welds but this had already detached to expose the steel beneath. Added to which there was corrosion developing around the window frames suggesting that the cut edges had not been primed before the windows were fitted. The Owner was also right about the cream finish: Using a spectrophotometer I confirmed that there were three different shades of cream, one of which appeared to be a completely different type of paint to the others.

Fig 3. Premature breakdown of paint scheme on a coach roof resulting in vigorous corrosion of the exposed black steel. The total thickness of this scheme was just 60 µm (microns) which is a fraction of the 250 µm usually required.

Unprimed and rusting steelwork around window cut outs.

Fig 4. Unprimed and rusting steelwork around window cut outs.

Fig 6. Poor welding beneath a rubbing strake on another vessel.

Fig 5. Unprimed steel and lose swarf behind an external electrical fitting.

Fig 7. A rusty bilge seen on an older steel narrowboat. No other access was possible to check the condition of plating from inside the vessel. Needless to say the black steel was unpainted and badly pitted inside and out.

Looking further afield, as one does, questions were asked about the underwater paintwork. In short there wasn't any! I examined the vessel on hardstanding at a marina where she had been lifted out to repair a leak from the stern gland. The water there is brackish, but the owners were waiting for a weather window to cross the channel.

Fig 8. The flat of bottom was unpainted black steel and even in fresh water had been corroding freely.

When I enquired with the boatbuilder about the lack of paint on the underside he said "it's a Dutch Barge so it will only be used in fresh water. They spend most of their time dragging on the bottom anyway so there's no point in painting them"; yet she was fitted with a full set of navigation lights, SatNav, Radio, and radar. The owners were in no doubt that they had asked for a seagoing vessel. Something didn't quite add up. On making further enquiries the subject of Health and Safety was raised, with the explanation that 'it wasn't safe to paint underneath a boat weighing thirty tons'. Admittedly there were two token zinc anodes fitted at the bow and two aft but these had already crusted over during their passage through the canal system. (Magnesium anodes are preferable in fresh water). It is also a little known fact than sacrificial anodes can only protect metal within direct line of sight. Unbelievably, much worse was to come.

Whilst kneeling on the deck examining the bulwark cappings I quickly became aware that quite a lot of water had collected on the foredeck and had nowhere to drain to. The owners also commented that they had to 'brush the water away every time it rains'. The bulwarks were of solid steel plate construction from the aft mounted Wheelhouse forward, rising to about 50 centimetres above deck level at the stem. There was only one small water freeing port cut out on each side of the deck, not quite big enough for me to fit may hand through. Dutch barges have very little freeboard so you don't need to be a Physicist to work out that a big blue wave over the bow could result in many cubic metres of seawater becoming trapped on the deck, with potentially disastrous effects on stability. Whether or not the 'patio doors' into the accommodation would withstand the pressure of a metre of seawater slamming into them is open to question.

Fig 9. A similar Dutch Barge on hardstanding. Note the length of the solid bulwarks and the lack of adequate water freeing ports.

I was invited on board for lunch and was shown inside the Engine Room, which was tidy. The bilges had been neatly painted with International Danboline in grey, but the total thickness was low because no primer had been applied to the black steel substrate. Rust was already showing around the edges of the spray foam. Like the Danboline above, the spray foam had also been applied directly to the bare, black steel.

I asked if I could have a look inside the bilges beneath the Saloon and accommodation but was told the only available access was via small hatch beneath the companionway from the Wheelhouse on the starboard side. This hatch was provided so that the bilge pump could be serviced and was the only access to the bilge. Bearing in mind this vessel was a newbuild and had only been afloat for a few weeks the bilges were already red with rust. The steelwork immediately surrounding the bilge pump had been painted but everything beyond that was unpainted rusty black steel. There was insufficient

Fig 10. The one water freeing port in the solid bulwark which was also showing symptoms of corrosion.

space to get into the bilges, (which in any case would have been unwise given the oxygen depleted atmosphere), but I could see a stack of loose concrete blocks in the bilges forward providing rudimentary ballast. Sections of old railway lines are also a popular form of ballast in these vessels.

By this stage it was far too late and uneconomic to rectify the problems that I have discussed. Even if the builder had been willing to cooperate it would have been necessary to completely strip out the accommodation; a process which would probably have taken six months at best. The owners had sold their house to fund the boat so living ashore for six to nine months was an option they could neither stomach nor afford.

After nearly two years of argument and stress the owners finally received an ex-gratia payment to cover the cost of rectifying the external paintwork, but this did nothing to resolve the many more serious defects that I saw; the long term effects of which frankly scare me. Ironically though, all of the problems discussed here, (and many others that I won't bore you with) could so easily have been avoided by engaging appropriate professionals at the design stage, and at key stages of the build to ensure that the vessel was both safe and fit for its intended purpose. The cost of these services would have been insignificant in the overall scheme of things and would almost certainly have saved money overall. A newbuild Contract and specification would also have ensured that the owners knew exactly what they were getting, and would have provided valuable protection when it became clear that their reasonable expectations would not be met.

Fig 11. Unprotected steelwork corroding around a deckhead ventilator behind spray foam.

Fig 12. Unprimed steelwork corroding in void space beneath an aft deck. Spray foam provides little anticorrosive protection whilst chemicals used in spray foams will encourage rather than inhibit corrosion, especially if applied to aluminium.

Fig 13. Zinc anodes quickly develop a protective crust in fresh water which prevents effective operation. Magnesium anodes are preferred in fresh water whilst aluminium is becoming more popular in mixed salt and brackish waters.

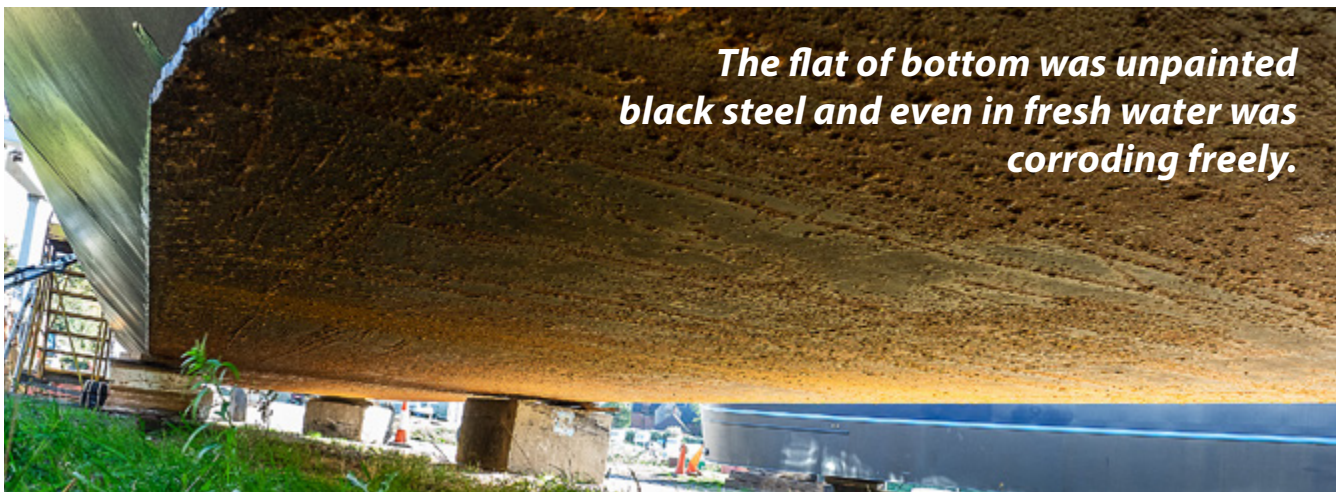
Fig 14. Rust around an external shower fitting owing to unprimed cut steel edges.

Fig 15. Rust developing around deck fittings owing to unprimed cut steel edges and lack of adequate bedding compound.

I wish I could say that this was an isolated incident but it is not. Many other inland waterways craft that I have examined have exhibited the same or very similar faults to those discussed here. These are some very good boatbuilders on the inland waterways who strive to build long-lasting boats, but it will always be difficult for them whilst other boatbuilders cut corners.

I do not believe any boat builder deliberately sets out to build craft which are inherently unsafe or unsatisfactory but there is clearly a lot of scope for training within the industry, and a need for much greater awareness of basic boat design and specification. Given the bespoke nature of these boats some form of newbuild Contract and specification is also highly desirable. These don't need to be long or complex documents, but a little thought and homework before building work commences and some key stage supervision during build would save a great deal of time, money and stress later on.

Nigel Clegg specialises in paintwork, corrosion and osmosis and has built up a wide experience of all kinds of marine vessels over the past forty years.
Visit his website at
www.passionforpaint.co.uk
for more information.



The flat of bottom was unpainted black steel and even in fresh water was corroding freely.

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Airborne and Structure-Borne Ultrasound as a Key Component to Predictive Maintenance

By **Adrian Messer**
Manager of US Operations, UE Systems, Inc.

Adrian Messer is the Manager of US Operations for UE Systems, Inc. For more than a decade, Adrian has been helping facilities around the country transform their reliability programs by successfully implementing Ultrasound technology for condition monitoring and energy conservation applications. As a subject matter expert on Ultrasound technology and implementation best practices, Adrian has been a featured speaker at numerous industry events. He is a graduate of Clemson University and maintains close ties to the University assisting current students in a mentorship program through the College of Business & Behavioral Science. Adrian is a Certified Maintenance & Reliability Professional (CMRP) through the Society of Maintenance & Reliability Professionals (SMRP), and he is also a charter member of the Carolina's Chapter of SMRP.

Today's maintenance departments are continually being asked to do more. Unfortunately, in most cases, they are being asked to do more with less. That is why it is critical for those in the maintenance and reliability fields to have the proper tools to aid in making better decisions about the health of the facility's assets. After all, maintenance is all about getting the most life out of an asset as efficiently as possible. It is also imperative that we begin to move away from reactive maintenance to performing more predictive or condition based maintenance tasks. Airborne and structure-borne ultrasound is a great place to start. This article will provide an overview of ultrasound technology and how it continues to enhance predictive maintenance, equipment reliability, and energy conservation applications.

In the early days of airborne and structure-borne instrumentation, most users simply kept an instrument around when they needed something to use to look for leaks. The first instruments in use were simple analog instruments that were used for "search and locate" applications such as leak detection. Through the advancement in ultrasound instrumentation and software, there were more users of the technology, and new applications were discovered. Ultrasound is now considered the perfect complimentary tool for other predictive maintenance technologies such as vibration analysis and infrared thermography. There is also an increase in the number of individuals who are using ultrasound as a first line of defense to predict faults and failures in rotating equipment and electrical inspections.

Simply put, the instruments are listening devices. Airborne and Structure-borne ultrasound instruments detect sounds that are not heard by normal human hearing. Average human hearing detects sound in the 16 to 17 kHz range. Ultrasound instruments listen for and detect sounds that are in the range of 20 kHz and above. The instruments actually listen for sounds that are above the threshold of normal human hearing. Ultrasonic sound waves are high frequency, low energy waves that are received by the instrument. The instruments then change or heterodyne the high frequency sound wave into an audible sound that is heard by the user through the headset which is plugged into the instrument. Since ultrasonic waves are high frequency and low energy, sources of ultrasound can easily be located amidst all of the ambient noise in a typical industrial facility.

The advancements that have been made in ultrasound instrumentation have been ground-breaking. UE Systems' latest model in the Ultraprobe series, the Ultraprobe 15000, is a good measure for just how far the instruments have come. This instrument has a large, color, touch screen display, onboard spectral analysis, onboard sound recording, built in digital camera, and spot radiometer for taking temperature. The available data management software is used for creating predetermined locations to download readings for trending. Detailed reports can be generated through the software such as a compressed air/gas spreadsheet that will show potential cost savings and CFM loss from an air or gas leak survey. Spectral analysis software is also available. This allows the inspector to playback sound files that have been recorded directly onboard the ultrasonic instrument. Views include both the FFT and Time Wave Form.

TECHNOLOGY

There are two main sources of ultrasound. The first is turbulence. Turbulence is created from something that is under a high pressure that is trying to get to a lower pressure (figure 1). An example of turbulent flow is when a compressed air or gas leak that is under a higher pressure is trying to exit through a small crack or orifice to atmosphere or the lower pressure. Turbulence is also created where there is a vacuum (figure 2). The sound that is created where there are vacuum leaks will be less though, since the sound is being pulled into the low pressure side.

Turbulence is also created when there are electrical disturbances such as corona, tracking, and arcing. Corona for instance has a steady "buzzing" sound that is produced from the air ionizing around a connection of 1000 volts and greater. At 1000 volts and up, air actually becomes a conductor. Therefore, corona will only be detected in electrical components of 1000 volts and greater. During the ionization process the molecules are vibrating and bumping into each other, thus creating turbulence.

The second source of ultrasound is friction. There may be either too much, or too little friction. An example of too much friction is in an over lubricated bearing. As more grease goes into the bearing housing, there is an increase in pressure, and the bearings are

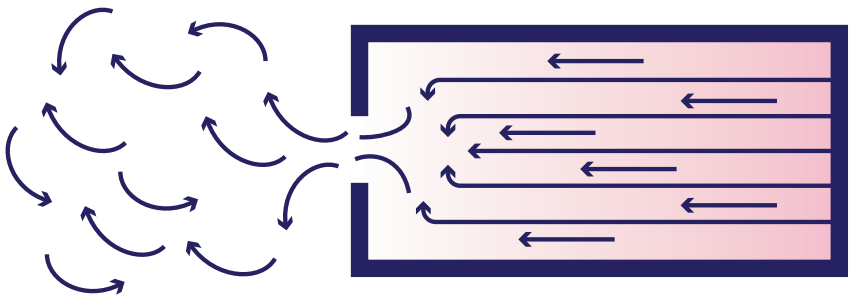


Figure 1 Pressure leak

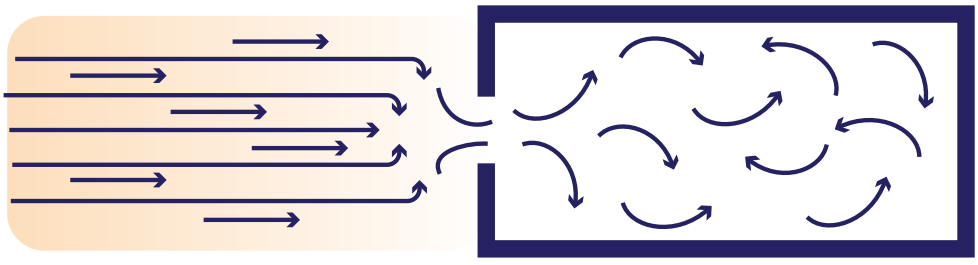


Figure 2 Vacuum leak

working harder to turn through the increase in lubricant. The increase in friction creates a roaring sound heard through the headset. There would also be an increase in the decibel level indicated on the instrument. An increase in friction creates more sound. "Rough" or "Scratchy" sounds may be an indication of impacts or a rolling element failure where the rolling element is sliding against the housing instead of rotating. "Cracking" or "Clicking" sounds are usually the result of bearing failure. An actual determination of a bearing fault can be determined by actually recording the sound with an ultrasonic instrument that has on-board sound recording, and then playing the recorded sound on a spectral analysis software.

APPLICATIONS

There are two main application groups for ultrasound. Airborne ultrasound applications include compressed air & gas leak detection, steam leaks to atmosphere, and vacuum leaks. Airborne ultrasound has also been used for specialty applications such as wind noise and water leak detection in the automotive and aircraft industry, and for quality checks in vessels such as fuel tanks, propane tanks, and autoclaves. Ultrasonic leak detection continues to be the most widely used application for airborne ultrasound instruments. This is mainly because of its ease of use and a very quick payback when leaks are found and then repaired. Usually, enough leaks can be found during an initial survey that the potential savings will more than pay for the instrument. The cost is based off of the pressure where the leak is located, the decibel level indicated on the instrument once the leak is located, and the cost per kilowatt hour of electricity. As an example, a 60dB leak at 100psi, at a cost per kilowatt hour of .06 cents results in a cost of approximately $450 per year for just one air leak. A compressed air and gas spreadsheet is available for easy reporting and trending of air leak surveys. This spreadsheet can also be generated through UE Systems' Ultratrend DMS software. Leak survey data is stored on board a digital Ultraprobe, downloaded into the software, and then the compressed air survey spreadsheet is generated.

An airborne ultrasound application that has seen a tremendous increase in usage over the last few years is for electrical inspection. Corona, tracking, and arcing can easily be detected with ultrasound instruments. Airborne ultrasound can be used for low, medium, and high voltage inspections. Corona, however, will only be detected in components that are at least 1000 volts. At 1000 volts and up, air actually becomes a conductor. Corona is heard in the headset as a steady buzzing sound. Tracking can be described as having a more intense "bubbling", "frying", and "popping" sound. Tracking would commonly be found in cracked insulators, loose connections, and where there has been a breakdown of the insulating material. Arcing has very distinct sudden starts and stops of energy and erratic bursts of the electrical discharge. Actual confirmation of these conditions is best done through spectral analysis and not just based on what the inspector hears in the headset. The first screen shot below is of corona seen in the FFT (figure 3). The second is of arcing as seen in the time wave form (figure 4).

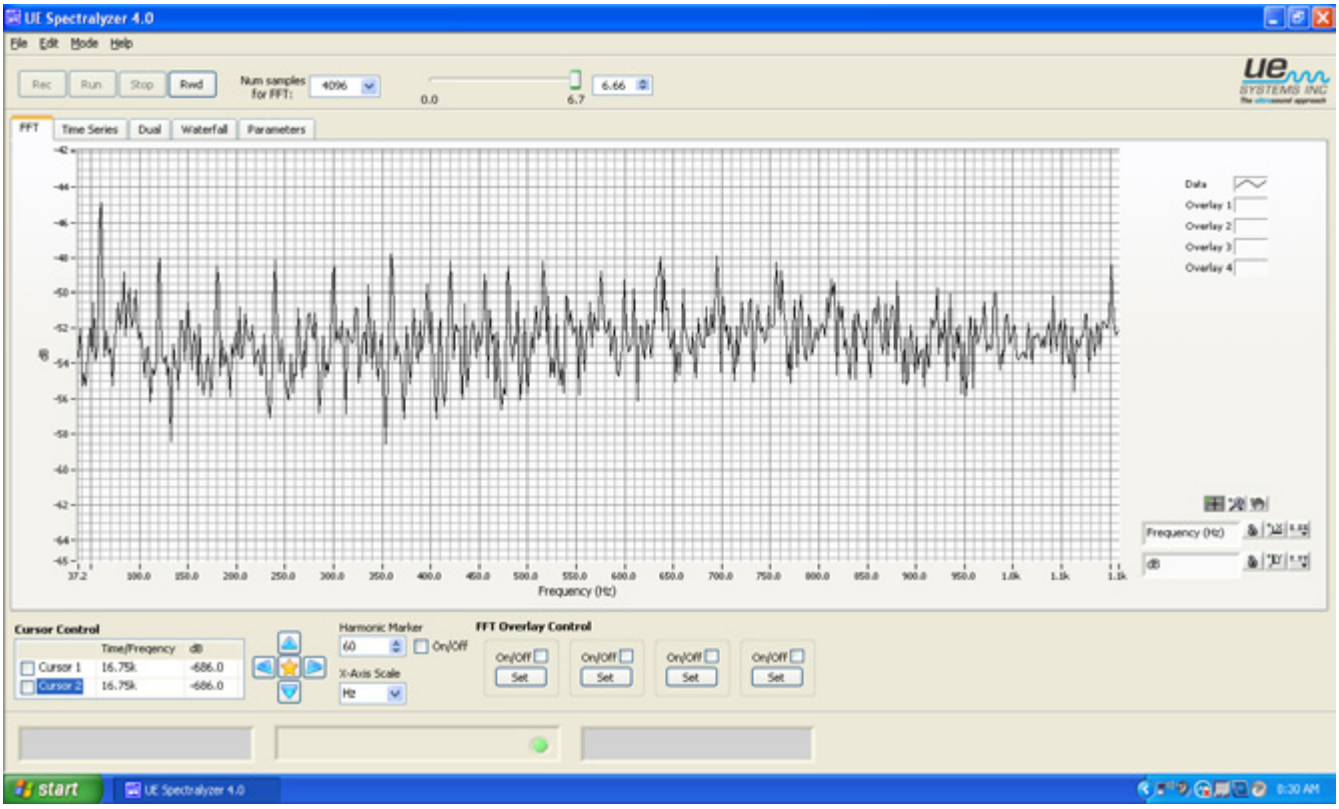


Figure 3 Corona seen in the FFT. Well defined 60Hz harmonics can be seen and rich "frequency content"

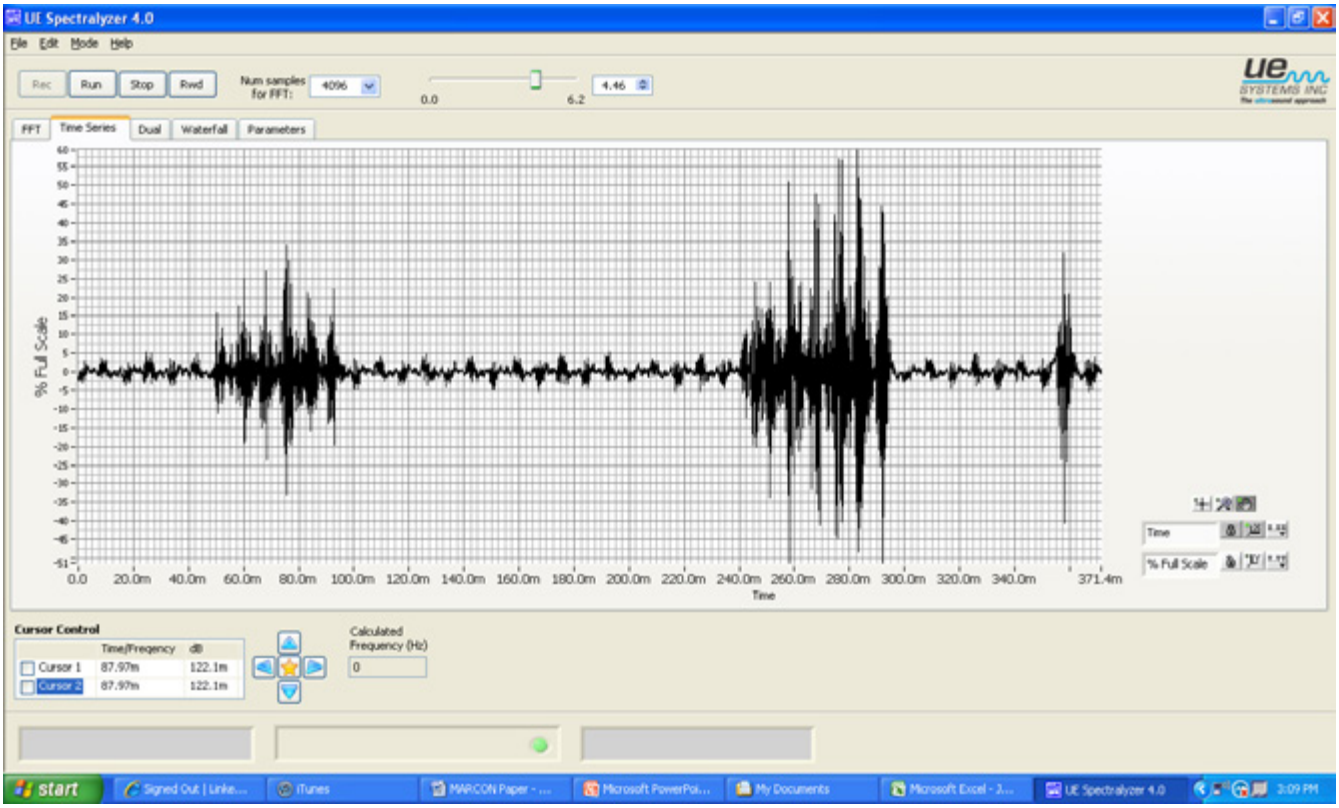


Figure 4 Arcing seen in the Time Wave Form

The second application group is structure-borne ultrasound. Structure-borne ultrasound applications include rotating equipment such as bearings, motors, and gearboxes. Premature faults can be detected early when using structure-borne ultrasound on rotating equipment. The P-F Curve below (figure 5) shows where equipment is running, but there is an instance of failure. The first line of defense in detecting the fault/failure is ultrasound technology. As you move farther down the curve you have audible noise, hot to the touch, and finally catastrophic failure. Ultrasound is used to detect faults and failures in rotating equipment before they can be heard audibly with normal human hearing. Obviously, if I have a piece of equipment that I can hear "roaring" or grinding" it is already in a failure mode. So, using ultrasound we can detect faults before they become catastrophic.

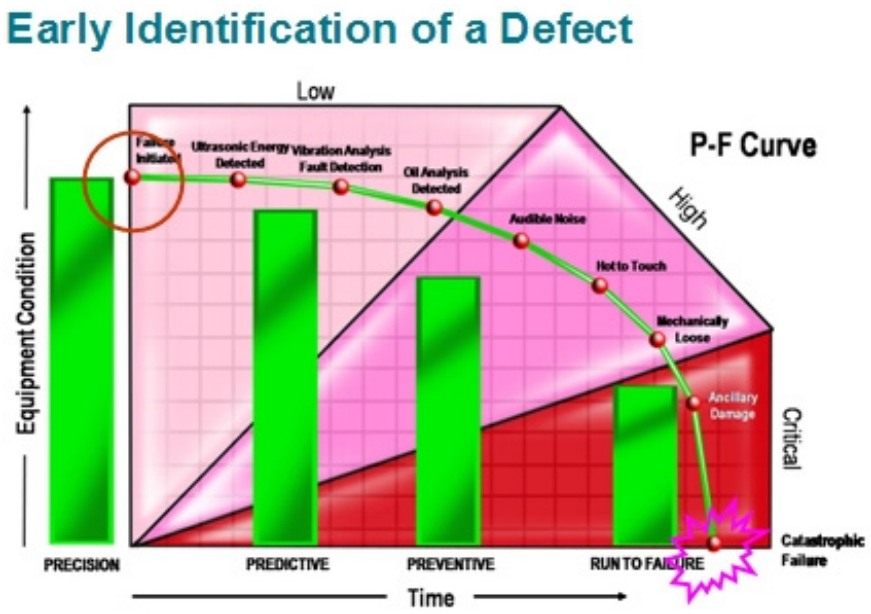


Figure 5 P-F Curve

A good piece of rotating equipment will have a much lower decibel level than one that is either in a fault/failure mode, or even over lubricated. Predetermined points can be created in the data management software, and data can then be stored onboard the instrument and then downloaded back into the software. This allows the inspector to trend the decibel level over time. Any increase in the noise level will indicate either a lack of lubrication or a more severe fault or failure depending on the amount of increase in the decibel level over a predetermined baseline. Actual diagnosis of conditions can be done through spectral analysis. The screen shots below are of two identical bearings of similar size, type, and speed. The first FFT shows a tight, narrow band with no harmonics or peaks (figure 6).

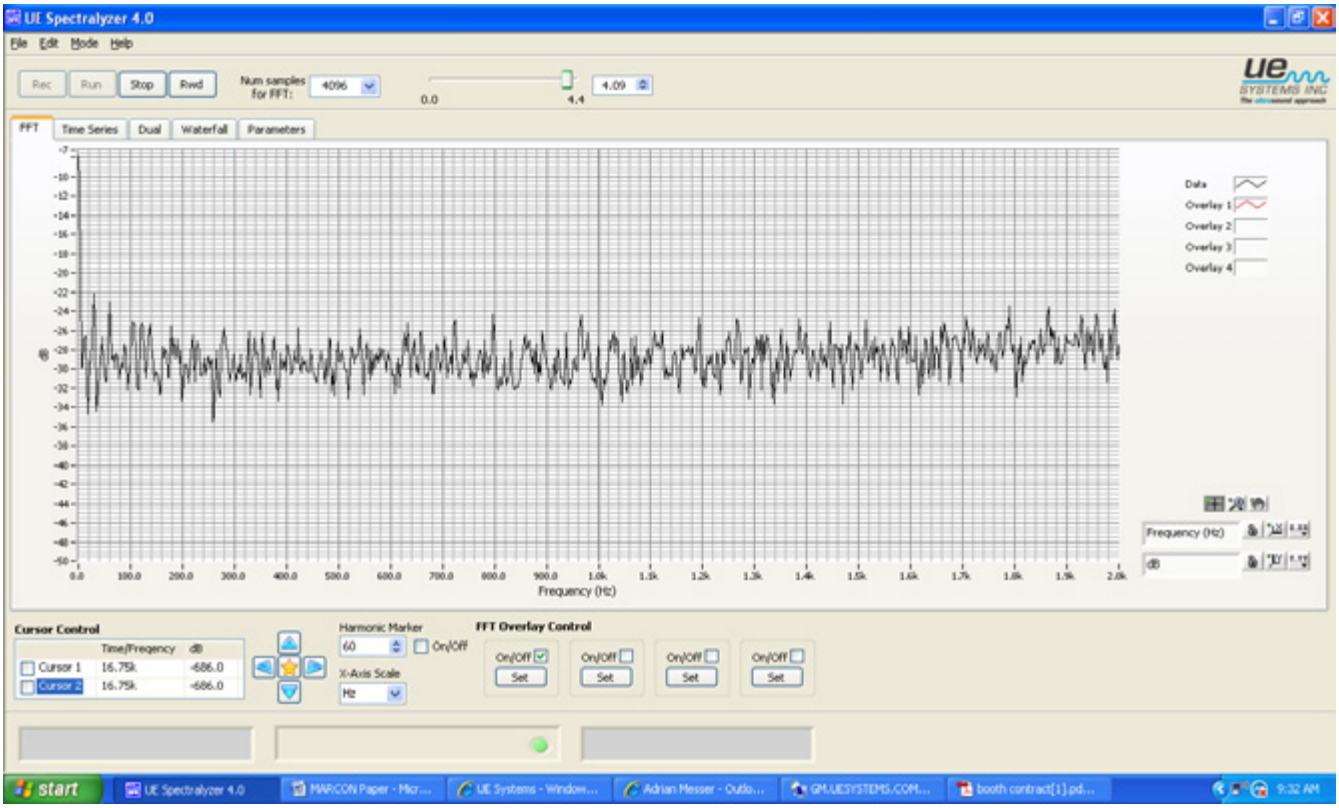


Figure 6 Good bearing as seen in the FFT

The second FFT shows that there are harmonics or peaks (figure 7). This would be indicative of either impacts, ball pass frequency, or rolling element failures.

Another use of structure-borne ultrasound is for steam trap testing. Steam traps are similar to valves. They regulate the flow of steam and condensate through the system and help to maintain a consistent temperature. Failed steam traps result in increased energy efficiency of the boilers, irregular temperatures in the

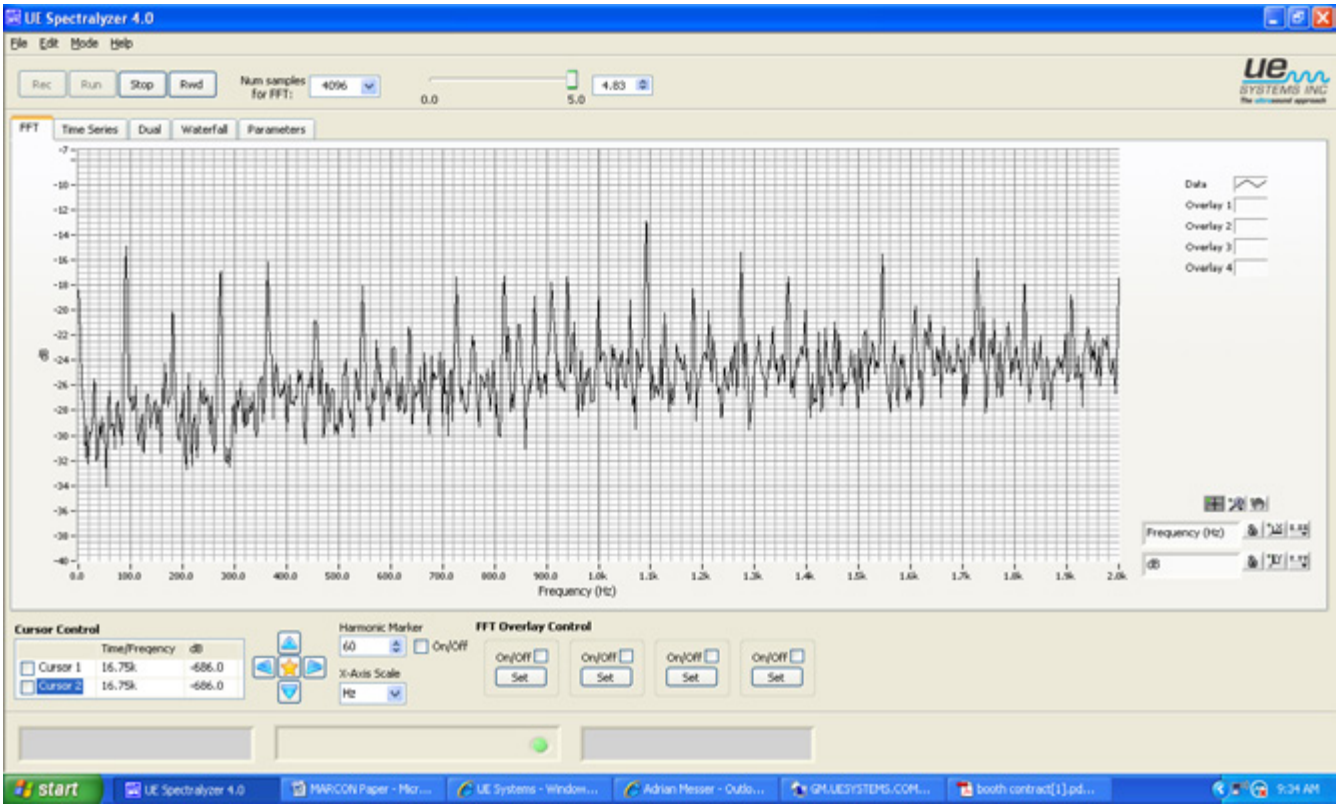
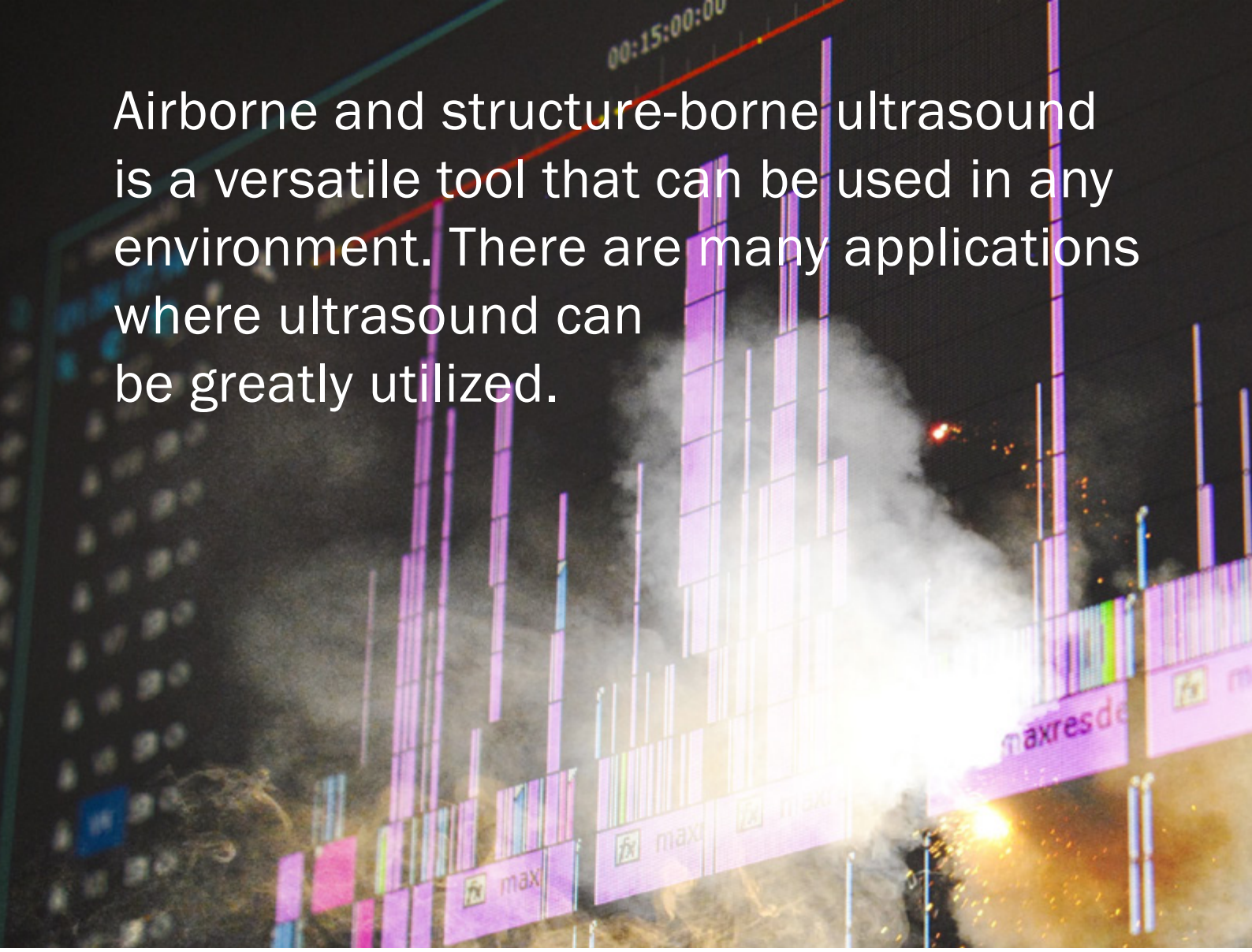


Figure 7 Bad bearing as seen in the FFT



Airborne and structure-borne ultrasound is a versatile tool that can be used in any environment. There are many applications where ultrasound can be greatly utilized.

system that can affect product quality and loss of heat. One of the most important factors to testing steam traps is trap identification. The inspector must be able to recognize the type of trap that is to be tested. Once the trap has been identified, it will have one of two sound characteristics. The trap will either have an "on & off" sound, or a continuous flow sound. On and off, or hold/discharge/hold traps are most commonly inverted bucket, disc, thermostatic, and thermodynamic traps. When listening to these traps the inspector should hear a very distinct cycling of the trap. A leak by condition will be heard when the trap is in the closed position, but steam intermittently bypasses the seat of the trap. The second sound characteristic is a continuous flow sound. This sound would be heard when listening to a float and thermostatic trap. There is a continuous flow of steam and condensate through the trap, but there is a float inside the trap that regulates or modulates the flow. A faulty float or a float that has collapsed due to water hammer will result in a failed open trap. This would be heard as a continuous rushing sound that has no modulation. This trap would be blowing steam straight through the trap, or in the failed open position.

CONCLUSION

Airborne and structure-borne ultrasound is a versatile tool that can be used in any environment. There are many applications where ultrasound can be greatly utilized. One way that facilities can have a big impact on saving energy is through finding and repairing compressed air & gas leaks, and repairing or replacing failed steam traps. Also, being able to extend the life of an asset without having catastrophic failure, can increase uptime and reduce unscheduled downtime. Being able to predict failures in equipment, and then plan accordingly, leads to less interruption in operations and production. For a minimal investment in predictive technologies such as ultrasound, vibration analysis, infrared thermography, laser alignment, and motor circuit analysis, the payback can be tremendous. In today's business environment, it's all about remaining competitive in your respective industry. One way to do that is through an increased emphasis on predictive and condition based maintenance.

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Diversification like never seen before

IIMS salutes just some of the many companies in the marine sector who have adapted their skills and production facilities to make personal protection equipment for hospitals and medical professionals. Additionally, there are companies that have donated essential stocks of equipment to worthwhile causes at a time of great need and scarcity. Our heartfelt thanks and a big well done to all marine related organisations and their teams and staff around the world who are helping at this time in the fight against COVID-19.

Barton Marine is providing clear film face masks to key workers around the South East.

Working in partnership with a component supplier in Taiwan, Barton has sourced an initial 500 face masks as part of its contribution towards helping combat the coronavirus.

"We are honoured to be able to offer these masks free of charge to front-liners in need of PPE who are taking care of those in need," explained Suzanne Blaustone, Barton CEO. "200 will be sent to the Met Police in London and the rest to food banks and care homes in desperate need of PPE.

"We salute those in every sector who take care of others and continue the effort to keep our countries and communities stable in these troubled times."

The masks will shield the face and eyes from flying liquid and debris, going towards helping protect essential workers from coronavirus.

With the current shortage of PPE across the globe, the team at Barton is continuing to explore ways to help reduce the shortage in the UK.

Berthon has donated its supply of Molton Brown hand lotion to the critical care unit at Lymington Hospital.

The company has run a shipyard in Lymington since 1877 with many of its staff living locally and says this is a small way in which it can help NHS staff.

"The hand lotions were ready to be placed alongside the hand soap in our five-star facilities in time for the start of the sailing season," said director Brian May. "However as soon as we were aware of the request from the local hospital we were delighted that Luke, our marina manager, could make use of our stock and deliver them to the hospital."

ISP is to start making equipment for the NHS to help tackle the COVID-19 crisis.

The company, that usually manufactures marine inflatable lifejackets, also has a background in military clothing and other accessories.

"We've recently diverted production to the manufacturing of essential NHS equipment," says James Saunders, operations director at Typhoon and ISP. "We're currently liaising with various parties on different requirements, however currently we're making up to 10,000 patient gowns."

He added: "The company's workforce is no stranger therefore to meeting manufacturing quality and efficiency standards and is in a strong position to adapt its production line over a tight timescale due to the flexibility it has always offered customers for bespoke products."

Whale has been responding to an increase in demand for sanitisation products during the coronavirus pandemic.

The company manufactures a range of manually operated foot pumps – its Babyfoot range - that are used in portable hand sanitation units.

Although production at Whale's facility in Bangor, Northern Ireland, has been suspended, a team has been pulled together to support the demand.

La Ciotat Shipyards has begun a collaboration with ID Yachting and Tilcara, producing protective face masks for non-medical personnel in the wake of the coronavirus pandemic.

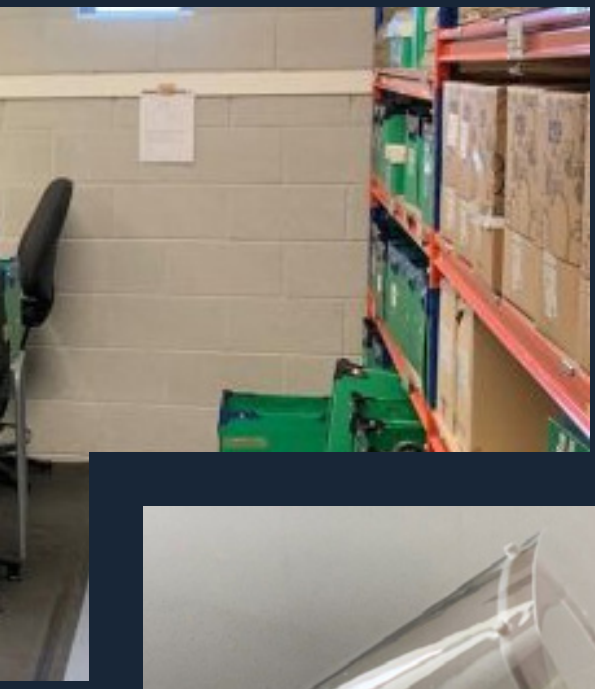
Both companies have facilities within the yards and specialise in the interior fit-out of superyachts with experience of working with fabrics and textiles.

The first delivery of raw materials has been received and around 500 masks are expected to be produced daily.

The first masks will be given away for free to priority police and public servants responsible for vital functions, in particular those working with the most vulnerable people.

Sailors and shore crew from the wider 52 Super Series family are seemingly putting their skills – and in many cases their hardware – to good use. In Palma, Mallorca, and in Valencia, groups and individuals are engaged in making personal protective clothing and protective masks and visors.

Many of the Palma-based sailmakers such as Phoenix's Mathieu Cassanas, Jordi Calafat from Platoon, Martin Winter of Quantum Racing and Provezza's Gwenael Le Guen are helping make cloth gowns and masks in an initiative coordinated by Pablo Torrado from the Maxi72 Cannonball. Others, such as Gladiator's Feargal Finlay and Azzurra's Ross Hunter are making full use of 3D printers to manufacture plastic protective masks and visors.



"In responding to the increased demand for our Babyfoot pumps, we were keen to take this opportunity to play our part in combatting the spread of COVID-19 around the world," said Whale MD Patrick Roberts.

"Without the dedication of the team here at Whale and our supply chain partners, this would not be possible. I would like to take the opportunity to thank everyone for their hard work and contribution during these challenging times."

Axiom Product Development is assisting in the manufacture of protective face masks for use by NHS and frontline workers in the fight against the coronavirus pandemic by manufacturing injection mould tools.

The full face, clear protective face masks are in a variety of designs, providing high quality, multi-fit protection and incorporate full face shields and an integrated forehead band.

"Axiom Product Development have now manufactured six 'multi-cavity' injection mould tools to produce various visor headbands that then mount the protective clear visor," said sales engineer Richard Maguire. "We can supply the visor material or the whole unit. These six tools only took a combined two weeks."

The company is used to fast turn-around engineering solutions including high quality CNC machining, complex tooling, manufacturing aids and prototype plastic injection mouldings.

Design engineering solutions can be carried out while continuing to adhere to the government's social distancing guidelines.

Sailmaker Barry Hayes and his UK Sailmakers firm in Ireland are using their skills to make protective equipment for local healthcare workers helping to fight the COVID-19 pandemic.

The firm, based in Crosshaven, has suspended its usual operations and instead will deploy its sail making skills to make protective clothing.

"Hopefully we can help in any way we can," said Claire Morgan, UK Sailmakers' director. "The sailing season is basically down the toilet. We have to hang tough for a few months."

The company, which began trading 47 years ago, has held a meeting with the Health and Safety Executive to put forward its plans and determine whether the gowns are suitable for use by the medical profession.

"We're in our initial stages of finalising our design and materials to use," Claire said. "We have sent samples off to a couple of nursing homes as well."

The firm will be using spinnaker cloth which is lightweight, waterproof, durable and doesn't rip easily. It can also be cleaned and disinfected easily – the perfect material for protective clothing.

Composite Integration is utilising its design and manufacturing capabilities to help fight against the COVID-19 pandemic.

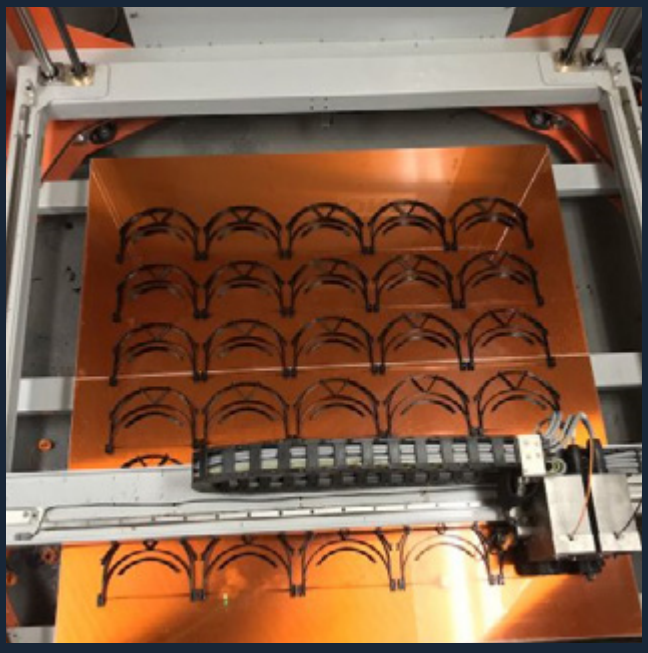
Working with a number of colleagues across the UK, the company has produced prototype face visors which have been functionally reviewed and accepted by NHS Plymouth.

All the components have been procured from local UK sources enabling Composite Integration to offer rapid supply to meet the growing demand.

The company is aiming to manufacture around 2,500 visors per week for key workers with strict health and safety measures introduced to protect employees, families, customers and suppliers.

The face shields are suitable for care homes, doctors' surgeries, healthcare professionals, and keyworkers and can be reused.

Features include low-cost, reusable face protection, lightweight and portable, with a flexible structure making them comfortable to wear.



Engineers at Teignbridge Propellers have turned their hand to printing 3D face shields to help combat the coronavirus.

The company has teamed up with South Devon College and is hoping to print at least 120 frames a week using its BigRep and Creality Ender3 3D printers.

"Utilising strict social distancing requirements, it takes 45 minutes per upper frame using the BigRep printer and the lower mask frames are being printed on the Creality Ender3 which will turn out eight lower frames every four hours," explained Brittany Rose, Teignbridge Propellers marketing.

"At the heart of the operation is Jack Ellis, the 27-year old engineer who noticed South Devon College, was printing face shields and was eager to get Teignbridge involved with donating.

"After the initial contact, it took less than 24-hours to begin printing these essential, life-saving shields."

In support of the NHS during the ongoing COVID-19 pandemic, Sunseeker International is donating Personal Protective Equipment (PPE) to Poole Hospital NHS Foundation Trust.

This PPE equipment consists of 400 face masks and 4,000 gloves...

"We all need to do our bit in these exceptional circumstances," says Michael Straughan, Chief Operating Officer. "We wanted to support our hardworking NHS workers as they continue their exceptional frontline work against the coronavirus. As we had PPE equipment available, we felt it was important to donate these to Poole Hospital to help however we can."

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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.

SeaDek adds defenders to its range

SeaDek Marine Products has added Dek Defenders flat boat fenders to its range. Dek Defenders are manufactured using 50mm of closed cell foam with a honeycomb embossed surface pattern and laser etched SeaDek logo.

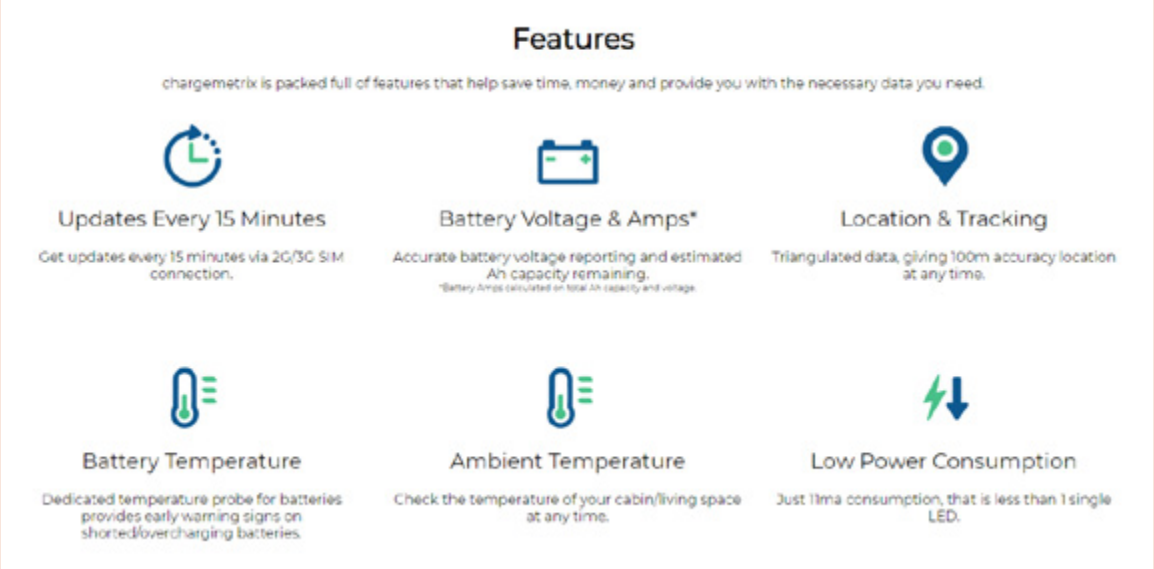
Each fender includes two colours: a 5mm surface colour on each side of the fender and a 40mm middle colour in different combinations: storm grey/black, Bimini blue/white, storm grey/white and mocha/black.

"Our customers take pride in caring for their boats and rely on our quality non-skid products to keep their boats looking like new while providing a safe and comfortable journey," said Sean Roebuck of ProCast Marine. "By adding Dek Defenders to our line-up of boating accessories our customers can now protect the interior and exterior of their boats."

Remote battery monitoring system launched

Chargemetrix has launched an automatic remote monitoring system for all 12-volt batteries. Ideal for boats, Chargemetrix delivers real-time remote reporting on battery voltage, temperature and even the vessel's location almost anywhere in the world. Monitoring batteries can significantly extend battery life and reduce both cost and waste by prompting the owner to take action before degradation and damage occurs.

Chargemetrix enables boat owners to check battery status via an app on any internet-connected device. The app provides real-time information plus a 30-day history, and can send push alerts such as low voltage or change of location.



See **http://www.chargemetrix.com**

New composite fabric dedicated to the yacht industry from Serge Ferrari

Stamoid Smart 1 is designed to protect equipment on board and is waterproof, breathable, lightweight and easy to manage with reinforced durability, high resilience and total UVB opacity.

"It's ideal for crew and equipment protection on board," explained Gemma Clifton, Kayospruce marketing. "The unique thing about it is its waterproof yet breathable."

The fabric's elastomer technology protects against bad weather, oils, mineral oils and extreme temperatures and is said to be easier to clean. In order to ensure waterproof seams and a flawless product, Serge Ferrari has also developed the SK Seam Sealer resin. Suitable for covering equipment on sailboats such as helms, tables, rigging and for motorboat consoles and seats, the fabric weighs 280g/m2 and is 0.3mm thick. It comes in 250cm widths and has a tensile strength of 125/140 daN/5 cm and a tear strength of 14/30 daN. With UV filtration of UPF 50+ it will remain effective in temperatures as low as -50°C and as high as 120°C.

LED circuit tester from Hubbell Marine

A new UL and CL-listed twist-lock circuit tester from Hubbell Marine is designed to speed the process of checking shorepower connections for proper wiring. The product uses LED visual codes to indicate electrical circuit conditions, aiding those working in dimly-lit or difficult-to-access locations.

When inserted into a 30A/125V receptacle, the LED back panel will display whether the circuit is complete and properly wired. A plastic card will identify seven connection conditions: correct or reverse polarity; open hot, ground or neutral; reversed hot and ground and hot on neutral.

The NEMA configuration of LED signals is designed to make it easy for users to diagnose mis-wiring situations.

New Bilgeaway filter from RCR

River Canal Rescue (RCR) has extended its range of Bilgeaway filters with the addition of a new smaller midi filter, suitable for boat owners who have little or no bilge pollution. The cartridge-free, 'plug and play' filter removes up to quarter of a litre of hydrocarbon contaminants (petrol, diesel, engine oil etc) from the bilge area, using a non-toxic solution to render them non-reactive.

"The midi and 10in filters are 'no-brainers'; if everyone installs a bilge filter it will dramatically reduce the oil/fuel vessels discharge annually, reducing environmental pollution," said RCR sales director Damien Forman. "In France it's mandatory for boats to have bilge filters fitted and I hope the UK follows this example.

Typically requiring maintenance only once it reaches capacity, users empty out the filter by unscrewing the top and decanting the 'crumb-like' environmentally-friendly deposits into a container before disposing of them. The filter can then be refilled and repositioned back in place.

ACR Electronics launches complete man overboard system

ACR Electronics has combined two of its AIS products to create a kit providing boat owners with a complete man overboard system. The new package unites the CB2 transponder with two Ocean Signal rescueME MOB1 man overboard beacons, with the aim of promoting a more rapid rescue from either the casualty's own vessel or other vessels in the vicinity if someone falls into the water.

Integrated within a life jacket, the compact MOB1 communicates with the CB2, as well as boats within about a five-mile range, and provides two methods of rapidly relaying the man overboard's position in an emergency. It transmits an alert to all AIS receivers and AIS-enabled plotters in the vicinity, and the MOB1 activates the DSC alarm on the vessel's VHF radio to alert fellow crew members. Crew members are able to track the person's position during rescue while the integrated strobe light allows the casualty to be seen in poor light conditions.

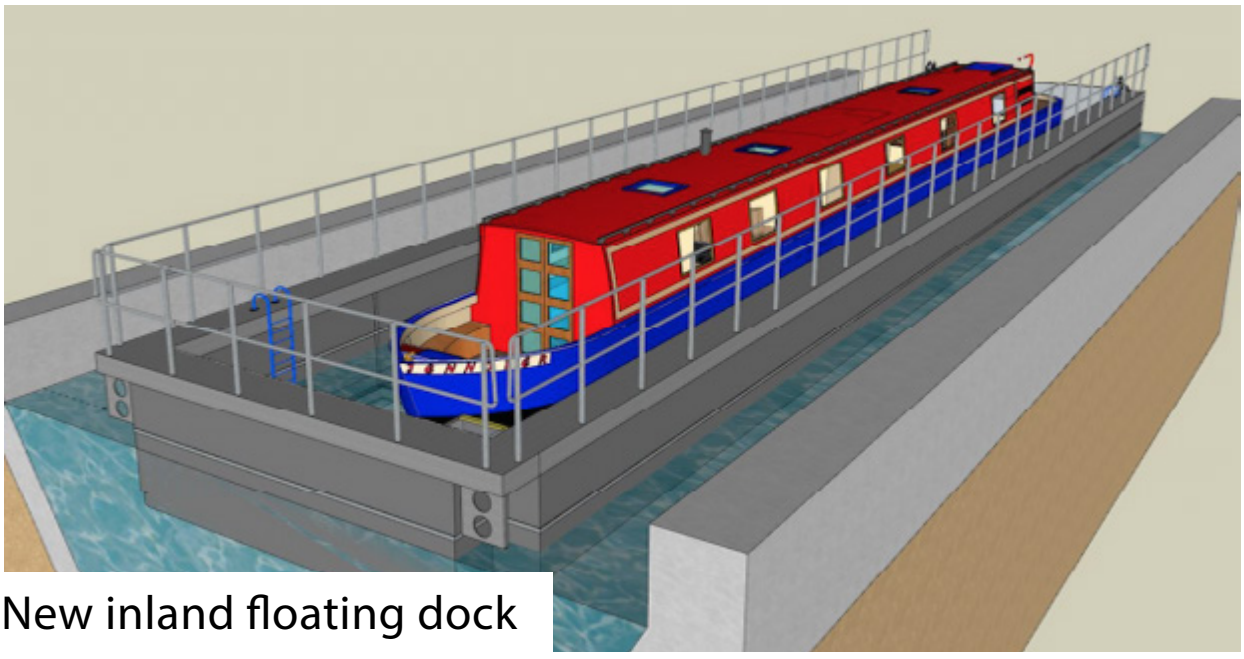
Mikele D'Arcangelo, Vice President of Global Marketing & Product Management, says: "We want to make the latest AIS technology accessible to more boaters so they can improve onboard safety by simply adding one complete solution to their onboard kit."

Teal & Mackrill extends its paint range

Two of the latest paints available from Teal & Mackrill for the inland waterways market are a galley paint and an anti-slip deck paint. The Teamac Galley Paint has been formulated to be used on cabin walls, bulkheads, ceilings and all interior surfaces.

It is designed to reduce condensation forming on interior surfaces, by way of a lightly textured surface that can be overpainted with Teamac marine products. The paint can be used in galleys, heads and shower rooms where condensation is most likely to form and is available in one litre size tins.

Teamac Suregrip Anti-Slip Deck Paint contains a coarse aggregate that provides slip resistance. The product is designed to be an easy to apply safety coating for glass-fibre, metal, concrete and wood surfaces. It is suitable for use where wet and slippery decks and roofs are prevalent.



New inland floating dock

P&D Marine Services (PDMS) is the boat lifting and handling arm of the Pontoon and Dock Company. The company was set up last year to provide equipment and service for the boat yard sector with one area covered being floating dry docks for the inland market.

"Many inland marina sites don't have the space for a traditional boat yard or cannot justify the financial commitment of other types of boat lifting machinery," said a company spokesperson. "The PDMS dry docks are purpose designed to be eco-friendly and available in a range of sizes to meet the customers specification, enabling safe and easy use."

The dry docks can be offered as either open or covered designs and with an internal layout to suit the end-requirements.

GIVING EXPERT WITNESS

By **Karen Brain**

Are you ready to be an expert witness? What does being an expert witness really mean?

This is one of a number of articles to explain the role and requirements of an expert witness but it is also relevant to those who write professional reports that may be in the "firing line" at sometime as an expert witness. To know what they should do and aim to achieve can focus those who write professional reports to consider their structure and content to avoid criticism.

First know your forum:

- Civil Case – Supreme Court
- Civil Case - County Court
- Criminal Case – Magistrate & Crown Court
- Coroners Court

Secondly know the rules:

- Civil Procedure Rules ("CPR") Part 35 - **https://www.justice.gov.uk/courts/procedure-rules/civil/rules/part35**
- Official Guidance e.g. Practice Direction Part 35 and Guidance for instructions of experts in Civil Claims 2014 - **https://www.justice.gov.uk/courts/procedure-rules/civil/rules/part35/pd_part35**
- Criminal procedure rules and practice directions
- Codes of Practice and Other Guidance e.g. professional codes of conduct and model forms

Your duty as an expert is to the court but do you really know what this means as the first case we look at explains?

Make sure you know the rules and how to conduct yourself at trial.

If you are not an expert of suitable calibre or competent as an expert (e.g. qualifications, knowledge, experience, not fit at the time of trial) or do not comply with the rules you may be open to criticism and be responsible for wasted costs.

In this article we are going to look at some of the recent cases that highlight the need to comply with court procedure rules and the consequences if you deviate from them, including wasted costs orders made against experts.

Collapse of trial – Fraud trial of brokers - carbon credits

In this case the judge decided the expert was not an expert of suitable calibre. He had no good understanding of the duties of an expert, no academic qualifications, his work had never been peer-reviewed and he had received no training, nor had he attended any courses.

This was a fraud case involving conspiracy to defraud carbon credits and diamonds and the prosecution's case was that there was no room to sell carbon credits in a secondary market and therefore no room for brokers to be working in a secondary market. The defence case was that a secondary market existed and there was legitimate room for brokers selling carbon credits in a secondary market.

One defendant found an expert who had worked in the market, he had academic experience and had written a book on carbon credits and fraud. He also was an academic and he had a PHD in carbon credits as well as having given evidence in other countries and civil courts. So, he had "good credentials" in contrast with the prosecution's expert witness. The defendant asked for the prosecution to abandon their expert witness before the trial commenced but they did not have a case without their expert so they would not abandon him.

The judge in the case asked the prosecution expert questions and from these questions it transpired amongst other things that the prosecutions expert witness had no academic qualifications (which is not always important as some areas are very specialist), he had decided to leave some years off his CV that were relevant and for years he had not undertaken any training post him leaving the market. Also, he had not undertaken any research on his opponent.

In this case experts should have used the CPS guidance on expert witnesses. Its appendices include:

- Certificate instruction that sets out the day the expert was instructed and what they were asked to do i.e. the scope.
- Certificate of self-declaration – experts sign a check list and if you have not got ticks in the boxes you have not done everything you should have done.
- Proforma for schedule of unused material so if and when an expert is asked by any side to amend a report or delete an appendices they can then put in their report the changes and who asked them to change the report, meaning the expert cannot be criticised.

In this case it transpired that the prosecutions expert was aware of the guidance but then accepted he had done none of it.

He had no certificate of instruction, no record of unused material and he had not been checking in with the officer of the case or the CPS lawyer and his only contact was a week before the trial and apparently he had missed the call.

In this case the instructing officer did not have an understanding about carbon credits and the expert had been leading the case and had been cutting and pasting questions from an officer but, the officer had not asked him the question. So incorrect information was contained in the report.

In addition, the police did not look properly into the background of the expert. They did not understand the expert's role and duties to record, retain and reveal; the disclosure officer did not understand what the expert should be doing. This expert had been used on other cases and at no time was his background and expertise challenged.

By following procedures and guidelines experts are protecting themselves in which ever court they are in - civil or criminal. So, make sure you follow procedure rules and ask for them if they are not provided, likewise for any specific guidance to follow. Ensure you communicate with your instructing party and query any instructions if they appear to digress from the rules.

So, it is crucial for an expert to be trained properly and understand his/her duty to the court and actually appreciate what it means by "your duty is to the court".

As an expert you should not rely on others to "police" you and make sure you are trained and understand and follow the procedures of any court - for civil disputes this is the Civil Procedure Rules.

The second case **we consider** highlights the duty to the court, the need **to** understand those duties and financial consequences of not understanding and complying with the duties.

Thimmaya v Lancashire Foundation Trust – wasted costs nearly £89k

This case involved a consultant who acted as an expert witness in a clinical negligence proceedings and was ordered to pay £88,800 to cover the costs wasted as a result of his input.

The expert was a consultant spinal surgeon who was deemed not generally competent as an expert witness and not fit to be giving evidence.

The defendants sought the wasted costs order after the expert was wholly unable to articulate the test applied in determining breach of duty in a clinical negligence case and as a result the claimant had to discontinue her claim.

The court found that the expert owed important and significant duties to the court and had failed comprehensively in those duties. A significant amount of court time had been wasted and significant consequences to the NHS in terms of costs.

The court heard that the expert was not fit at the time of the trial to give expert evidence. The expert submitted that he was having cognitive difficulties, problems with his memory and concentration, and had not appreciated he was unfit to give evidence. He added that on the day of the trial he had an adverse psychiatric reaction to the questioning of counsel for the defendant who reminded him of an interrogator who had previously questioned him in Iraq.

In 2017 the claimant's solicitor had asked the expert to confirm his suitability as an expert. He was not considered dishonest or deliberately misleading but he should have recognised he should not have continued to act as an expert witness and as a consequence the balance came down in favour of the defendant's (the NHS) application for wasted costs.

So when deciding on whether you are suitable to be an expert witness in a trial not only consider amongst other things your calibre, competence, qualifications, expertise, experience and knowledge of court rules, but also whether you are fit to undertake the role.

For those who are not expert witnesses but who intend to become expert witnesses it is worth considering your expertise, competence, qualifications, knowledge of the area and experience before accepting a commission. Also, as in the previous case, use check lists, ensure external sources are quoted for external information used in a report. Make sure you understand your scope of work and ensure it is clearly stated in your contract and report to your client.

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A day in the life of...

Sarah White

Sarah is still something or a rarity, a female marine surveyor working in an industry that is way behind the times when it comes to balancing out the sexes! Recently Sarah was one of those behind the success of the first IIMS Canada Branch Marine Surveying Conference to successfully take place in Vancouver. Mike Schwarz poses the questions in conversation with Sarah.

Q1. You were deeply involved in organising the recent inaugural IIMS Canada Branch Conference in Vancouver, which proved to be a great success and must have left you feeling a sense of pride. What were the highlights of the event for you and what memories will you keep from it?

I started working toward the conference about five months before the event, early in the morning, so I could also fit in my usual workload. By the day the conference arrived, my only focus was to ensure it ran smoothly. We had some fantastic speakers, but I didn't get to hear all they had to say as I was still in "keep it running smoothly mode." Fortunately, the presentations were recorded, and I got to listen after the event was over. What I did enjoy was the opportunity to chat to the attendees, (while we could still stand within a foot of each other), learn a little about the other survey disciplines operating across Canada and meet some of the local surveyors whom I had heard of, but not had the pleasure of crossing paths with. The event provided a good source of networking and a sense of unity in a vocation that can be quite solitary. The success of the event was a highlight; the people I met and the conversations we had were memorable, and the constructive feedback gained was invaluable to the planning of quality future events.

Q2. How did you find your way into the marine surveying profession and was it a deliberate decision, or did you come into it by accident as some do?

My decision to become a marine surveyor was most definitely planned. I started working in the marine industry after moving to Canada from UK over 25 years ago. I intended to use the money I earned to supplement a change of vocation to flying. Unfortunately, neither the income nor the timing was ever symbiotic to the needs of bush pilot training, so I remained in the marine industry. I built and refinished classic, and not so classic, wooden yachts, serviced, and commissioned both new and older composite power and sail pleasure craft, and educated myself wherever I could. During this period, I also ran a service company, which used in-house and contracted staff. I was shocked at the level of professionalism seen across the local small craft service industry during this time and turned my focus on trying to improve it. Fortunately, a four-year apprenticeship-training program for marine technicians had already been developed and was operating with success on Vancouver Island. I enrolled my staff in this program and eventually facilitated the schooling to be conducted in Vancouver encouraging other techs to enrol. The results born of this program are most visible today. The skills and education I had gained through these last 25 years were invaluable, and I wanted to apply and share what I had learned to the improvement of the more senior profession of a small craft marine surveyor.

Q3. What is one of the most challenging situations you have faced as a marine surveyor?

The profession of a small craft marine surveyor requires no official training or certification in Canada, yet, the role of the surveyor is to ensure the safety of craft and consequently save lives and infrastructure on the water. This role is an enormous burden to put on the shoulders of an unregulated profession. This lack of regulations

has also provided an advantage to unskilled and unqualified individuals who wish to fraudulently profit from a senior profession. The results can be catastrophic, yet clients continue to place value in these individuals, whether through lack of education or to save a buck. My challenge (aside from maintaining top quality work to my clients) is on-going: to educate the boating world on the role of the marine surveyor, to support the training and education of future surveyors, and work toward a recognised industry standard for our profession.

Q4. IIMS is keen to encourage more women to come into the profession. What advice would you give to a woman thinking about entering the surveying world in what is still a male dominated industry?

My message to women (and men) is, ensure you have the skills, knowledge, and confidence always to do your job well and stick with it. The time required to gain our experience is a long journey, and our reputations are our trademark. Along this journey, we do encounter circumstances that favour our skills, and these will eventually help denounce the word of the sceptics. I always remember one boat owner saying to me, "Sarah, if my husband wants to buy and use this boat, I have to be happy too,". These words were from a lady who supported women in industry and subsequently promoted girls working on boats. There is also no denying that we will face difficulties in our careers from time to time, but in today's world, with the right approach and support, these problems can be resolved.

Q5. How important is it for a surveyor, even an experienced one, to continue to refresh and develop new skills?

Paramount. There is an adage that says, "I have forgotten more than I have learned." Even when I refresh, I have to re-refresh! Unfortunately, like so many of us, I wasn't born with a photographic memory, so I have to work hard to stay informed, and in today's marine world of constant technological and material advancements, the only way to keep current and informed is through continued personal development.

Q6. What types of surveys do you carry out mostly and which aspect of the survey process challenges you most?

Although we do work on other structures, the majority of the surveys we conduct tend to be on small craft for pre-purchase, condition and valuation, damage investigations, new construction, or refit. I think the most challenging task is report writing. Whether a vessel or a floating structure is custom or production, not one is alike. It's installations, use and the environment in which it operates cause wear and trauma in ways specific only to that vessel. This uniqueness means the use of a generic survey document, for all report writing purposes, is not an option. Consequently, reports can take a long time to complete, often with changes to the document structure and multiple proofreading techniques to ensure the final report is tailored to the intended purpose and is as accurate as possible.

Q7. How have you adapted to the rash of new technological tools and equipment available to the surveyor and do you have a favourite?

I keep a keen eye on the different survey tools and techniques, ultimately to improve the quality of an investigation. In 2017 I completed a Masters' degree in marine surveying; my thesis was "The Application of Non-destructive Technologies (NDT) to the Detection of Flaws in Glass-reinforced Plastic (GRP) Production Recreational Small Craft". I was surprised to learn through my research that the use of NDT is common among surveyors, although the tools vary. However, for the average small craft surveyor, the use of high tech tools is limited, simply due to prohibitive costs and lack of local demand. I use ultrasound and thermal imaging along with a variety of different electrical diagnostic tools, which certainly aid the survey investigation; however, in view of safety, my latest investment is an air quality detector; the BW QT-X000-R-Y-NA GasAlertQuattro Single Gas Personal Detector.

Q8. What do you say are the most important personal traits for a surveyor to master?

I think the willingness to keep learning and the awareness that we do not have all the answers is a hurdle most professionals face throughout their working life, and the older we get, the more challenging it seems. Most of us learn diplomacy along the way, which is paramount if we are to succeed. However, vitally important is also the need to respect other surveyors in the field. Whether these surveyors are our colleagues or competitors, collectively, we all create the image of our trade, and I, for one, wish to be proud of my profession and of those who are part of it!

Q9. What particular challenges does the geography of Vancouver and British Columbia present for you and your fellow surveyors?

Despite the amount of rainfall we get, often very little. And even with the rain, we do consider ourselves lucky to work in British Columbia as we can work year-round. Other parts of Canada do not experience the mild winters we get here on the West Coast; as a result, their boats are dry-docked in the late fall, so surveyors have to put down their tools until late spring. The west coast of Canada consists of the mainland, Vancouver Island and other archipelagos. Transit is typically by car, ferry, private watercraft, or floatplane. Access by road and ferry is very good to all the major boat storage areas, which are often close to a yard. Most surveyors will operate within a specific catchment area, however, those who accept contracts further afield, the distance would most likely be the challenging factor, particularly if a few ferry changes or multiple forms of travel are involved.

Q10. How important is networking with other fellow surveyors and what role should mentoring others play?

We learn and gain other opportunities through interaction with our peers and industry cohorts; networking is the making of business and progress; I don't see how any trade can develop without it. For those who are isolated in their work, having opportunities to interact through training and conferences, facilitated by an organisation such as IIMS, can be invaluable. Mentoring is also imperative if we are to strengthen our industry; if we can't support those who are following in our footsteps, there can be no substance to our trade. Mentoring increases the professionalism and growth of our industry, and through my association with marine technician training; I get to bear witness to the positive results of mentoring every day.

Q11. What was the last book you read that left an impression on you?

Gosh, there are so many, off the top of my head, Eric Newby's 'The Last Grain Race' or Richard Henry Dana Jr., 'Four Years Before the Mast.' They gave me a porthole into a life on board what I glorify as majestic sailing vessels, but in reality, were tough ways of life on leaky and often dangerous craft. I respect and honour the sailors of yesteryears and try to imagine what their lives would have been like if they had had the benefit of today's modern surveyor.

Q12. Once the work is done how might we find you relaxing and unwinding?

Oh, I wish I could just put my feet up and nod-off in the afternoon, but the closest I come is occasionally collapsing on the deck with a glass of red wine after a full-on week. Running local trails, exploring our beautiful coastline, sailing dinghies, or sinking my teeth into a family restoration project tends to be the general run of the mill post-work activities. My partner Mike and I spent 14 years restoring a wooden boat, best known for her racing prowess on this coast. The year we launched her, we had the privilege of leading the fleet out to the start line on the 50th anniversary of her renowned win. Our current project is not so glorious, but satisfying none-the-less: the renovation of our island cottage.

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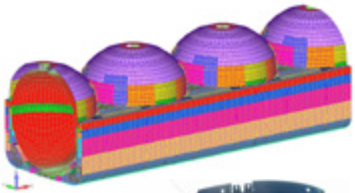

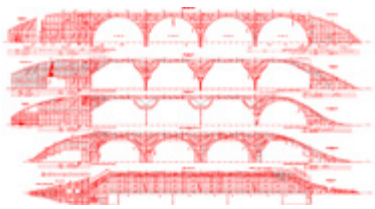

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