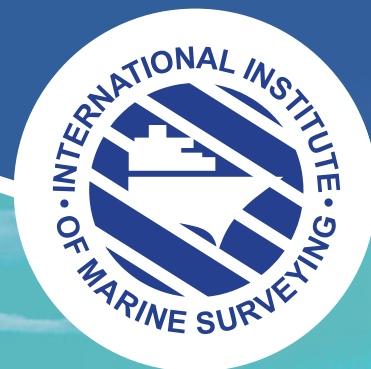


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THE REPORT

DECEMBER 2019
ISSUE 90

The Magazine of the International Institute of Marine Surveying



IMO 2020

**The biggest challenge to
hit shipping for decades**

CEO review of the year

**UAE Branch Conference
10th anniversary report**

**End of life boats.
The solutions?**

**Bug attack corrosion...
what surveyors must know**



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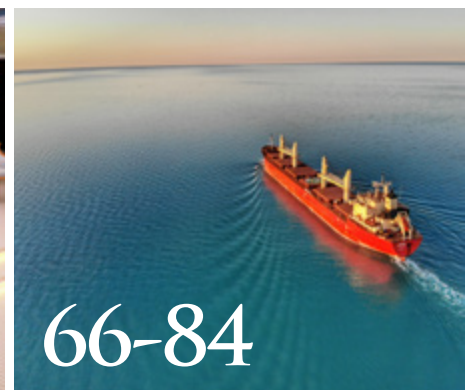
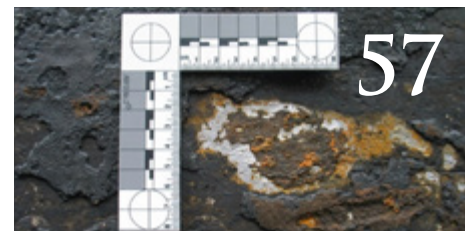
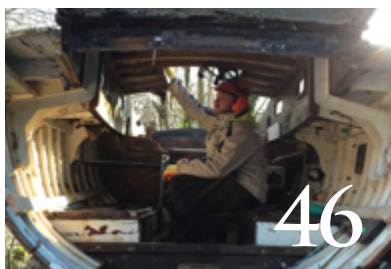
THE REPORT

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EDITOR'S LETTER

Dear Member

Welcome to edition 90 of The Report Magazine, the biggest we have ever published in our history.

The shipping sector is in a state of disruptive change and flux, but you don't need me to tell you that I am sure. The much vaunted and long debated IMO 2020 Sulphur Cap regulation hits the shipping industry next month. And as one quote I recently read said, "Tougher rules on sulphur emissions from ships will come into effect next year in the biggest shake-up for the oil and shipping industries for decades" - (Reuters). This a big deal and a challenge for all involved. With this in mind that I have devoted many pages to this topic with comment, opinion, thoughts and observations from a number of experts in the field.

The thorny issue of what to do with the millions of end of life boats that exist around the world (6 million estimated in the European Union alone) will not go away. I found someone local to the office in Portsmouth who works for a company that is involved in scrapping 200 of them a year. But as Luke Edney explains in his article, it is a time-consuming business (page 46). The 6th biennial UAE Branch Conference celebrating the tenth anniversary since the formation of the

branch just last month was something magnificent. The setting aboard the famous Queen Elizabeth 2, now moored permanently in Port Rashid, Dubai, was spectacular. Great speakers at Conference on a range of on-trend topics made the event memorable. My congratulations to those locally for making it such a success. A report on the event can be read on page 32.

As has become tradition, I have written at length about the IIMS year that will soon be consigned to history. See page 36. It is an honest review of all that the Institute has been engaged with and it has given me great pleasure to record my thoughts for this edition on what has been a truly eventful year. One of the highlights of 2019 is undoubtedly the progress IIMS has made towards the purchase of Murrills House, a most exciting prospect. We are closing in on an historic event in the Institute's life.

I co-authored an open letter to the yacht and boatbuilding manufacturing industry worldwide on the subject of latent defects with Vice President, Geoff Waddington. It was his initiative and one I applaud him for and in which I was happy to assist. It has been subsequently published by various media and has opened up some interesting lines of discussion. I have published the letter in full on page 42.

For a bit of fun, I recommend having a look at the boating building terms published on pages 50 and 51. How many are you familiar with? All of these have been taken from the handy guide written by Jeffrey Casciani-Wood. Additionally, I am grateful to Jeffrey for allowing me to share his content on the subject of bug attack on metal, a condition not well understood by some surveyors. Corrosion is, of course, a subject dear to all surveyor's hearts and a regular sight when on survey, but the speed which bugs can eat through thick steel is extraordinary. See page 57.

New management board member, David Pestrige, is the subject of 'A Day in the Life of' on page 103. Other features to interest you are one on risk management, many recently published safety briefings and 'Insurance Claims are on the Increase!' by Karen Brain.

It only remains for me to wish you a Happy Christmas (if you celebrate it) and more importantly, all the best for a successful and prosperous 2020.

Survey well

Mike Schwarz
Chief Executive Officer
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THE PRESIDENT'S COLUMN

Dear IIMS Member

It is my pleasure to write to you this final message of the year in an optimistic and upbeat mood. I report with great delight after the successful completion of the UAE branch's 10th year in existence and the celebrations that took place just a few days ago onboard the QE2 in Dubai. You shall read all about it in much more detail in this edition of the Report Magazine and also in a special supplement that is going along with this edition (coming soon).

I addressed the Conference attendees that we had had a good run in with likeminded committee members who felt that surveyors needed to uplift the image of synergy and professional pride amongst us by working together to build and grow the brand image of our profession. This I feel, under the leadership of the past five branch chairmen, has been successful with the support of committee elected members.

We have good harmony going on here in the UAE as a branch and with loyal committee members. We have been giving out four awards

biennially to recognize the efforts of senior surveyors and this has improved our goodwill as IIMS tremendously amongst our peers. I have offered an open invitation of mentoring with the support of any of our past chairmen who may be available to help and structurally grow any branch that may need assistance in any aspect of their journey to sustain and grow itself. It's only about initiatives not necessarily expensive that needs to be thought about. We are here to help was our 10th year message to the IIMS global fraternity.

Benchmarking IIMS with other older and more successful institutions (viz: RICS, NI, ICS, RINA, IMAREST) which have grown consistently and substantially over the years, it is beyond doubt that growth of the IIMS is directly proportionate to the growth of its global branch activities. It remains the lifeline of our future growth, this I have written and mentioned during our board meetings several times.

The nature of our job means we have differences in opinions frequently while we are out there in the field for joint surveys, but please do not carry this home or

off the job site. Do not let this difference of opinion get personal. We have demonstrated at the UAE Branch how we can cooperate and create something good together for uplifting our professional pride.

With this gesture I end with this year-end message during the season of giving, sharing and smiling with friends and family. Please continue to extend this message of cooperation, kindness and synergy amongst the surveying fraternity.

With this thought let's all have a toast this Christmas and enjoy the coming year with great pride for our Institute and our fellow members around the world.

Season's greetings and a happy new 2020 to one and all.

Be safe and celebrate responsibly!

Your President

Capt. Zarir Soli Irani, *President International Institute of Marine Surveying*
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Email: Capt.Irani@constellationms.com

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- 2016 - 2018 Mr Adam Brancher

CO2 SYSTEMS SAFE WORKING CASE STUDY

North P&I Club has published a study following a recent incident that resulted with the loss of ten people onboard a vessel, highlighting the dangers when the operation of fixed CO2 systems is not fully understood.

The incident occurred whilst the vessel was in dry dock. A junior officer was tasked with getting details of the fixed systems CO2 bottles in the vessel's CO2 room. While the junior officer was in the CO2 room, he discovered a leak from one of the cylinders. In an attempt to stem the leak, a pressure increasing valve was mistakenly opened, which increased the pressure in the system and resulted in the release of all the cylinders in that bank.

The system had a final distribution valve to the engine room which was initially closed but subsequently opened in error. This led to the occupied engine room being flooded with CO2.

To prevent incidents occurring when working with or on fixed CO2 systems, it is critical that the all persons involved are aware of the risks.

Any maintenance – planned or unplanned – that is to be carried out on the system must be appropriately risk assessed with the necessary control measures in place in accordance with the vessel's safety management system (SMS) and the manufacturer's recommendations.

Read the article in full at <https://bit.ly/2CjJXa4>



David Patterson, North P&I Club, the author of a case study on safe working with CO2 systems

LIFTBOAT OVERTURNS DUE TO INADEQUATE INFORMATION ABOUT SEAFLOOR COMPOSITION REVEALS REPORT

The US National Transportation Safety Board published its report on the liftboat Ram XVIII, that overturned in the Gulf of Mexico, on November 18. Due to the incident, three personnel suffered minor injuries, while about 1,000 gallons of hydraulic oil were released. The vessel was declared a constructive total loss at an estimated \$1,140,000.

The Ram XVIII started from Houma, Louisiana, on Friday, November 16, after taking on a Fugro Chance surveyor and survey equipment, to service the WD-68-U platform. The vessel was carrying 190 tons cargo, and the voyage lasted 2.5 hours.

Upon arrival, the liftboat received permission from the platform to approach. They would conduct work on the east side, with the bow to the platform. The master stated the plan was to establish the starboard leg in a can hole, close to where two previous vessels had jacked, and according to the surveyor's data, the Ram XVIII was positioned with both the starboard and aft legs in cans.

The surveyor used sonar equipment to survey the bottom and confirmed the location of the can holes. Before landing on the seabed, the surveyor provided a picture of 'a clean bottom with no trash' and he verified the position of each leg using a Fugro satellite positioning reference system. He then went ashore by crew boat with his equipment.

Of the 190 tons carried on board, the Ram XVIII had around 25 tons sitting on deck on arrival, including a compressor, grocery boxes, and sandblasting equipment. The mate loaded 400 tons of water in the preload tanks, filling them to the top.



Liftboat, Ram XVIII, overturned in the Gulf of Mexico

While jacking up the Ram XVIII, the starboard and stern legs penetrated the seabed, showing they were in the can holes as planned. The master worked for about two hours, keeping the vessel level while elevating it out of the water.

As expected, the port leg did not penetrate very far, despite the master's effort to 'lean' the ship in that direction by jacking the starboard side to put more weight on the port leg. The mate relieved the master and continued to 'tweak' the legs.

Read the article in full at <https://bit.ly/2NMLPgD>



Fishing vessel safety public declaration

FISHING VESSEL SAFETY PUBLIC DECLARATION SIGNED BY NEARLY 50 STATES

At a Ministerial Conference held in Torremolinos, Spain, 48 states signed a public declaration to indicate their determination to ratify the 2012 Cape Town Agreement on fishing vessel safety. This is a significant regime to create much-needed safety standards for fishing vessels.

During the Torremolinos Ministerial Conference on Fishing Vessel Safety and Illegal, Unreported and Unregulated (IUU) Fishing (21-23 October 2019), nearly 50 states signed the Torremolinos

Declaration. By doing so they have publicly indicated their determination to make sure that the 2012 Cape Town Agreement on fishing vessel safety will enter into force by the tenth anniversary of its adoption, on 11 October 2022.

The Cape Town Agreement includes mandatory safety measures for fishing vessels of 24 metres in length and over. It regards key parameters like stability and associated seaworthiness, machinery and electrical installations, life-saving appliances, communications equipment, fire protection and fishing vessel construction. Although adopted in 2012, it will only enter into force after at least 22 States, with an aggregate 3,600 fishing vessels of 24 metres in length and over, have confirmed their consent to be bound by it.

Read the article in full at <https://bit.ly/2ClrREx>

IMO INCREASED EFFORTS TO FIGHT FAKE FLAG REGISTRIES

In response to a spike in fake flag registrations, the International Maritime Organization (IMO) is seeking to combat "rogue" national flag registries which are operating without the knowledge of governments they claim to represent, according to the insurer Standard Club.

In recent years, IMO has received reports that 73 vessels were unlawfully flying the flag of the Democratic Republic of the Congo, 91 vessels were illegally registered under the flag of Fiji and 150 vessels were unlawfully registered under the flag of the Federated States of Micronesia. (Micronesian law doesn't even allow international vessels to flag into its national registry.) The vessels involved are typically smaller, older cargo vessels.

To address this challenge, IMO is developing a comprehensive database of registries on the publicly accessible area of the Global Integrated Shipping Information System (GISIS), a proposal which has been under discussion since at least October 2018. The database will contain the names and contact details of each national governmental body (or authorized delegated entity) in charge of registration of ships. The database will also include information regarding countries which do not operate a ship registry, be it domestic or international.

Standard Club advises shipowners to follow these IMO best practices for validating a vessel's flag registry:

- ensure Flag State Administration contact information is up-to-date;
- prospective charterers should utilise the United Nations (UN) Security Council Sanctions List Search webpage;
- verify the relevant information relating to registries of ships in the 'Contact Points' module in GISIS.



IMO HQ London

Read the article in full at <https://bit.ly/32mEc5V>

ABYC AND TRANSPORT CANADA ANNOUNCE ONE SET OF MARINE SAFETY STANDARDS THROUGHOUT NORTH AMERICA

Transport Canada Marine Safety and Security (TCMSS) has published a policy on the acceptance of the American Boat and Yacht Council (ABYC) standards as an approved alternative method for small vessel compliance in Canada. The policy is effective as of October 30, 2019.

“Having one set of standards throughout North America is a huge benefit for engineering, manufacturing, and trade for the marine industry,” said Craig Scholten, ABYC Technical VP. “Being able to design, certify, and produce product to one standard will streamline and simplify everyone’s efforts.”

TCMSS will accept the equivalent standards published by ABYC with some Canadian modifications. The policy affects pleasure craft less than 24 meters and other craft of not more than 15 gross tonnage constructed, manufactured or rebuilt in, or imported into Canada.

Read the article in full at <https://bit.ly/2NNY8cC>



NEW REQUIREMENT FOR MAINTENANCE OF LIFE-SAVING APPLIANCES ENTER INTO FORCE IN 2020

The amendments to SOLAS regulations III/3 and III/20, introducing mandatory new requirements for the maintenance and inspection of lifeboats and rescue boats, are entering into force on 1 January 2020, to ensure safety of life-saving appliances and equipment.

The amendments were adopted during the 96th session of IMO’s Maritime Safety Committee (MSC 96) in May 2016 and introduce mandatory new requirements for the maintenance and inspection of lifeboats and rescue boats, launching appliances and release gear to be carried out by ‘certified personnel’ as per Resolution MSC.402(96)).

The provisions aim to prevent accidents with survival craft and address longstanding issues, such as the need for uniform, safe and documented standards related to the servicing of these appliances.

Key points

These requirements shall apply to the following equipment:

- lifeboats (including free-fall lifeboats), rescue boats and fast rescue boats; and
- launching appliances and on-load and off-load release gear for lifeboats (including primary and secondary means of launching appliances for free-fall lifeboats), rescue boats, fast rescue boats and davit-launched liferafts.

Weekly and monthly inspections and routine maintenance of such equipment must be carried out by authorized service providers, or by shipboard personnel under the direction of a senior ship’s officer in accordance with the maintenance manual(s).



Annual thorough examinations and operational tests must be carried out by certified personnel of either the manufacturer or an authorized service provider. The service provider may be the ship operator, provided they are authorized.

Five-year thorough examination, any overhaul, overload operational tests and repairs of such equipment, must be carried out by certified personnel of either the manufacturer or an authorized service provider.

Read the new regulations in full at <https://bit.ly/2Ch50tx>



Corrosion is a concern for tank container owners and operators

CORROSION NIGHTMARE IN TANKS, AND HOW TO MITIGATE

Corrosion is a perennial concern for tank container owners and operators. The stainless steel construction is resistant to staining and corrosion, but may be vulnerable to pitting from certain cargoes or certain cleaning and maintenance operations. Visually minor pitting may conceal development of substantial or even catastrophic corrosion below the surface.

It may be expected that UN Class 8 dangerous cargoes (Corrosive Substances) are the predominant challenge where corrosion of UN portable tanks (tank containers) is concerned, although such commodities are not alone in

presenting risk. In terms of classification however, corrosive substances are tested against a criteria of causing severe damage when in contact with living tissue and in the event of leakage are capable of damaging or destroying other goods, or means of transport.

For the purposes of classification under the IMDG Code, substances identified in Packing Groups I and II are not tested against their corrosivity towards the stainless steel shell of the tank container, but against the destruction of intact skin. Substances assigned to Packing Group III demonstrate corrosion whereby it either causes damage to living tissue to full skin thickness, or exhibits a corrosion rate on either steel or aluminium surfaces exceeding 6.25mm per year at a test temperature of 55DegC when tested on both materials.

Read the article in full at <https://bit.ly/2oOKsWe>

US NAVY DEVELOPS CORROSION TOPSIDE DRONE DETECTION SYSTEM

The US Navy's Office of Naval Research has recently worked with the operator of the retired WWII-era carrier USS Midway to test a drone-based corrosion detection system.

ONR's fast-prototyping division, TechSolutions, has developed a sensor package and processing system called Topside Drone that can detect corrosion and anomalies on hull surfaces automatically, saving time in surveys. The technology will be used to inspect and detect material defects, corrosion, warping and other forms of deterioration.

In a manner broadly similar to technology under development by ABS, Topside Drone uses visual data and a processing algorithm to detect areas of possible corruption. The drone system flies around the exterior of a ship taking video, infrared footage and LIDAR measurements. The results are used to create a digital model of the ship's structure and fed into the algorithm for analysis.



Topside Drone

The ONR development team wanted a "target-rich environment" to use for testing the drone's technology. The 1945-built USS Midway is permanently moored in San Diego, where she is open to the public as a museum ship, and operator USS Midway Museum agreed to partner with ONR for a test. During the flight demo, the system's computer vision algorithm analysed the collected data and revealed significant corrosion all over the vessel.

Watch a short video at <https://youtu.be/nmeWj4h8FmA>

HYBRID SES: FIRST HYBRID POWERED SURFACE EFFECT SHIP TO BE USED FOR CREW TRANSFER

CWind has announced a long-term charter contract agreement with Ørsted, delivering by mid 2020, the world's first hybrid powered Surface Effect Ship (SES) to Borssele 1 and 2 offshore wind farms. The agreement between the world's leading windfarm operator Ørsted and CWind, part of the Global Marine Group, covers an initial three-year firm charter with options available for a further two years. The Hybrid SES crew transfer vessel will be operating from the Dutch port of Vlissingen, to Borssele 1 and 2, located 23km from the Dutch coast in the North Sea.

The development of the Hybrid SES for use as a crew transfer vessel is in response to an industry-wide push to develop and deploy innovative technologies that reduce CO2 emissions, whilst cost effectively servicing windfarms located further offshore. CWind's Hybrid SES crew transfer vessel achieves this through a combination of electric and diesel propulsion which, when combined with the surface effect hull form and heave compensation technology, is able to operate in sea states of up to 2.0m Hs, whilst decreasing fuel burn and CO2. The Hybrid SES is therefore able to deliver crew faster to these sites and with improved comfort, resulting in increased operation days offshore for the client's O&M and construction activities.



Hybrid SES

Read the article in full at <https://bit.ly/33ouPnE>



HPI-CEproof: HPI Verification Services (HPIVS) and CEproof Group

HPI-CEPROOF: THE MERGING OF TWO LEADING GLOBAL MARINE COMPLIANCE COMPANIES

Two leading organisations in the global marine compliance industry, HPI Verification Services (HPIVS) and CEproof Group, have merged to create HPI-CEproof.

It's been a milestone 12 months for EU Notified Body HPIVS, which completed accreditation with The Irish National Accreditation Board (INAB) in 2018 for HPI Verification Services (Ireland) Ltd to ISO 17065 so that it can continue to certify products to the EU Recreational Craft Directive (RCD) and the EU Pressure Equipment Directive. This has enabled HPIVS to provide continuity of service, irrespective of Britain's future status in the EU.

Recreational Craft Directive specialist, CEproof, has enjoyed an equally successful period. Its core UK operation and 10 global offices have continued to develop its

tailored services, offering detailed and bespoke guidance for compliance with marine legislation, with particular focus on the RCD. The company has also seen wide adoption of its ICOMIA Technical File Generator. This software tool's ability to simplify the entire process of managing RCD compliance documentation has attracted significant industry praise, including an IBEX Innovation Award and METSTRADE DAME Awards nomination.

Speaking of the benefits of the merger, Alasdair Reay, CEO at HPIVS, explained: "CEproof has quietly built a substantial array of software tools for the boat industry with new products launching in the immediate future. By merging the businesses we can add these valuable resources to HPIVS's outstanding services. Working together we will make compliance easier and more watertight than ever."

"HPI and CEproof have worked as two links of the same compliance chain for many years," CEproof CEO and Managing Director, Craig Morris adds. "The future is so exciting now that we are able to combine our worldwide customer base with the abilities and tools of both companies."

3D PRINTED BOAT SETS GUINNESS WORLD RECORD

A 3D printed boat built by The University of Maine's Advanced Structures and Composites Center has received three Guinness World Records. They are as the world's largest prototype polymer 3D printer, the largest solid 3D-printed object and the largest 3D printed boat.

The boat is 25-foot, 5,000-pounds and named 3Dirigo. The 3D printed boat took just 72 hours to complete.



The largest 3D printed boat to date. Photo credit: University of Maine

The new 3D printer is designed to print objects as long as 100 feet by 22 feet wide by 10 feet high, and can print at 500 pounds per hour. The one-of-a-kind printer will support several initiatives, including development of biobased feedstocks using cellulose derived from wood resources, and rapid prototyping of civilian, defense and infrastructure applications.

Biobased feedstocks are recyclable and economical, providing competitive advantages for Maine's manufacturing industries, including boat building. The University of Maine Composites Center received \$500,000 from the Maine Technology Institute (MTI) to form a technology cluster to help Maine boat builders explore how large-scale 3D printing using economical, wood-filled plastics can provide the industry with a competitive advantage. By 3D printing plastics with 50 percent wood, boat moulds and parts can be produced much faster and are more economical than today's traditional methods.

LNG SHIPBUILDING BOOM TIME AHEAD. BUT ARE WE READY FOR IT?

It has been nearly a decade since the last mega LNG newbuilding program in South Korea was completed. Building forty-five LNG carriers for Qatargas at three major Korean shipyards – Hyundai, Samsung, and Daewoo — had been challenging on many fronts. Several new technologies and systems had to be qualified at the design stage, during plan approval, construction and shop trials and verified during commissioning, gas trials, and sea trials. Anomalies and deficiencies, if left undiscovered, cause rework, costly delays and considerable technical problems after delivery. Fortunately, with a handful of very experienced engineers involved in the QG project from concept to commissioning, it was a job well done in the end, to the satisfaction of all parties. What is now imminently around the corner is something much bigger, something that will overshadow the last newbuilding boom, and bring about a welcome change to the whole marine industry across the board. Here is why.



LNG shipbuilding around the corner

LNG seaborne trade almost doubled between 2008 and 2018, from 235 billion cubic meters to 431 billion cubic meters. Thanks to the increasing use of LNG as fuel ashore and on ships, the next decade is likely to see even faster growth in gas transportation, and consequently, in newbuilding orders for LNG carriers.

Qatar's LNG expansion program to raise production by 33 million tonnes per year (mtpa) by 2024 will need another 112 LNG ships of 180,000 m³ capacity (less or more depending upon the carrier size). That should be welcome news for shipyards, especially the South Korean yards with unparalleled experience in building LNG ships.

Read the article in full on pages 52 and 53 of this magazine.

WORLD SAILING AND ICOMIA SET TO JOIN FORCES

World Sailing, the world governing body of the sport and ICOMIA, the global voice of the recreational marine industry, have joined forces to ensure a sustainable future for the sport.

World Sailing and ICOMIA have a shared vision to grow participant numbers whilst safeguarding the environment. As part of a memorandum of understanding (MOU), the two organisations will collaborate on a variety of common interest areas such as vessel recycling, hybrid propulsion and sustainable maintenance.



World Sailing and ICOMIA set to join forces

“We cross paths with ICOMIA regularly when lobbying at an international level for the benefit of recreational boating,” said Dan Reading, World Sailing’s head of sustainability. “By joining forces to strengthen the link between the marine industry with end users, we can be more effective in creating a more sustainable sector.”

Under the MOU, both organisations will share statistics and data with the aim of increasing the number of people who are active on the water.

Udo Kleinitz, secretary general of ICOMIA added: “By formalising the strategic partnership with World Sailing, our organisations acknowledge the benefits of the knowledge, resources and positively increasing the industry’s profile.”

HERITAGE REPORT FOR 2017-19 PUBLISHED BY CANAL & RIVER TRUST

The Trust formally checks for changes in condition, defects or hazards along each stretch of canal at least once every two months. These inspections show that incidents affecting waterways heritage stood at 626 in 2017/18 and 635 in 2018/19, down from 800 recorded incidents in 2016/17. The most common cause of damage was vandalism (42% and 41% in 2017/18 and 2018/19, with half involving graffiti).

Less frequent, but significant, are incidents of damage caused by impact from vehicles or boats. In 2017/18 40% of all such incidents were caused by boats, reducing to 19% in 2018/19. Vehicle collisions typically damage canal bridges, and in 2017/18 there were 63 reported incidents, rising to 85 incidents in 2018/19.

Heritage at Risk

The Report takes a closer look at the number of our assets that are on the Heritage at Risk registers. In 2017-19 there were three sites on the Historic England register: Birmingham Roundhouse; Whaley Bridge Transhipment Warehouse, and Hanwell Flight in London. The Engine Arm Aqueduct was removed from the register following repair work, and work to restore the Roundhouse and the Transhipment Warehouse have continued over the period.

Volunteers play an important part in supporting our heritage activity and over the period have been involved in all areas, including historical research, making heritage assessments and conservation management plans, practical works, and recording historic structures.

Download the full pdf report at <https://bit.ly/2JWnNyR>



Heritage report for 2017-19

MAIB PUBLISHES THE RESULTS OF 25 INCIDENTS IN ITS SAFETY DIGEST 2/2019

The second Safety Digest of the year, edition 2/2019, has been published by the Marine Accident Investigation Branch (MAIB). It features the outcome of 25 incidents and accidents in digest format presented in a 71 page pdf which can be downloaded (see below).

Capt Andrew Moll says in his introduction, "As always, I will start my opening comments by thanking Hans Hederström, David Dickens and Keith Colwell for the introductions they have written for the three main sections of this edition of the MAIB's Safety Digest. We ask guest introduction writers to make insightful comments from their own perspective and to pass on pearls of wisdom. They have not let us down. Do please take time to read their words which are, as ever, very powerful.

Throughout my seagoing career, and especially since joining the MAIB, it has been true to say that 'every day has been a school day'. There is always something new to learn. I would therefore like to thank Hans for introducing me to his tactful but effective approach to raising concerns when things are not going according to plan. You will read more about his acronym PACE – Probe, Alert, Challenge, Emergency – over the page, but it seems to provide a simple method of escalating expressions of concern, and I will be adding it to my toolkit. Of course, it does require all members of the team to understand the plan beforehand – that shared mental model – so they can spot when things are starting to go awry, and this edition contains a number of examples where this has been the case.

More than half the articles in this edition's Fishing Section recount stories when the actions of the crew were significant, either in resolving the situation or reducing its consequences. One of my former captains once told me, "it's not what happens, it's how you deal with it that matters". His point was that you cannot always prevent bad things happening, but dealing with them effectively can help prevent a drama from becoming a crisis. The fire-fighting tale (Case 17) and abandonment story (Case 19) provide good examples of when drills and training before the event significantly improved the crew's ability to deal with an emergency. Is the message about wearing lifejackets when on deck getting through? I hope so. The deckhands in Cases 18 and 20 would probably have perished had they not been wearing lifejackets when they went overboard. While both these cases had a positive outcome, they also help make the point that surviving the initial immersion and remaining on the surface to be rescued is only the first part of the story. A man overboard is not safe until he or she is back on board. Hopefully, you already review and practice your manoverboard recovery procedures but, if you do not, now would be a good time to start.

Some years ago, I was training to become a powerboat instructor. Our teacher told us that it was important to assess the abilities of the students right at the start of the course, and that a good way to do this was during the opening session to invite everyone to introduce themselves and say a bit about their boating experience. Those who were completely new to powerboating would probably say so, but others might claim extensive prior experience. The difficulty was knowing how much value to place on an individual's self-account. The teacher suggested one simple method for assessing prior experience that was, simply, to quietly invite anyone who might perhaps be overselling themselves to coil up a discarded rope. His theory was that a good seaman would instinctively coil up and secure unused lines. In doing so, they would not just be tidying up. They would be checking the condition of the line as it passed through their hands, ensuring it was kink free, and that it was ready for immediate use when required. His ethos was that professionalism and safety go hand-in-hand. I think he was right."

Andrew Moll, Chief Inspector of Accidents

Download and access the report in full at <https://bit.ly/2BcmG9c>

AMSA RELEASE VIDEO: CREATING A SAFETY MANAGEMENT SYSTEM FOR FISHING VESSELS

AMSA has produced an excellent short video explaining how to develop a safety management system for fishing vessels. Watch this 16 minute video for easy to understand steps, real-world stories and experiences of why an effective safety management system (SMS) is essential when working in the fishing industry.

Fishing for Safety has been produced via a collaboration between Southern Rocklobster Limited Clean Green Program and AMSA, as part of a broader ongoing project: Southern Rock Lobster Clean Green Program— revision, digitisation and extension across the supply chain.

View the video at <https://youtu.be/twDW2JQq1p0>

PACIFIC KNIGHT: POOR STABILITY ASSESSMENT LEADS FISHING VESSEL TO CAPSIZE WITH ONE FATALITY

The National Transportation Safety Board issued an investigation report on the capsizing of the fish tender 'Pacific Knight' while at anchor off Alaska in July 2018. The investigation identified several contributing factors to the capsizing, including poor stability assessment by the captain, vessel modifications, overloading and slack water in the tanks.

NTSB determines that the probable cause of the capsizing of fish tender Pacific Knight was the captain's inadequate assessment of the vessel's stability and the risks related to vessel modifications, slack water in the tanks, and overloading of the vessel.

Witnesses to the sinking of the Pacific Knight recalled the vessel capsized to port and sank rapidly, leaving only the starboard quarter out of the water.

The vessel had no reported problems, and the hull showed no post-salvage signs of leaks or damage. Thus, there is no evidence that any hull damage, machinery defects, or structural failures led to the capsizing and sinking of the Pacific Knight.

At the time of the accident, the Pacific Knight was likely overloaded. According to witness accounts, while at anchor prior to the accident, the Pacific Knight had a very small freeboard and a stern trim that submerged the vessel's name on the transom.

The last stability assessment of the Pacific Knight was conducted in 1996, about 22 years before the accident, and would not have included any modification done to the vessel since then. The weight and placement of the two cranes that the captain added to contract for tendering a month before the sinking likely increased the vessel's vertical centre of gravity (based on the position in which the cranes were found when salvaged).

Download the report in full at <https://bit.ly/2OSksUN>

LITHIUM-ION BATTERIES LINKED TO FIRE IN SUPERYACHT'S GARAGE SAYS REPORT

Transport Malta's Marine Safety Investigation Unit (MSIU) has published an investigation report on a garage fire onboard the superyacht 'MY Kanga' while at anchor off Croatia, in September 2018. The investigation concluded that in all probability, the seat of the fire was the Lithium-ion batteries. Transport Malta recommended a review of the Commercial Yacht Code of 2015 on the storage of Li-ion batteries, as well as closed ventilation systems.

Conclusions

- The crew did not seem fully aware of the hazards associated with the Lithium-ion batteries, which resulted in an inadequate assessment of the risks involved with these batteries, even after three of the four batteries were found leaking.
- The garage space of Kanga was not considered a service space, within the meaning defined by the Commercial Yacht Code, 2015 and therefore, additional measures to prevent the spread of, as well as to extinguish, the fire were not deemed necessary to be provided in the garage.
- Unlike SOLAS II-2/5.2.1.1, which requires the main inlets and outlets of all ventilation systems to be capable of being closed from the outside of the spaces being ventilated, as well as the means of closing to be easily accessible, the Commercial Yacht Code, 2015 placed this requirement only for ventilation ducts/fans of the machinery spaces and galleys.
- Only Section 4.2.8.1 of the Commercial Yacht Code, 2015 required ventilators to be provided with permanently attached means of weathertight closure, which were to be easily accessible. The Code did not address the means of closure from the point of view of control of air supply, which could pose a potential for fire growth.
- The only means to detect a fire in the garage were through a photoelectric smoke detector and a fire patrol.
- There was no gas detector fitted in the garage, which could have provided an early warning of the situation in the garage; probably even before the activation of the fire alarm triggered by the smoke detector.

Download the report in full at <https://bit.ly/35yxdtl>

TUG GROUNDING AND SINKING REPORT ISSUES BY AIBN

Norway's Accident Investigation Board (AIBN) has released its report into the tug FFS Achilles grounding and foundering off Farsund on 3 March 2017, suggesting that the presence of a lookout would have reduced the risk of the incident occurring.

The vessel ran aground at a speed of 8.4 knots and sank shortly thereafter due to damage to the bottom under the engine room. FFS Atlas arrived at the scene before the vessel sank and rescued its crew, who were in the life raft. Two out of the three crew members had suffered minor injuries and received medical attention.

The mechanical control system for the propeller units (Voith Schneider) on board FFS Achilles was controlled by autopilot. The navigator, who was alone on watch, has stated that he initiated a change of course to port on the autopilot to pass the green navigation marker at Nordre Lamholmflua on his starboard side. The autopilot did not respond, and he made several unsuccessful attempts to initiate a change of course. He decided to deactivate the autopilot in order to switch to manual control, but the vessel ran aground before he could do so.

The investigation into the accident has not found any faults or defects in the propellers' mechanical control system, and the autopilot did not store data.

With its single bottom and long engine room, FFS Achilles was vulnerable in the event of a grounding. The ingress of water through the damaged bottom exceeded the bilge pumps' capacity, and the intact water-tight compartments to the fore and aft of the engine room were too small to keep the vessel afloat.

The investigation concludes that the current design requirements would not necessarily have made a new vessel of the same type as FFS Achilles, built for sailing under the Norwegian flag, any safer when the bottom was damaged. However, as a result of requirements stipulated by some flag states, the industry has developed a new design for a similar tugboat that would probably have survived the damage that sank FSS Achilles.

TSB CANADA RELEASES VIDEO ABOUT TUG GIRDING IN LIGHT OF MANY INCIDENTS

Between 2005 and 2018, the TSB Canada received reports of 26 girding (also known as girting) situations resulting in 21 capsizings. Girding occurs when a vessel is pulled broadside by a towline force and is unable to manoeuvre out of this position. The TSB has produced a video to illustrate the factors leading to girding and the recovery methods that can be taken in this eventuality.

Girding happens quickly and is a high impact event. When it does happen, the consequences can be serious. According to the video, when the TSB is called to a scene when girding has occurred, they often see that few operators have received instructions on how to recognise the factors that created the girding situation, and how to avoid or deal with it.

Factors that can lead to a girding situation:

- (a) Suitability of the tug: size, power, manoeuvrability, power, and visibility.
- (b) Towline length: When the two is overtaking the tug it can affect the tug's stability.
- (c) Location of the towing point: A sideways towline force creates a negative stability force which can cause the tug to capsize.
- (d) Tow features: size, weight, momentum and pivot point.
- (e) Environmental conditions: wind, current, tide, water depth.
- (f) Watertightness of tug: Watertight integrity must be maintained to ensure the tug's stability.

Recovering methods:

- 1 Adjust towline length and reposition tug in front of tow;
- 2 Using assist tug to reposition the tow;
- 3 Flop alongside: when the tug allows itself to be pulled alongside the barge until it can safely reposition.

Watch the video at <https://youtu.be/VWHdg917hZ0>

PERFORMANCE OF EALS TRIGGERS UPDATE TO SHAFT ALIGNMENT RULES

Classification society DNV GL will update its shaft alignment design rules to differentiate between Environmentally Acceptable Lubricants (EALs) and mineral oils in stern tubes. The update, effective 1 July 2019, is based on the phase 1 findings from the joint development project (JDP) DNV GL has been running in cooperation with marine insurers The Swedish Club, Norwegian Hull Club, Gard and Skuld to test the potential influence of EALs on failures in stern tube bearings.

The JDP was prompted by an upsurge in stern tube bearing failures that coincided with the increased uptake of EALs after the introduction of regulations requiring their use in commercial vessels trading in U.S. waters in late 2013. In phase 1 the JDP has focused on mapping out differences in the load carrying capacity between EALs and mineral oils. DNV GL has overseen detailed laboratory testing by Leonardo Testing Services Ltd. at the University of Sheffield, UK, and by INSAVALOR at INSA Lyon, France.

“Phase 1 has looked into how pressure, temperature and shear rate influence the viscosity of the lubricants, thereby affecting the oil film thickness and the load-carrying capacity”, says Øystein Åsheim Alnes, principal engineer. “Test results have proven that, in particular, the pressure- and temperature viscosity properties of EALs are different to those of an equal grade mineral oil. The findings show that while EALs provide safety margins that are equal to mineral oils in most operating modes, there are transient conditions where the EALs can have a reduced load carrying capacity.”

THE TYGER OF LONDON MAIB REPORT HAS BEEN PUBLISHED AND YACHT SURVEYORS ARE URGED TO READ THE SAFETY FINDINGS

The investigation found that the failure of the keel structure of the yacht caused the loss of the keel and led to the Comar yacht capsizing. Technical inspection of the keel plate, recovered with the hull, revealed that the keel had not been manufactured in accordance with the designer’s drawings. Furthermore, the unusual keel design meant that the condition of the weakest part of the keel structure could not be monitored, surveyed or inspected as it was hidden within the external lead casting.

The investigation also found that the crew of Tyger of London were well prepared for emergency situations such as capsize; they were wearing lifejackets and the yacht was equipped with a liferaft and electronic position indicating radio beacon (EPIRB). However, the EPIRB and liferaft were not rigged to float-free and the crew did not have time to release and operate them before the yacht capsized.

Download the report at <https://bit.ly/33347AK>

GARD P&I CLUB HIGHLIGHTS ISSUES WITH SCRUBBER CORROSION AND PIPING FAILURES

In new guidance for shipowners, marine insurer Gard advises its members that the installation of scrubber units must be carefully monitored in order to minimize the risk of premature corrosion and potential piping failure. Additional potential casualties from improper workmanship include the possibility of sparking a fire within the unit during shipyard hot work and the failure of poorly-executed shipyard welds during operation. With these factors in mind, Gard advises shipowners to monitor and evaluate their shipyard’s work to ensure a proper installation.

Rapid corrosion is a significant concern for scrubber discharge piping. The washwater exiting the scrubber tower is acidic, and all piping routing the effluent to the overboard discharge must be painted internally with a protective coating. The absence of or poor application of the coating, along with poor application of paint on the outer hull plating near the discharge port, have been identified as potential causes of dramatically accelerated corrosion. Gard has already seen a few incidents where the overboard discharge piping has corroded away within about a year’s time, resulting in water ingress into the engine room, ballast tanks or cargo holds. The damage required temporary repairs by divers and permanent repairs at a shipyard.

Read the article in full at <https://bit.ly/2NjHCRf>

MCIB REPORT SAYS NON-COMPLIANCE LINKED TO FATAL VESSEL SINKING

Ireland's Marine Casualty Investigation Board (MCIB) has published an investigation report on the fatal sinking involving the fishing vessel 'Beal Sruthan' off Craugh Island, Galway Bay, in May 2018.

Probable causes

The cause of the vessel's sinking has not been firmly established. The most probable cause was the failure to properly blank off the redundant stern tube by failing to properly seal both ends. The only possible alternative was that the power from the outboard engine caused the stern to squat sufficiently to permit water ingress through the two transom holes found.

Conclusions

- If the vessel was engaged in commercial fishing then it should have complied with the requirements of the CoP for Small Fishing Vessels. The vessel did not have a Declaration of Compliance (DoC) or the required licence to engage in commercial fishing.
- If the vessel was engaged in recreational fishing then the vessel should have complied with the requirements of the CoP for Recreational Craft.
- The vessel did not comply with either CoP and it did not have the required safety equipment.

Recommendations

Following investigation, MCIB provided the following recommendations:

- The Minister for Transport, Tourism and Sport should issue a Marine Notice confirming that craft engaged in non-commercial potting should comply with the CoP for the Safe Operation of Recreational Craft and that craft engaged in commercial potting should comply with the CoP for the Design, Construction, Equipment and Operation of Small Fishing Vessels of less than 15m length overall.
- The Minister for Transport, Tourism and Sport should issue a Marine Notice reminding owners of fishing vessels of the dangers associated with modifying vessels, including changes to a vessel's engine, without proper evaluation of the consequences. Owners of vessels should comply with Section 1.5.5.2 of the CoP for the Design, Construction, Equipment and Operation of Small Fishing Vessels of less than 15m Length overall which requires proposed modifications to be agreed in advance, with one of the approved Code of Practice Surveyors.

Download the report in full at <https://bit.ly/31eQZqg>

CHIRP PUBLISH MARITIME FEEDBACK ISSUE NUMBER 56

Maritime FEEDBACK issue number 56 has been published. In this issue they have featured a wide variety of topics from a number of independent reporters. In this issue the matter of fatigue and hours of rest is the lead editorial and CHIRP would like to hear a lot more from mariners in these two areas.

The articles in the issue are:

- Fatigue and hours of rest
- Could have been embarrassing: A report highlighting a delay to the berthing of a cruise liner due to a faulty stabilizer fin
- Near miss recreational fisherman and tug: Whilst fishing at anchor a pleasure vessel had to cut its anchor rope and fishing lines in order to avoid a drifting tug.
- A positive result following engagement with the DPA
- Illegal Bilge Discharge: Alleged MARPOL contravention in the Caribbean Sea area
- Unsafe Working at Heights. CHIRP continues to receive reports primarily from the yachting sector concerning unsafe working at height. These highlight practices where the potential for serious personal injury or even death are present.
- Inadequate Master/Pilot exchange. In recent months, CHIRP has received three reports where the Master/Pilot information Exchange was less than fully comprehensive.

Download the latest Chirp Maritime bulletin at <https://bit.ly/319X4Et>

REPORT INTO DEADLY KIRIBATI FERRY SINKING SAYS THE VESSEL WAS UNSAFE

An independent commission has released its report into the loss of the ferry Butiraoi in the South Pacific off the coast of Kiribati last year, finding that the vessel was “unsafe” and could reasonably be “expected” to sink in the conditions it experienced.

On January 18, 2018, the wooden catamaran ferry Butiraoi took aboard 89 passengers, 13 crew and about 30 tonnes of cargo at Nonouti. She had recently gone aground three times without any immediate follow-up or repairs, and two weeks earlier, a local marine surveyor had ordered her not to carry passengers due to an insufficient number of lifejackets. Even if Butiraoi had been licensed to carry passengers on the accident voyage, the number on board was in excess of permitted limits.

When she exited the port and reached open water, she experienced an easterly wind of about 10-15 knots and waves of up to about eight feet. About half an hour into the trip, the main cross-beams between the catamaran pontoons towards the bow began to fail. The vessel made several loud noises, but the master did not turn back. Two hours later, the hulls began to separate, and the superstructure – including the wheelhouse and upper cabins – collapsed inwards. She broke up and ultimately sank.

As the passengers and crew made to abandon ship, they launched the Butiraoi’s two inflatable liferafts and two aluminum workboats. One liferaft was punctured by the wreckage of the vessel. The survivors overloaded the second liferaft, tearing off its floor and leaving only the tubes available for flotation. About 30 made it into the two workboats and 30 others crowded into the second liferaft. The master remained behind, and survivors reported seeing him “sitting on one of the capsized hulls with some passengers, obviously dazed, regretful and sorry.”

No distress call was issued, the EPIRB was not activated (or failed to activate), and the marine authorities had not been notified of the Butiraoi’s departure when she left harbor. No immediate SAR response was mounted.

The commission found that the vessel’s destruction was “something to be expected” in bad weather, given the Butiraoi’s maintenance record and her recent groundings. In addition, it blamed the captain for failing to maintain adequate discipline among his crew, allowing his vessel to be overloaded, and failing to organize a coherent and effective response when the vessel was in distress.

Read the full story at <https://bit.ly/2NIO5vd>

WARNING ISSUED ABOUT LITHIUM-ION POWER FOLLOWING FERRY FIRE AND EXPLOSION

The Norwegian Maritime Authority has published an alert concerning a small fire that erupted in the battery room onboard the MF Ytterøyningen passenger ferry. The Norwegian Maritime Authority is warning shipowners, operators and other stakeholders and interested parties about the dangers associated with lithium-ion battery systems after a fire and subsequent gas explosion on board a diesel-electric ferry in Norway.

The small fire was reported in the battery room of the Norled passenger ferry MF Ytterøyningen. The ferry returned to harbour under its own power where passengers and crew were evacuated to land. Overnight, however, a serious gas explosion rocked the battery room causing significant damage.

In light of the incident, the Norwegian Maritime Authority recommends that all shipowners with vessels that have battery installations, carry out a new risk assessment of the dangers connected to possible accumulations of explosive gases during unwanted incidents in the battery systems.

Corvus Energy has published its own recommendations and advice concerning the incident:

- Do not sail without communication between EMS and the packs (BMS). Keeping the packs powered up will maintain this communication link. An unpowered pack can not communicate important system data (faults, warnings, temperatures and voltages) to the EMS/bridge. Ensure that current ESS parameters are showing at the EMS interface. This is a verification of the communication link.
 - If a gas release, thermal runaway situation or fire in the battery room is suspected: Do not power down the battery equipment.
-

TUG CAPSIZES DUE TO LACK OF TRAINING AND OVERSIGHT SAYS REPORT BY TSB CANADA

The Transportation Safety Board of Canada discusses a capsize incident where the tug George H Ledcor was towing another barge and resulted to the former's capsize. The event resulted to a seriously injured crewmember and an unknown quantity of oil spill.

Probable Cause

The TSB Canada provided information on the factors that may have played a role in the event.

- The George H Ledcor attempted to pull the Evco 55 to port, but the tug was unable to change the direction of the loaded barge, due in part to the assist tug pushing on the stern.
- As the barge began to overtake the George H Ledcor, the towline, which was not secured by hold-down gear, began to exert a broadside force on the tug, placing the tug in a girded position.
- The master applied full starboard rudder and full throttle; however, given the forces acting on the vessel's stability, such as thrust from the propellers, flow of river against the hull, and increasing force from the towline, this action increased the tug's heel.
- As the tug's heel progressed, and given the shortened towline, the master did not have sufficient time to initiate corrective action.
- As the tug's deck edge and bulwarks submerged, they created a dragging force, and the tug heeled further to starboard; the crew attempted to abort the tow, but they were unsuccessful and the tug rapidly capsized.

Download the report in full at <https://bit.ly/32gytPE>



ABS RELEASES A SHUTTLE TANKER ADVISORY REPORT

ABS has launched the 'Shuttle Tanker Advisory' report, explaining what shuttle tankers are, where they operate, scoping out the challenges that they could face in different regions, their design features, and focusing on safety and human factors.

Shuttle tankers are primarily employed in offshore oil and gas fields. Typically, the offshore facility from which a shuttle tanker loads from is a Single Point Mooring (SPM) buoy or a Floating (Production) Storage and Offloading (F(P)SO) unit.

A shuttle tanker must be able to safely moor and load cargo from these types of units. This means that station keeping, cargo handling and communication between the shuttle tanker and offshore loading facility are crucial to the safe operation of a shuttle tanker.

Given that many shuttle tankers operate in the North Sea, the Canadian east coast (offshore Newfoundland) and the Russian (Varandey, Caspian, Sakhalin and Yamal) coast there are specific considerations related to operating in cold climates that need to be considered.

Therefore, ABS offers Notations for Operation in Low Temperature Environments and for Ice Load Monitoring. They also offer a full suite of Ice Class Notations including Polar Class, Enhanced Polar Class, First-year Ice Class and Baltic Ice Class.

ABS also offers machinery related Notations for shuttle tankers, providing requirements for temperature monitoring and alarm, oil seal design, bearing wear down measurement, management of monitored data and surveys.

Download the report in full at <https://bit.ly/2VGrRYp>



YOUR DONATION TOWARDS THE PURCHASE AND MAINTENANCE OF MURRILLS HOUSE CAN STILL BE MADE

In case you missed the launch of the crowdfunding opportunity earlier this year, IIMS is reaching out to members and supporters of the Institute to invite them to make a financial donation towards the purchase of Murrills House as the Institute's new permanent headquarters. Any financial donation (no matter how small or large) will not simply go to the bottom line of the business and get lost. Rather, we plan to invest it in paying for the stamp duty on the purchase with any balance left being put towards some of the maintenance work we will need to do, which includes a variety of minor works to bring the building up to scratch.



All those who choose to make a contribution (unless anonymously) will be recognised with a special, individual Founders Plaque which will be displayed in the offices for ever more. And rest assured that any donation will be very gratefully received. We have made it simple to do by setting up an online 'Just Giving' page, which can be accessed at <https://bit.ly/2VU4Qnr>. Alternatively, you can simply transfer money to IIMS but please let us know beforehand if you intend to do so; or you may send a cheque directly to head office.

The opportunity to donate will remain open until 31st March 2020.



IIMS UPDATES ITS SAFETY BRIEFING LIBRARY WITH THE LAUNCH OF A CENTRAL DATABASE IN EXCEL FORMAT

The safety briefing area of the IIMS has become increasingly popular and well used since it was launched last year and can be found at <https://bit.ly/2V4QgtP>.

The page lists dozens of reports with the outcome of incidents and accidents.

But additionally, IIMS has created a Main Safety Briefing Database in excel format that can be downloaded at the same web page as above. Just look for the link on the page. Download and save the document as a valuable reference point.

The spreadsheet has been subdivided for ease into categories for:

- US Coast Guard safety alerts and reports
- P&I Club alerts and reports
- IMCA Safety Flashes
- MAIB reports
- National Transportation Safety Board reports
- CHIRP safety news bulletins
- Miscellaneous other safety reports





Captain Allen Brink

LONG STANDING IIMS FELLOW, CAPT ALLEN BRINK, INVESTED AS A CHARTERED MASTER MARINER

Allen Brink, one of the founding fathers of IIMS and a Board member, had the status of Chartered Master Mariner conferred upon him at a recent ceremony aboard the HQS Wellington, which is moored in the River Thames, London. This award was given to Allen by the Honourable Company of Master Mariners, a city of London livery company stretching back nearly 100 years with Queen Elizabeth II as patron and Prince Philip as Admiral.

The CMMar is awarded to maritime professionals who have risen beyond prescribed qualifications and can prove exceptional performance alongside individual contributions to the industry, including charitable and other not-for-profit work, such as mentoring and skill-sharing.

The Honourable Company was founded by Sir Robert Burton-Chadwick in 1926. Since 2013, under the terms of its Royal Charter, the Honourable Company of Master Mariners has had the right to grant Chartership status to qualifying Master Mariners. The Chartered Master Mariner will always command respect as a leader within the global maritime industry.

Allen is the only South African to have achieved this accolade and status; and there have only been 30 such awards made internationally.

On behalf of the Institute and its members, IIMS would like to congratulate Allen on his great achievement. At the same investiture, two other friends of IIMS were awarded their chartership. Capt John Lloyd is the CEO of the Nautical Institute and Capt Mike Meade is Managing Director of M3 Marine Group, located in Singapore. We send them our hearty congratulations too.



Captain John Lloyd



Captain Mike Meade

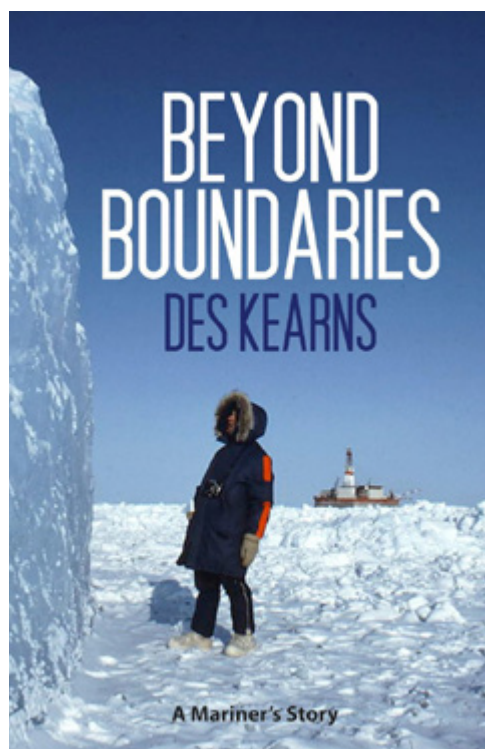
'BEYOND BOUNDARIES' BY DES KEARNS MIIMS

They say that everybody has a book in them which in turn means that everybody should be in a book. Sadly, it takes a long time for people to realise that they are able to write their story. Happily, the longer we wait the more they have to tell, and this is such a case. The story of an amazing and interesting life with lots of very different experiences, many of them at sea. Writers are called 'word smiths' and Des has perfected his craft, wielding his hammer skilfully to shape his words on an anvil of paper. Not only has he benefited from many years of report writing to become a good writer, but he has also mastered the art of the storyteller by building his paragraphs to give the punch line its maximum effect. A good book should make you laugh and cry aplenty and this one does not disappoint in this respect. Interspersed with substantiating photographs it is a brilliant story which is hard to put down. Reviewing books such as this is a great pleasure!

Published by Popeye Publishing. ISBN 978 64440 831 5. US\$30. Available by email from des@deskearns.com or via his website www.deskearns.com.

About Des Kearns

Australian Des Kearns was born in Sydney 4th August 1944. Educated at Epping Boys High School and King Edward Nautical College, UK. He is a professional mariner and author. He immigrated to Canada in 1972; moved to Singapore in 1988; currently resides in Thailand.



TWO OF OUR OLDEST MEMBERS DELIVER STELLAR PERFORMANCES WORTHY OF OSCARS

Within two weeks of each other, two of our oldest members (Jeffrey Casciani-Wood and Ian Nicolson - aged 89 and 92 respectively) delivered what can only be described as masterclasses.

Jeffrey delivered a 50-minute live lecture to an online audience on the topic of *Microbial Corrosion of Iron and Steel*. His knowledge on this subject is astonishing and his concern is that many surveyors are unaware of this type of corrosion, which is so destructive, it can eat through metal very fast.

Ian spoke for an hour at the recent Large Yacht & Small Craft Working Group Scotland event in November on the subject of *75 Years of Marine Surveying*. He reminded those present to ensure they did the best and most detailed survey possible each and every time and passed on his decades of wisdom. Ian's slides included his own hand drawn illustrations.

IIMS would like to thank Jeffrey and Ian for sharing their expertise and valuable knowledge for the benefit of members.

Both presentations were such a treat to be seen and heard that IIMS has decided to include them as part of the forthcoming *Marine Surveying International Fest II* on 10th December. You still have time to reserve your place for these and ten other presentations – see <https://bit.ly/2qQatoQ> for full details.



NEWS OF WORKSHOPS AND MEETINGS HELD BY THE IIMS INDIA BRANCH

June Workshop in Mumbai

An IIMS Member Meet was held at Hotel VITS, Mumbai on 06th June 2019.

The following attended the meeting:

Pervez Kaikobad - Regional Director, IIMS, India

AWJ (Tony) Fernandez - Honorary Fellow Member and Mentor Speaker

T.S.Shrinivaasan - Chairman and Member

Milind Tambe - Fellow Member

Subash Chander - Member

Mandeep Pruthi - Secretary and Member

Capt. Andley

Capt. Xerxes Aga

Capt. Sahoo

Nischal Saini - Offing Member



Capt. Mukesh Gautama presents Mr. Tony Fernandez with a gift of appreciation.

At the outset, the IIMS India Branch Committee thanked Tony Fernandez for readily accepting to deliver a session on mentoring. He returned from abroad only the previous evening and in spite of jet lag and his health conditions, he came to the venue much earlier to deliver his speech. He also shared informative case study examples on General Average Claims during his speech.

IIMS Workshop and Members Meet

Held at Chennai on 13th September, 2019 - A total number of 33 persons participated who were welcomed by IIMS India Branch Chairman Mr. T.S.Shrinivaasan.

Prior to the start of the workshop, mourning of two surveyors Mr. R.K. Ilango, a Senior Insurance Surveyor from Trichy and Capt. C.K. Mani, a Senior Marine Surveyor from Jam Nagar who expired recently, were observed.

The Workshop was opened by Pervez Kaikobad, Regional Director of IIMS, India Region.

The forenoon session was handled by Mr. Milind Tambe on the subject of Imaging Techniques for Surveyors. He made a concise reprise of his original presentation on the subject which normally lasts up to 3 days. Nevertheless, he touched upon the intricacies and explained right from early stage of photography until digital photography the different features in a camera, how to store, preserve and the retrieval of images.

The afternoon session was handled by Mr. A.W.J.(Tony) Fernandez with an innovative method of Interactive Case Study of a Cargo and Hull claim. Members actively participated and Tony kept the audience alive with his in depth knowledge on marine insurance and shipping.

The Branch Chairman proposed a vote of thanks and the workshop concluded by all present singing together the National Anthem.

After workshop concluded, a Members Meet was held. The following Members were present:

Mr. AWJ (Tony) Fernandez

Mr. P. Sridharan

Mr. Milind Tambe

Mr. Pervez Kaikobad

Mr. T.S.Shrinivaasan

Capt. Mukesh Gautama

Capt. Lalith Kumar

Mr. Kushal Roy

Mr. Koteeswar Rao



Brief minutes of the meeting:

- a) Registering of the Indian Branch was discussed. As there was problem in ROC (Registrar of Companies) to have words like "International" or "India" in the name, Capt. Lalith Kumar and Mr. Kushal Roy volunteered to sort out through their known sources. Mr. Pervez also keeps trying by naming differently other than IIMS.
- b) Next Member Meet is planned to be held at Gandhidham some time in December, 2019. The Gujarat Members would gear up now onwards with venue, date and content.
- c) Year 2020 is the tenth Anniversary of the IIMS India Branch and the event is to be celebrated on a grand scale. To mark the tenth year, it is felt we have to celebrate on a two day basis either in Goa or elsewhere.

NEW HANDY GUIDE PUBLISHED: WHAT A MARINE SURVEYOR NEEDS TO KNOW ABOUT SURVEYING FRP/GRP CRAFT

IIMS has just published the twenty first handy guide in its series 'What a marine surveyor needs to know about'. There are a number of differing views of fibreglass boats, the traditionalist often referring to them as bathtubs or Tupperware boats. But the simple truth is the average yachtsman in the current age just does not have the time or money to devote to the high maintenance of a traditional or classic yacht. Fibreglass boats do not have to be bathtubs and a lot have been constructed showing considerable style and character which is pleasing and offer a very acceptable performance.

Fibreglass is a good and reliable material that has stood the test of time since its inception back in the 1950s.

This handy guide does not set out to explain the finer details of FRP/GRP glass fibre construction, but it gives helpful pointers and an insight into the material, how it is prepared and then attached and its various properties as a composite. Gaining some practical experience of these systems will help the surveyor in his assessment of the craft produced in this way.

For many surveyors, FRP/GRP boats will be their area of specialism as most of the vessels they survey will be made from this material and for them this handy guide is a useful companion.

What a marine surveyor needs to know about surveying FRP/GRP craft is available at £17 (paperback) and £15 (downloadable pdf). Copies can be ordered directly from the IIMS web site at <https://bit.ly/2uxuY7k>.





MARINE SURVEYING INTERNATIONAL FEST II IS COMING TO A SCREEN NEAR YOU ON 10 AND 12 DECEMBER 2019

Following the success of the inaugural online only event last year, IIMS is delighted to present Marine Surveying International Fest II in two parts. We have lined up a feast of education and information for yacht and small craft surveyors on Tuesday 10th December and for commercial ship surveyors on Thursday 12th December - both commencing at 06.00 UK time. You do not need to be a member of IIMS to participate in the Fest.

Building on 2018, these two days seek to recognise the importance of the profession of marine surveying and promote the vital role surveyors perform in keeping lives safe at sea. No matter what time zone you are based in around the world, or

area of surveying you work in, we hope to offer something of interest to you. The day will equally appeal to those who work with, or engage surveyors, or touch the profession in some way.

How both days work

Marine Surveying International Fest II is an online only event and will be anchored from the IIMS head office in the UK. It is a rolling 12 hour, non-stop marathon, starting at 06.00 (London UK time) and runs non-stop until 18.00 (London UK time).

Each hour on the hour, a new presentation will be delivered live (with a couple of exceptions) by a knowledgeable presenter somewhere in the world on a surveying related or relevant business topic. For one low fee, you can join the Fest taking advantage of as many of the 12 presentations over the 12 hours as you wish. And if you miss any presentations because the time does not work for you in your location, your fee covers access to the entire content after the Fest, which will be videoed and sent to you.

For full details of the presenters on both days and to reserve your place go to <https://bit.ly/377cxJA>.

THE FIRST ANNUAL MARINE SURVEYING RETURN 2020

Currently no detailed research or study exists about the market size and its value, nor about the individual and collective activities of those involved in the marine surveying sector worldwide.

As part of this new initiative, IIMS is keen to seek replies from its members and also from others who are engaged in the surveying profession around the world.

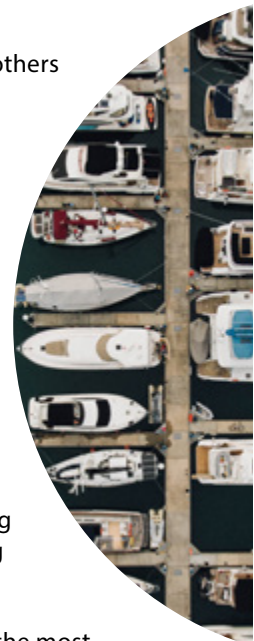
Taking part in this annual return will be anonymous and will not take too much of your time. There are thirty plus questions that will be made available by a web site link in a simple to use, online format. The return will be open for completion from the first week in January and will close at the end of February 2020.

The study comprises five sections:

- About you
- About your business
- About your future optimism for the marine surveying profession
- About your work as a marine surveyor
- About your personal development

Once the information has been collated and summarised, the findings will be published and a press release issued to hundreds of relevant marine media, all with the aim of raising the profile of the marine surveying profession and its importance to the boating, yachting and shipping sectors.

Please look out for the link in the new year, complete the return and help IIMS to publish the most extensive industry research findings ever in the marine surveying sector.



IIMS EXHIBITS AT IBEX, TAMPA

James Renn, IIMS US Regional In-Country Representative and a member of the management board, manned the IIMS stand at the recent IBEX show, assisted by his wife Faith and Mike Schwarz.



IBEX is North America's largest technical trade event for marine industry professionals and is powered globally by METSTRADE, the world's leading platform and community for professionals in the leisure marine equipment industry.

Over the course of the three days several important pre-arranged meetings were held with much discussion ensuing. IIMS also had the opportunity to meet a good number of potential new members and is confident of welcoming up to six new recruits to the fold after the exhibition. James Renn (pictured) setting up the stand.

ROUND UP OF TWO RECENT LYSCWG TRAINING EVENTS

The annual training event in Scotland took place on 4/5 November at The Royal Northern & Clyde Yacht Club near Helensburgh and drew about 15 members. Both days were rich in content with presentations given on the following matters:

- Karen Brain: The number and size of insurance claims is rising. What can surveyors do to prevent this?
- Fraser Noble: Certifying Authority update and common MCA code interpretation
- Ian Nicolson: 75 years of yacht surveying
- James Hale: Surveying and LPG the basics
- Ian Lumley/Ricky Tropman: Three recent fires aboard - causes and prevention
- Paul Winter: Insurance case studies and report writing tips
- Simon Cormack: Navigating the challenges for successful code vessel design compliance



On 25 November, 15 members were joined by a good number of online delegates for the LYSCWG training day that took place near Portsmouth. The day provided to be thoroughly thought provoking and informative for all involved with experts in their field sharing their knowledge.

Karen Brain had updated and adapted her presentation given a couple of weeks' earlier in Scotland to reflect the in-depth discussions that had ensued. Additional presentations were given by:

- Nigel Clegg: Understanding osmosis and the use of moisture meters
- Keith Chappell: Understanding and combating cyber crime



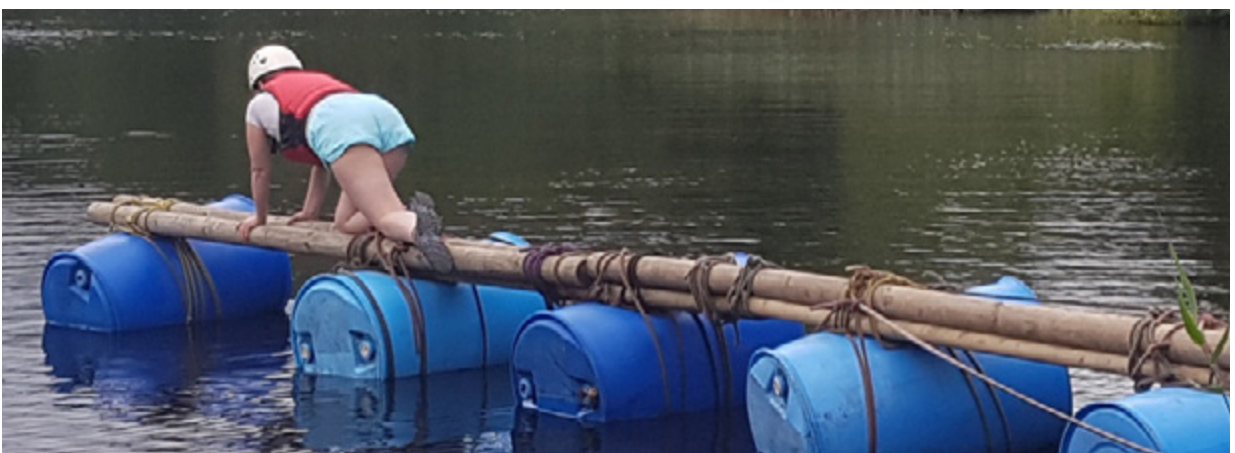
REPORT ON THE HEAD OFFICE TEAM BUILDING EVENT

For the third year in succession, members of the IIMS HQ headed off to the New Forest in southern England for a 24-hour overnight team building event.

The team is pictured below at the start of a group activity to construct a pontoon, which in the end reached out into the lake about 15 metres once successfully launched. Holly bravely attempted (and managed) to get to the end of the pontoon, until the structure's stability was found to be sadly lacking tipping her into the water!

Barbeque supper was a success, as was sharing personal experiences around the campfire. The team considered and shared their individual personality traits with the group. Most chose to sleep out under the stars in hammocks on what turned out to be a warmish and dry night - a new experience for some. On the second day, most of the team took to bicycles in small groups and set out on to the forest tracks and roads on a beautiful sunny day to decipher clues and gather objects from the woodland, returning to base several hours later to reveal their answers in exchange for points.

Commenting on the event, Mike Schwarz, said, "The aim is not to break team members, rather to give them an opportunity for personal growth by inviting them to participate in group activities they would not normally experience. There is strong evidence that these events have brought the team closer together and I have been delighted to personally witness how individuals have grown in stature as a result of their participation."



IIMS HEAD OFFICE STAFF OUT ON SURVEY

Over the past few years, the Institute has developed a policy of exposing new members of the team to a survey as part of their induction into the business under the expert guidance of Paul Homer, Chairman of Standards.

Last month, five members of the IIMS and Marine Surveying Academy teams headed off to Shamrock Quay, Southampton. Their mission? To survey a Humber motorboat well over 40 years old. Whilst it was in fair condition at best, it became obvious that the vessel had issues causing varying degrees of concern.

All present had a chance to hammer tap the hull, observe the use of some of the test equipment, scrape the hull and lift the access covers inside the vessel to peer inside the hull. A look into the engine compartment certainly gave all involved on the day an appreciation of the meticulous work required to survey an ageing small craft!

Having completed the survey, those present sat down to talk about writing up the report post survey before heading back to the office.



Paul Homer with Head Office staff (from left to right): Sharon Holland, Pui Si Chung, Holly Trinder, Lorna Robinson and Jen Argent.

FIRST WHATSAPP GROUP LAUNCHED BY IIMS

IIMS has extended its technological reach with the launch of its first WhatsApp group, this one dedicated to UK based Inland Waterways surveyors who are involved in the survey of canal narrowboats. Around a dozen members have signed up for the service, which is a member benefit and as such is offered at no charge. The requirements for membership of the group are simply that it is open to anyone in the UK who is involved in narrowboat surveying. That makes it targeted, focused and manageable.



The aim is to provide a place where thoughts and techniques on surveying narrowboats can be exchanged and discussed. Imagine seeing something on survey not seen before? Who do you turn to for advice or another opinion? Members of this WhatsApp group can now share images with the rest of the participants and the chances are someone will have seen it and can offer advice and comment.

Some rules have been written, which must be adhered to, and Holly Trinder from IIMS HQ will act as the moderator and facilitator for the group. Early indications are that the group is being well supported with constant chatter and regular exchanges on a range of subjects, most recently debating risk management and how to organise risk assessments. It would appear to be adding great value.

If you have ideas for a targeted WhatsApp group in your region or specific area of surveying, Holly would like to hear from you by email at info@iims.org.uk. As we learn from this first test group and develop it, other groups will surely follow too.

IIMS US BALTIMORE CONFERENCE

**“Very New Tools for the Old Schooled” or
“What you don’t know about mold can hurt you”...**

Network with fellow surveyors and industry sector professionals, meet the experts, view new tech and rethink procedures on Friday January 24th and Saturday January 25th.

Contact: James “Randy” Renn 410-490-0216

Day One: Friday 24th 2020

- 08:00 Registration and Coffee
- 08:30-9:00 Mike Schwarz CEO IIMS
Status of International Institute of Marine Surveying and Interagency Participation.
- 09:00-9:20 Van Macomb, Softpoint Industries Director of Marketing
Surface coatings for non-skid surfaces.
- 09:20-9:50 James Renn AMS, FIIMS, Surveyor, Marine Forensic Technicians.
Measure of slip resistance in non-skid surfaces per OSHA, CFR’s and NACE.
- 10:00-11:00 Chloe Kay-Coltraco Ultrasonics.
Latest in ultrasound measurements of storage tanks, fire suppression equipment, UT testing and bearing wear monitoring.
- 11:00-12:00 On Campus Ships Simulator demonstration. As one of the most advanced ships simulators in the world this is as exciting as any Disney ride you could imagine. The very real thing run by Professionals for Professionals. You may wish to bring some Dramamine!
- 12:00 Lunch included in the registration cost.
- 13:30-14:15 Michael Pinto-President, Wonder Makers Environmental
International expert on mold will discuss the basic parameters which support growth, identification and the unique challenges of remediation.
- 14:30-15:00 Bartosz A. Dagnowski-President, GC Lasers Systems.
An upfront and in person live demonstration of Pulse Laser cleaning or descaling. Have we ever heard of a Femtosecond and blasting or vaporizing corrosion with 400 watts and without residue? A must-see fascinating technology.
- 15:00-15:45 Capt. William Ackley. Owner, Marine Forensic East Coast.
Practices and regulations for safety in the workplace. How some get it right and many get it so wrong from a working supply ship Captain.
- 15:45-16:45 Jeffery Casciani-Wood, FIIMS and IIMS Past President, Fellow RINA., President and Fellow at the Institute of Diagnostic Engineers.
Biological Attack on Iron and Steel (pre-recorded video). It may look like rust however you may need more than just sight to see what is going on. We have known about the situation and now an expert in the field explains them.
- 16:45-17:00 Closing remarks and Thank You.



IIMS, SAMS, NAMS and others welcome to participate.
 Cost including lunch \$225.00 for both days.
 Online only delegate \$200.00 for both days.
 Check your organization’s policy for CE’s or CPD’s.
 Accommodation is available at the Conference Centre at a reasonable rate and includes meals.
 Call 410 859 5700 or 866 900 3517.

Day Two: Saturday 25th January 2020

- 08:00-08:30 Coffee
- 08:30-09:00 Mike Schwarz CEO IIMS
State of the Institute, Building Purchase, Institute Expansion and Industry Growth.
- 09:00-09:30 Dennis David, President, RGS Distributors, SAMS Aff.
Tools to detect mold-visible or invisible, identify types, remove and prohibit future growth from Star Wars Electrostatic Weapons to Non-volatile Chemical Treatments.
- 09:30-10:15 Capt. Bill Weyant and Robert Kissinger
Ethical Situations and how to handle them as played by two AMS Marine Surveyors.
- 10:30-11:00 Capt. Todd Taylor. SAMS SA-Todd T. Taylor Marine Surveying and Consultant
Surveying for Donations or Charities. As former Donations Manager for the Chesapeake Bay Maritime Museum Todd has a unique perspective on the needs and legal requirements of Donation Surveys.
- 11:00-11:45 Col. James Sweeney, Via Clean Technologies
The Causes and Long Term Dangers of exposure to mold and global repercussions of consistently inadequate methods of treatment and prevention. Learn about Trihydroxysilyl and possibly Propylidimethylloctadecyl Amonium Chloride or how to spell them as well as Coconut Fiber filters.
- 11:45-12:30 Dan Phelan-Groco Mechanical Laboratories-Vice President
Demonstration of Self Actuating Seacocks and Macerating Seawater Strainers. One of the oldest and best-known producers of underwater ships hardware in the world.
- 13:00-14:15 Todd Lochner, Lochner Law-Admiralty Attorney
Clarification of responsibility as to whom the Surveyor and their Report is responsible to. There are sharks in the water.
- 14:15-15:00 George Zeitler-Reliable Maritime Solutions
Understanding “Environmental Surveys”, what they are and why we do or do not perform them as well their needed place in our industry.
- 15:15-16:00 Capt. Lloyd Griffin, Frigate Marine Services & Coastal Thermal Imaging
What we see and cannot believe. “You just can’t make this up”. Inspired foolishness on the waterfront.
- 16:00-close Ian Nicolson, HonMIIMS
Lessons learned and continue to be learned after 75 years of marine surveying. Many books written and more to read. This zoomed pre-recorded video will be a lesson to everyone.

Registration can be made by email to iims.usa@aol.com or by calling 410 490 0216. Alternatively use the form at the bottom of the online page <https://bit.ly/35A2yLI> to indicate your preference and we will invoice you.

Payment can be made by cheque made to IIMS or by credit card by calling 1 410 604 2327. Cheques may be sent to: Marine Forensics, P.O. Box 1041, Stevensville MD 21666..

2020 IIMS EVENTS CALENDAR

(Please note this is a provisional schedule subject to final confirmation)

The 10th anniversary since the launch of the IIMS India Branch falls in 2020, but no date is available at the time of publication for their celebratory Conference.

JANUARY

Friday 24 January to Saturday 25 January IIMS US Conference Baltimore

FEBRUARY

Monday 24 February Large Yacht & Small Craft Working Group training day (venue to be confirmed)

MARCH

Friday 6 March to Saturday 7 March IIMS Canada Conference Vancouver

APRIL

Thursday 23 April to Friday 24 April Western Mediterranean Large Yacht & Small Craft Working Group training Palma

MAY

Monday 11 May Certifying Authority training day Portsmouth area

Monday 18 May Inland Waterways Working Group training - Midlands UK

JUNE

Wednesday 10 June Seawork Exhibition (Small Craft Surveyors Forum)

SEPTEMBER

Monday 21 September to Tuesday 22 September Large Yacht & Small Craft Working Group Dublin

Tuesday 29 September to Wednesday 30 September IBEX Tampa

OCTOBER

Thursday 1 October IBEX Tampa

Monday 5 October Certifying Authority Training Day Portsmouth area

Thursday 15 October to Friday 16 October Eastern Mediterranean training event Malta

Monday 19 October Inland Waterways training day

Monday 26 October Large Yacht & Small Craft Working Group training day Portsmouth area

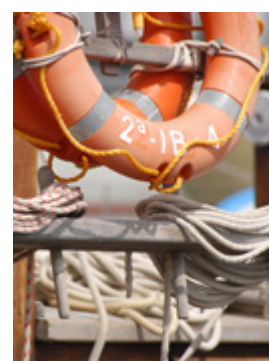
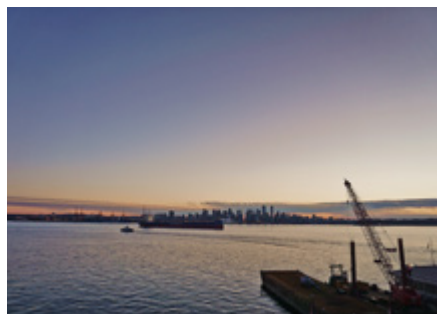
NOVEMBER

Monday 9 November to Tuesday 10 November IIMS Scotland training

Tuesday 30 November Marine Surveying International Fest III 2020 (Yacht & Small Craft)

DECEMBER

Thursday 2 December Marine Surveying International Fest III 2020 (Commercial Ship)





Celebrating the 10th anniversary of the IIMS UAE Branch

On the evening of 19 November, nearly 100 invited guests assembled in the Grand Lounge on the famous old ship, the Queen Elizabeth 2, (now permanently moored in Dubai), for a splendid cocktail party to celebrate the tenth anniversary of the IIMS UAE Branch. The event was kindly and generously sponsored by HFW, represented by Richard Strub, who said a few words.



Once the canapes had been finished, IIMS CEO, Mike Schwarz thanked President, Capt Zarir Irani, the local UAE Branch Chairman, Capt Omprakash Marayil and his committee colleagues for their efforts, both in terms of securing such a prestigious and historic venue to mark this special celebration and for delivering a great event.



Special commemorative certificates were presented to each of the past Chairmen, the Treasurer, Current Chairman and Vice Chairman.



Mike went on to announce the winners of four awards for excellence that had been decided on by the committee locally. They were:



Most Courteous Surveyor awarded to Chris Partridge



Student of the Year awarded to Rohan Moorthi



Facilitator for Surveying in the Region awarded to Capt Devathirjan, Harbour Master of Sharjah



Lifetime Achievement Award awarded to Brian Thornborrow



Wednesday 20 November, the day of the IIMS UAE Branch 6th Biennial Conference onboard the Queen Elizabeth 2, drew over 80 delegates on what turned out to be a unusually wet and miserable Dubai day. But inside the room, the mood was far more dynamic.

Accreditation Scheme with the sole aim of helping to drive up standards across the profession.

Delegates were welcomed to the event by President, Capt Zarir Irani. He gave way to Mohammed Khalifa Alhuraiz, who, on behalf of the Dubai City Maritime Authority, officially welcomed guests to Dubai and in particular, the IIMS UAE Branch Conference.

The first speaker of the day was IIMS CEO, Mike Schwarz. In his short address, he spoke about the progress and development of the Marine Surveying Practitioner



Capt Rahul Khanna delivered a polished presentation on the topic of the Allianz Safety & Shipping Review 2019.



Veteran surveyor and mentor, Tony Fernandez HonFIIMS from India, spoke in his usual forthright manner, engaging the audience on the subject of Due diligence in marine hull insurance – myth and reality?



Richard Strub and Capt Sanjay Bhasin performed a fascinating double act, during which they played out a mock scenario and arbitration role play entitled Expert witness for a project cargo on a breakbulk vessel.



Arun Prasad, an expert in the local underwriting sector, gave an update on the current insurance market with a particular emphasis on war risk perspectives.



Dr Zubin Sethna covered the diverse subject of marketing, something that all surveyors need to have some knowledge about these days. A published author on this subject, he spoke about the onslaught of artificial intelligence from a marketing perspective.



Human error remains the root cause of so many incidents and accidents. Capt Porus Dalal spoke knowledgeably as he assessed this phenomenon.



Cyber remains a hot topic and Pradeep Luthria is something of an expert on this subject. He spoke eloquently. His topic - cyber resilience and insurance?





The ever popular Capt Nick Sloane, the man behind the project to salvage the Costa Concordia, gave a thorough overview of one of the most frightening scenarios – Ultra large containership fires.



Capt John Dolan presented on one of the most on trend topics – the risk caused by mis-declared cargo in container ships. He presented a rather gloomy overview of the current situation and urged the shipping sector to look for solutions to this unethical practice.



Bharati Bhagnari,
UAE Branch
Treasurer



Capt Rajiv Thakar, W E Cox Claims Group, talked about the recovery from carriers of losses suffered by cargo interests involving the negligent navigation defence.

Branch meeting

At the end of a long day’s conferencing, there was a local branch meeting attended by a group of local members plus others from overseas observing.



The digitisation of the survey appointment means things are changing. Capt Henrik Uth was on hand to speak about and demonstrate the SYVR App.



2019, a year that will live long in the memory of IIMS history



IIMS Chief Executive Officer, Mike Schwarz, presents his honest and detailed overview on what has been a fast moving and eventful year by recalling some of the key moments.

"The world of marine surveying is changing rapidly in so many areas. I feel it increasingly important that the Institute takes responsibility for alerting members to these developments, many of which are highly disruptive in nature, and providing the means to allow them to access, learn and master new skills so that embracing these immense challenges becomes easier." Mike Schwarz

Every time I come to write an annual review, I find myself wanting to start by saying what a busy year it has been. And in truth, this year has been no different. It has been busy – very busy and productive too. Life is never dull at IIMS and we set ourselves some stretch business targets for the Head Office team in 2019. Overall, we have met most of them. One or two fell by the wayside and a couple of projects have been delayed. But this is consistent with any strategy plan, which by definition must be flexible as well as scalable. And there have been some welcome surprises along the way that most certainly were not in the original plan - more on those later. Importantly, IIMS has enjoyed a strong financial performance in 2019 with strong revenues and costs held well in check. I'd like to start my review of the year by looking at the human factor which underpins IIMS and makes the organisation what it is and ultimately successful.



Management Board succession planning and the head office team

After many years excellent service to IIMS, Capt John Noble stood down from the management board in the summer and relinquished his positions as Chairman of Administration and Education Committee Chairman. John has agreed to remain on the Education Committee for the short term and I have taken over as Chairman for now. Vice President, Geoff Waddington, agreed to take on the role of Chairman of Administration and indeed has visited the office on several occasions. He continues the tradition started by John and comes armed with biscuits and cake for the team! Much appreciated Geoff.

Three new members of the management board were unanimously voted through at the AGM in June. They are Peter Broad (Deputy Vice President) who is based in South Korea, David Pestridge, a yacht and small craft surveyor who works from Devon, UK and Capt Sanjay Bhasin, MD of Octant Marine Ltd, located in London.

This year, IIMS has welcomed two new members to the Portchester based head office team, both of whom have settled in well. David Parsons was promoted to Certifying Authority Administrator following the departure of Tania Bernice. He is doing a great job and is overseeing a Certifying Authority

that is showing signs of growth. Holly Trinder was appointed into David's old role with new responsibilities. Her administration job is wide ranging from managing our website activity and social media output to moderating our newly launched, first WhatsApp group. Lorna Robinson took over from Cathryn Ward as Education, Training & Events Co-ordinator. Her primary function is to manage the IIMS distance learning Professional Qualifications, inducting new students and certifying those who complete their studies. Additionally, she handles the many events that IIMS is running across the year at various UK and international locations. Jen and Elly continue to provide excellent service running the accounting function. I am grateful to Camella, who not only manages the members and new applications, but also fulfils her role as Office Manager diligently and effectively. Hilary, Pui-Si and Sharon, the Marine Surveying Academy team, continue to play a pivotal role within the organisation and their business is set to grow as we move towards five-year reaccreditation for some of the schemes we run and look to launch two new ones in the coming months. Craig Williams, our in-house graphic designer, has continued to output some of the most stylish and creative materials, including The Report, monthly news bulletins, new marketing collateral, handy guides and so on.

Our 24-hour overnight head office training event in September proved to be a hit and has certainly had a positive impact on the whole team. A day away from work in

different surroundings deep in the New Forest, challenge by choice, certainly stretched some. But it produced a very positive outcome and plans are now afoot to raise the bar further for 2020!

Potential purchase of Murrills House

One of the biggest surprises of the year, was finding myself entering into negotiations to acquire Murrills House from our landlord, Casson Beckman. If there is one thing that has given me more pleasure than anything else in my nearly six years at the helm of IIMS, it is engineering the opportunity to acquire the historic office building that we call home and have rented for almost ten years. Six years ago, such a possibility would have seemed like a pipedream and totally out of reach financially. We are not quite there yet, but it is now close. And it all came about by chance.

At the 2018 Annual General Meeting, members voted at the end of our lease in 2020 to look to purchase suitable office accommodation. That proved to be a challenge and indeed, I could find nothing that was even vaguely suitable in the area. But a chance encounter with our landlord in the car park early one morning, during which he asked me what our plans were when the lease expired, led to an unexpected reply from him. Having told him we planned to find

somewhere to purchase, he came back within a matter of days and asked if IIMS would like to acquire the freehold of Murrills House. I was initially sceptical thinking we could not afford it. But it turned out after discussions we could. Subsequent meetings proved that it was a deal that could be done and would suit both parties. What's more, our landlord is set to become our new tenant on a 10 year lease. So where are we now? We are aiming to complete on the purchase all being well by the end of March 2020 latest. Our solicitors are conducting the necessary searches in readiness for an early exchange of contracts and we need to get our mortgage offer finalised. I feel honoured and humbled that the Institute could soon become the owners and custodians of a 500 year old manor house, one that is to be preserved for future generations and which is of historical importance in the local area. I have delved into the history books and if you have not read it, do look at the June 2019 Report Magazine on the website. The building has had a fascinating history and is worth a read. Our crowdfunding initiative has to date raised over £10,000 which will go towards the essential maintenance of the building once acquired. You have until 31 March 2020 to make a donation should you wish in exchange for an individual plaque in the offices. No amount is too small, and I thank you in advance for your generosity.

New database

The IIMS Central Database (ICD) is all but completed now. We have been rolling out aspects of the new database over the past year starting with education, then membership and the Certifying Authority coming online recently. Moving to a cloud-based drag and drop database built in Zoho Creator, which has been specially built for the Institute, means we have effectively become paperless. Although it has taken

time to deliver, the wait has been worthwhile. It has enabled us to streamline many of our laborious processes and procedures and will free up many hours to let us explore other opportunities.

Membership benefits

One of the greatest frustrations in my role is being asked by albeit a small number of members to justify the annual membership fee. Once we have spoken, most readily admit that they had no idea so much was available and on offer from the IIMS and then happily renew their membership. My slight frustration is borne out of the fact that so much of our time at head office is dedicated to looking after our members and developing new and beneficial initiatives. But it is then reliant on the member to get involved and take advantage of these benefits. I cannot influence that or a member's engagement.

This year alone we have added plenty more for our members to explore. Hours of fresh video content has been added to the IIMS YouTube channel, freely available to watch. The number of freely available training podcasts has grown exponentially. We have added more content to the copyright free downloadable image photobank. We have invested heavily in new App technology to make IIMS and its members more visible to those who engage and look for marine surveyors. We have offered more networking opportunities this year and have launched our first WhatsApp group. We have launched an area of the IIMS web site dedicated to safety briefings and within that have published an excellent categorised excel database giving direct access to many hundreds of accident and incident reports. We disseminate vital information through our very active social media channels to members and the wider maritime industry fast.

I believe IIMS offers fantastic value for money and I can assure you that we will continue to develop innovative new solutions and services in the coming period that will benefit our members no matter where in the world they are located.

Education and distance learning Professional Qualifications

This year has seen one of our strongest intakes on to the Professional Qualifications. There are currently around 170 students enrolled from across the globe. We have spent time reviewing and refreshing some of the modules. I have authored a new module entitled Business Management Skills, which has just been released and made available to students. Phil Duffy is currently authoring another new module, this one entitled Surveying Large Yachts >24 metres, which will be available in 2020 Quarter 1.

Module 1 - An Introduction to Marine Surveying - has been thoroughly reviewed, the information and statistics updated. It is fit for purpose and has replaced its predecessor.

Module 4 - Report Writing - is the next one to be thoroughly reviewed and updated.

Some of our older modules that were never peer reviewed and released for study are now being updated and readied for new students. An example of that is Surveying Helidecks.

We have further developed our policy of hosting online meet and greet sessions after each quarterly intake. This allows new students to 'mingle' online with each other and to get to know Lorna and a couple of module authors and markers who join in as well.



App development

Earlier this year, IIMS launched its third app with the help of our App Development Team, eDot Solutions, based in Goa. In March the first version of the Marine Surveyor Search App was unveiled and launched. It is early days and several supplementary versions have been released since. We hold regular online meetings with Michelle, Shreya and their colleagues in Goa and have continued to refine and enhance the offering through the App. We still have work to do to encourage more downloads from those who will potentially engage the services of surveyors and this is a long-term objective, but there is clear evidence that the App is being used.

Concurrent with this development work, a web-based version of the Search App has been developed. Very soon an IIMS member will be able to log in and manage his/her membership profile, check their surveying specialisations and even apply for new ones.

Media output, Report Magazine and Handy Guides

Editing *The Report Magazine* has continued to give me immense satisfaction and judging by the positive feedback I regularly get,

it continues to be well received and read by members and others in the marine industry too. I have continued to commission content on topics I have felt to be relevant to surveyors whenever possible, which means that much of the content has been specially written for you and cannot be found elsewhere. Each issue is beautifully laid out and well depicted by Craig Williams, who uses his range of graphic design skills to bring the magazine to life.

Our monthly news bulletins, which eat up plenty of time to write and design, continue to attract excellent traction with members. They are regularly being opened by more than 50% of recipients, which is an extraordinarily high rate. This year we have tried to pop in vital industry stories as and when they have occurred.

We are not prolific issuers of press releases, but we have circulated a couple this year that have won us considerable media exposure. Earlier in the year to announce the launch of the Marine Surveyor Search App, we issued a press release. It was picked up and published by 17 publications and websites. More recently, Geoff Waddington (Vice President) co-authored (at his request) an open letter to remind the yacht and boat manufacturers that they have a responsibility when it comes to latent defects in their products. That too has started to appear in various media.

Certifying Authority and Professional Standards

The IIMS Certifying Authority, whose examiners inspect and certificate commercial vessels under 24 metres in accordance with the regulations laid out in the various MCA codes, has had an upbeat year and has shown steady growth. Our fleet size has expanded with the influx of a number of windfarm crew transfer vessels in particular. In addition, we have noticed a strong increase in the number of tonnage measurement surveys we have processed. We have also signed a new Tonnage contract with the MCA.

I have continued in my role as Chair of the Certifying Authority Professional Standards Working Group within the MCA. This year has seen us make something of a breakthrough and following several meetings involving all of the UK Certifying Authorities, we are working our way towards a new certification scheme to be launched in 2021, which all CA examiners will need to undertake successfully. This is starting to feel like real progress! In similar vein, Fraser Noble, Chairman of the Certifying Authority, has continued to work hard, not only with internal matters but as an active delegate of the MCA's technical working group.



Events and training

One of the central planks of being a member of the Institute is being able to access and take advantage of the amount of training opportunities we present each and every year around the world, both for real time and online delegates too. This year has been no different and I am proud of our training output that has seen us meet over 300 members in person alone and many more non-members too. I am grateful to all those who have given freely of their time to speak and present at an IIMS or MSA event this past year.

The Baltimore Conference, organised so effectively by James Renn in January, is becoming an annual event of stature. This year saw a wide array of speakers and record attendance too. Various yacht and small craft training events have taken place around the UK, all attracting good presenters, interesting topics and well supported. This year we visited Dublin, Ireland, for the first time in many years. That proved to be a very worthwhile two-day event and I have promised to return. Our annual Western Mediterranean gathering around the Palma Superyacht Show was excellent. The highlight this year was most certainly a sea trial organised by John Walker.

The London Conference, although a success in terms of the quality of speakers and the content they delivered, was poorly attended this year, which saddened me. It causes me to question the role and relevance of a London Conference in the future. However, the Conference dinner, held at the delightful 10-12 Carlton House Terrace was well attended and proved to be one of the highlights of this year. I was humbled by the warmth of the welcome that was afforded to me

that evening as I rose to address those present after dinner.

Our joint initiative, the Small Craft Surveyors Forum, which we organise in conjunction with the other UK based membership organisations, was held at the Seawork Exhibition. The afternoon session attracted around 70 delegates. My trip to Brisbane and Singapore this year proved one thing to me very strongly. It proved to me that we have a great bunch of members out in the Australasia region and there is a latent need for training and advice about the surveying profession in general. I am grateful to the 50 plus delegates who showed up for what was a hugely successful two-day event. A big thank you to Adam Brancher, Mick Uberti and Nick Parkyn for facilitating the event in Brisbane.

The 6th biennial UAE Branch Conference, celebrating the tenth anniversary of the setting up of the branch has just been held and what a spectacular and fitting celebration it was onboard the QE2, now a conference centre and permanently moored in Dubai. My thanks to all those locally who worked so hard to put on a great event, one which I was proud to be part of.

Social media and the IIMS website

Once again IIMS has continued to ramp up its social media activity through the various available channels. In particular, our LinkedIn feed has shot on again and, at the time of writing, we boast around 4,500 followers on that medium alone including some real marine industry movers and shakers. We post on Twitter daily as well.

We have continued to boost the free to view content on the IIMS

YouTube channel throughout the year, which now numbers 200 originally made videos in total.

The IIMS website remains a very powerful tool indeed. Our policy of optimising each new daily news item means that IIMS ranks number one on Google search for a wide variety of terms and phrases. The site attracts on average 15,000 visitors each month. It is rich in content and I encourage you to explore it if you have not already done so.

WhatsApp special interest groups for member surveyors

IIMS has extended its technological reach with the recent launch of its first WhatsApp group, this one dedicated to UK based Inland Waterways surveyors who are involved in the survey of canal narrowboats. Around a dozen members have signed up for the service, which is a member benefit and as such is offered at no charge. The requirements for membership of the group are simply that it is open to anyone in the UK who is involved in narrowboat surveying. That makes it targeted, focused and manageable.

The aim is to provide a place where thoughts and techniques on surveying narrowboats can be exchanged and discussed. Imagine seeing something on survey not seen before? Who do you turn to for advice or another opinion? Members of this WhatsApp group can now share images with the rest of the participants and the chances are someone will have seen it and can offer advice and comment.

Although it is early days, it is good to see much chatting going on between group members and the sharing of some images for comment. If successful we will roll out more groups in 2020, so if you have ideas for new groups to propose, let head office know.



Marine Surveying Academy update

There has been some considerable work going on in the background which will benefit the Marine Surveying Academy (MSA) in the coming years as we look to unveil new certification and accreditation schemes.

MSA is nearly six years old and I am proud of the considerable progress that business has made and the impact we have been able to play in providing accreditation solutions in previously unregulated areas. Work has been undertaken on the five-year reaccreditation process for our IRMI and RMCI standards as well as the eCMID accreditation scheme we run for IMCA.

Over the year we have run a number of training courses and seminars. Of particular interest for me was hosting the recent eCMID AVI Renewables one day seminar in Amsterdam, our first such initiative. It gave a valuable insight into how renewable energy is set to power our modern world in the coming years and reminded me of the huge step changes that have happened during my lifetime alone.

In conclusion

2019 has been a memorable year with many highlights for me personally. Some of the effects of what we have been working on behind the scenes will not become apparent until 2020 and beyond. In conclusion, I'd like to give my personal thanks to Capt Zarir Irani, IIMS President, for his ongoing support. He has worked tirelessly to promote the organisation across the globe this year on his travels. I also want to express my personal thanks to the management board for their continuing support and for allowing me to manage the organisation in an unfettered manner - in particular Paul Homer for co-starring with me in the Report

Writing seminars and for giving his time to give practical instruction to new head office colleagues on how to conduct a survey. As always, I would like to show my appreciation to my colleagues for all they do to support me and you. Also let me show gratitude to all those who sit on various IIMS committees, both locally but also in the various branches around the world. Their efforts are truly appreciated. And finally, I propose a big vote of thanks to all IIMS members, for without you the organisation is nothing.

Survey well and all the best for 2020.

Mike



An open letter to the worldwide yacht and boat manufacturing industry written by the International Institute of Marine Surveying

All worldwide manufacturing industries fundamentally face the same basic key challenges. They must be competitive within the markets they operate in, which requires them to produce the best possible products within strict financial constraints ensuring they make a profit and can continue to invest in research and development to create new products.

Some manufacturers through choice approach this challenge by producing the best possible high-quality product with a top end price. They have a well-defined strategy of selling less units using a marketing approach to create a unique market position and a cachet around the brand. Put in simple terms, at the top end are the elite where only a limited amount of a product is manufactured with a high price tag. At the other end of the scale are the mass-produced, low-cost products with a throw away price tag by comparison.

However, no matter which end of the scale they are at, all manufacturers have a duty of care to their customers and end users to manufacture a safe product, which meets recognised quality criteria and international standards. In the European Community that is the CE mark and around the world there are many others existing. The protection these marks offer to the buying public is the assurance that what they are purchasing has been produced to a known standard and therefore should be safe to use.

Looking at domestic machinery in the UK for a moment, it too must meet certain standards and regulations in two principal areas:

- Supply of Machinery (Safety) Regulations 2008, as amended by the Supply of Machinery (Safety) (Amendment) Regulations 2011. These regulations require all machines placed on the market in the EU to carry a CE mark as described by the European Machinery Directive 2006/42/EC.
- Provision and Use of Work Equipment Regulations 1998 (PUWER 98). These regulations place duties on people and companies who own, operate or have control over work equipment.

With domestic machinery, the White Goods Trade Association states that domestic appliances are usually designed with a Mean Time To Failure (MTTF) rating. Television manufacturers often publish these, although some choose not to. A cheap washing machine may have an MTTF of 600 hours whereas an expensive one may well exceed 10,000 hours.

Motor vehicles have a range of high-quality standards too. Euro NCAP introduced the overall safety rating in 2009, based on assessment in four important areas.

- Adult Occupant Protection (for the driver and passenger);
- Child Occupant Protection;
- Pedestrian Protection which has been expanded to include cyclists and is now known as Vulnerable Road User (VRU) protection;
- Safety Assist, which evaluated driver-assistance and crash-avoidance technologies.

The overall star rating was introduced to add more flexibility to the previous ratings scheme which had been in use since 1997.

In the UK the vehicles sector has the Government Agency (DOT), the Vehicle Standards Agency (DVSA) or (DVA) to check standards.

The UK aircraft sector has the Government Agency (DOT) and Civil Aviation Authority (CAA) to check standards. Other countries have their own standards too. Generally speaking, civil aviation

worldwide has the highest levels of safety. Basic international regulations are set by a United Nations body called the International Civil Aviation Organisation. Individual national regulators then take these regulations implementing and enforcing them in their own country. They may also add to them to further raise safety levels. Within Europe much of the safety regulations are set by a European Commission body called the European Aviation Safety Agency. This means there is a common set of requirements across Europe. National regulators, such as the UK CAA, then use those requirements to regulate civil aviation locally.

Turning to the marine sector. Recreational Water Craft, as they are classified, now have the European Recreational Craft Directive (RCD). Commercial vessels have the Maritime and Coastguard Agency (MCA), recreational and workboats <24 metres that are used for commercial purposes have the UK Certifying Authorities to check on design, stability and construction.

The RCD is a European Directive which sets minimum requirements for a boat that guarantees its suitability for sale and use within the European Union and EEA.

The RCD (2013/53/EU) became the current legislation for the CE marking of boats from the 18th January 2017. There are several additional supporting documents published by the Notified Bodies' Recreational Craft Sectoral Group (RSG) guidelines and the European Commission (EC).

Common sense must prevail; for example, the life expectancy and indeed the suitability of a product is to a degree dependent on its use. A family saloon is not a suitable vehicle to drive across muddy fields and rough terrain in and a tractor is of little use on a motorway.

This is all well and good; however certain models of cars and domestic appliances are often recalled by manufacturers due to latent defects, which have subsequently come to light following production and placement on the market. There have been several high-profile examples of recall campaigns in recent years involving thousands of tumble dryers, fridges and vehicles. The key difference to point out is that if a family saloon starts to smoke and catch fire, the occupants can pull over to the hard shoulder and get out of the car. If a washing machine or tumble dryer overheats, it can be switched off, but if the rudder breaks or the keel falls off a yacht in mid Atlantic, there is little one can do. Lives are therefore put in danger and at risk. Arguably, the only other industry which has similar risks associated with it is the aeronautical industry, where mechanical failure often leads tragically to loss of life, but water craft are not subjected to annual vehicle MOT inspections or CAA inspections.

Some marine industry manufacturers take their responsibilities seriously. As soon as a latent defect comes to light, they inform the purchasers. Repair teams are dispatched around the world to rectify the defect before any serious incident can take place. Others, however, deem it acceptable to wait for individual purchasers to bring each example of a defect to their attention before taking individual action - in effect a damage limitation attitude and approach, which is not good enough when the safety of life is potentially being put at risk.

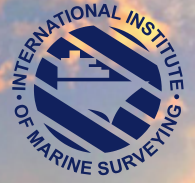
All too often surveyors find defects in a vessel and the next time they inspect another vessel of the same type they know what they are looking for and quite often find the same defect and can advise accordingly. But this is a very hit and miss approach.

The International Institute of Marine Surveying has written this open letter because it feels duty bound to bring these issues to light and to be pro-active in helping to spread the word and stimulate debate. But what the institute would like to see more than anything else is the worldwide marine yacht and boating industry coming together to act responsibly at all times in the way it treats latent defects with their products, those which they are either already aware of or are brought to light later by users.

Authors: Geoff Waddington and Mike Schwarz

IIMS US Conference Baltimore

Friday 24th to Saturday 25th January 2020



Two days of educational seminars for all IIMS members and industry professionals.

Visit <https://bit.ly/35A2yLI> for a list of presentation speakers.

VENUE:
The Marine Conference Center,
MITAGS-Maritime Institute of Technology and Graduate Studies
692 Maritime BLVD, Linthicum Heights, MD 21090, US

IIMS Canada Branch Conference

Friday 6th to Saturday 7th March 2020



Two days of educational seminars for all IIMS members and industry professionals. Includes the IIMS Canada Branch AGM.

A list of presentation speakers to come.

Check <https://bit.ly/35b5o9J> for further updates.

VENUE:

The Lonsdale Quay Hotel, North Vancouver, British Columbia, Canada.
<http://www.lonsdalequayhotel.com>

Quick and easy travel from the Vancouver airport via Skytrain to the Waterfront Station (Canada Line). Take the Northbound exit from the Waterfront Station to take the ferry to Lonsdale Quay. Travel cost is \$3 and takes 29 mins.

A discounted hotel rate is available for IIMS guests, \$145 per night. Early reservations are recommended.

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END OF LIFE BOATS...

A PROBLEM THAT WON'T JUST GO AWAY!



BY LUKE EDNEY

Luke Edney is the Communications Manager for the marine recycling company Boatbreakers. Luke is from Portsmouth and lives in Gosport so has spent many years surrounded by boats. He joined the company in 2015 after completing a degree in Journalism at the University of Brighton. It's his job to organise all of the end of life boats the company recycle, from initial enquiry to destruction and waste disposal.

Luke puts his degree to good use by telling the world about everything Boatbreakers is up to on social media and through his "Breaking Boats" Blog. Through the work on social media Boatbreakers has appeared on radio, TV and in magazines. Boatbreakers is currently filming series three of Scrap Kings on Quest after featuring in the first two series. The company also has an active following online with frequent dialogue with followers as well as people signed up to a weekly newsletter.

During the last sixty years, the marine industry has been churning out increasing numbers of recreational and working craft, the majority being fibreglass (glass fibre reinforced polyester). An aerial view of almost all waterways in developed countries reveals a plethora of small boats occupying much of the available water space.

The International Council of Marine Industry Associations (ICOMIA) has estimated that there are more than 6 million recreational craft in Europe alone. Of the hundreds of thousands that lie in marinas or boat yards most rarely move, venturing out less than half a dozen times a year.

Because GRP boats are highly durable, end-of-life (EOL) disposal has not so far been a major issue.



Many of the numerous GRP boats produced in the early years still exist. But sooner rather than later even these early composite boats will come to the end of their life cycle.

The present trickle of EOL disposals is likely to become a flood as successive generations of old fibre-glass boats reach the end. Unlike metal and wooden boats, that are made of recyclable or naturally degrading materials, fibreglass craft leave a lasting trace on the environment.

CURRENT DISPOSAL SOLUTIONS

The current methods for disposal are in their infancy and the crude nature of just crushing down old fibreglass and sending it to landfill isn't sustainable. Due to this approach being considered unsustainable in the long run; already some nations, such as Holland and Germany, have adopted rules stopping the sending of GRP to landfill. Recycling will

become the only viable and available option.

There is a process of reducing chopped fragments of GRP still further to sizes from smaller fragments to fine particles. It can produce a product that is usable in construction materials such as cement, in bulk and sheet moulding compounds and even in laminates that could be used for new boats or other products.

In the UK Boatbreakers is the only business actively trying to get the boat recycling sector to develop into a structured system for end of life boats, however at present it's still in an embryonic form. Currently the activity is relatively small-scale and development of the integrated supply chain that will become necessary will take time. Also, more sophisticated recycling methods must evolve that can retrieve high-performance fibres, including carbon, for re-use and utilise separated resin more productively than simply as a fuel to burn –

though even the latter could be a viable option.

EXAMPLE OF BOAT RECYCLING INITIATIVE

A range of initiatives have addressed the issue, given impetus by the growing tally of vessels that are abandoned on beaches, in marinas, in fields and at sea (sunken) by their final owners who, faced with major costs and lack of disposal infrastructure, feel there is little alternative or simply that they can just get away with it. Consistently, all signs that could help identify those owners – Hull ID numbers, registration details and the like – are removed before the boats are abandoned, so harbour and local authorities are having to pick up the bill.

In the past the European Union sponsored a project that addressed the end of life issue as part of an aim to reduce the environmental impact of the marine industry.

The BOATCYCLE programme, implemented in Italy and Spain between 2010 and 2012 and so called because it attempted a 'cradle-to-grave' lifecycle analysis of vessels' economic and environmental impacts, investigated disposal options for four types of vessel, a small yacht, a sizeable sailboat, a rigid inflatable boat (RIB) and a fully inflatable craft. An aim was to establish the total costs of disposal, including transport, using well tried methods that are familiar to scrapyards worldwide. For logistical reasons, the sailboat was scrapped at a boatyard located in a Catalan (Spanish) port. The other craft were easier to transport by truck to a central location.

A TIME-CONSUMING PROCESS

In the case of the most intricate disposal/recycling challenge, the sailboat, the first step was to decontaminate the craft by removing waste oils and fuels, bilge water, batteries and other environmental contaminants. Next, all the metal items including spars, fittings, stanchions etc. – were removed. Once stripped down to the bare hull the craft was reduced with hammers, saws and a hydraulic grapple, to large pieces. At this stage wiring, foams, engines etc became separated and were removed.

Then different wastes were placed into containers for weighing and separate treatment. Fibreglass

content, the highest proportion of the waste by weight, was sent as small fragments to landfill – the prevailing practice today. However, this practice has potential health and safety implications, uses scarce landfill capacity and incurs landfill taxes, which are steadily rising. Hence alternatives are urgently needed.

BOATCYCLE investigated and piloted a number of recycling pathways for the variety of craft in question. A key approach was to mix recovered fibreglass with certain thermoplastic matrices to produce new composites that can be used industrially. A similar pathway was piloted for neoprene, the basic material constituent of inflatable craft and RIBs.

The project succeeded in showing that fibreglass can be recovered as part of the EOL boat disposal process, that a useful proportion of the fibres' original as-new properties are available in the recovered form, and that the fibres can have a second service life. Moreover, the resulting thermoplastic composites are, unlike thermosets, themselves recyclable since they can repeatedly be re-moulded under heat.

WHO WILL PAY FOR END OF LIFE BOAT DISPOSAL?

BOATCYCLE's ambitious mission to investigate impacts over the entire

boat lifecycle was illuminating, particularly in showing that EOL disposal overall needs to be better managed and that there are better options available than those pertaining at present. The big questions that arise, however, are what costs are involved and who will pay them?

Researchers calculated that the average cost of conventionally dismantling a 23ft long boat, including logistics, is £800, rising to some £1500 for a 32m craft and £15,000 for a 50ft vessel. (The rise is related more to boat volume than to length, and to the greater complexity of larger vessels).

Some say that the costs should fall on the boat owner, but many of the owners who are in place at the ends of boats' lives are unwilling or unable to afford such substantial sums, at least within a short time span. Unlike owners of metal boats, which have significant scrap value in their recyclable metals, those of reinforced plastic craft cannot rely on embodied scrap value to reduce disposal costs. Collecting the costs from owners, even those that can be traced, would be difficult.

Another objection to this approach is that it would require every boat to be registered so that ownership can be traced throughout its lifetime. This imposes the need for an additional bureaucracy which, itself, would have to be staffed, managed and funded. However, registration also allows the



possibility of imposing on owners an annual boat tax, akin to car tax, the resulting fund being earmarked for EOL disposal. This levy would be less onerous for owners over the duration of ownership than an EOL lump sum payment. Alternatively, the cost could be shared between owners and the boatbuilding trade, the two principal stakeholders in boating, by using a combination of purchase levy with an annual 'boat tax'.

END OF LIFE BOATS: A BUSINESS OPPORTUNITY

Although end of life concerns have not yet instilled in most boatbuilders and their suppliers a high sense of urgency, they surely will. Law makers and landfill costs will see to that.

There are about 6 million recreational craft in Europe alone, and with boat lifespans of 30-45 years, some 140,000 of these boats per year can be expected to become due for scrapping. Most will be composite and the majority of those will be GRP.

Expand this picture to global scale and it seems clear that, in years to come, rational, affordable and environmentally acceptable means of processing the multitude of vessels out there after their service lives end is destined to become not only a big challenge but a major business opportunity too.

ABOUT BOATBREAKERS

Boatbreakers is a marine recycling and salvage company based in Portsmouth established in 2006. Company Director Steve Frankland, whilst surveying boats, realised that there was nobody offering a solution for end of life boats, so he decided to make one. The company has gone from strength to strength and covers the UK & Ireland. We have also recently opened a Poland branch as we look to expand across Europe.

Currently Boatbreakers is dealing with around 200 boats per year, mainly for private owners. This can be for several reasons including damage, unable to sell, rising mooring fees, costly repairs or simply no longer wanting to own a boat. Boatbreakers also works with various insurance companies, harbour authorities, marinas, boat yards, local councils and crown estates.

Alongside boat recycling we also try to support research into recycling methods for GRP. The company sees it as one of the biggest problems the marine industry must tackle. But it must be an industry wide effort to come up with a solution. One worrying finding from the work that we do is just how brittle GRP becomes in old boats over 30 years old. This is an issue we are in a unique position to notice but one that raises serious questions about the safety and longevity of older GRP boats.

Boatbreakers is always open to talk about the issues surrounding boat disposal. The British Marine Federation has told us that there are around 660,000 registered boats in the UK alone. This shows the scale of the issue as many will be GRP hulls. Not forgetting that the number of unregistered boats is unknown, and they are the ones more likely to be abandoned and fall to others to foot the bill for.

ABOUT BOATCYCLE - the management, recycling and recovery of wastes of recreational boat scrapping

The project's main objective is to reduce the impact of the marine industry in environment through the development of methodologies for ships treatment as waste both as management and waste recovery. Enter the dismantling waste of three types of recreational boats (wood, fibreglass, neoprene and PVC), previously treated as new additives in polymer composites, to minimize the impact of these boats when they end their life. To reduce the environmental impact, this project focuses on providing the recovery and recycling methodologies through pilot projects, increased environmental awareness, and provide guidance for future implementation of adoption of best practises and regulatory measures. It will promote sustainable production of boats based on an approach of LCA and eco-design.



How much do you know?

(and are you a master of boat and ship building terminology?)

For a bit of fun, here is an A-Z (minus X and Z) of boatbuilding terms, some of which are in more common usage than others it has to be said. How many are you familiar with?

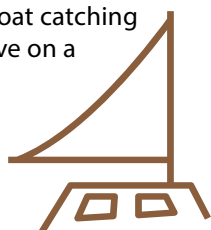
The examples below have been taken from 'What a marine surveyor needs to know about small craft, ship and boatbuilding terminology' written and compiled by Jeffrey Casciani-Wood over many years.

Anti-trip Chine



A flared out after section of the side/bottom of a planing hull. Its purpose is to prevent the hard chine of the boat catching a wake or small wave on a sharp turn.

Bumpkin



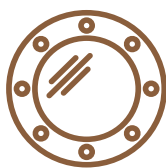
A spar attached to the stern of a sailing yacht to take the sheet of an overhanging boom.

Charlie Noble



A galley stove exhaust pipe. The name is traditionally alleged to come from the days of wooden sailing ships when such galley chimneys were often made of copper. A British merchant ship captain who lived about 1820 insisted that the one on his ship should be made of brass and kept polished and so, in good seafaring tradition, the galley chimney was named after him.

Dodger



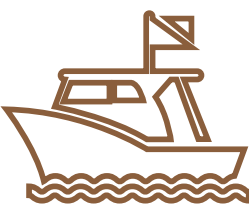
A temporary canvas screen (sometimes with vinyl windows) fitted over a cockpit or similar to keep out the weather.

Elephant's Trunk



A short length of flexible hose attached to the transom scupper of a RIB and designed to free the deck of water.

Fitch Timber



A separate main structural transverse timber running across the top of the hog to strengthen the bottom of small boats or dinghies.

Gooseneck



A special metal hinge attaching a derrick to the heel of a mast or derrick post and designed such that the derrick may be lifted, lowered or swung from side to side.

Hungry Horse



A colloquial term used to describe the indentation of plating between the frames and usually due to weld contraction.

Inwale



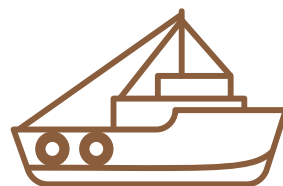
A longitudinal secondary main structural timber fitted inside the heads of the frames or timbers and under the capping to form the vessel's gunwale.

Joggle



A piece of decking joined to a margin strake or covering board by a snipe with the end snubbed is said to be joggled.

Kont Nozzle



A hydrofoil sectioned ring fitted round a propeller to increase the thrust at low speeds and often found on tugs and trawlers.

Luff



The fullest or roundest part of the bow.

Maienform

Bow



A special form of bow shape with a sharply cutback forefoot and (approximately) triangular forward sections. Sometimes, incorrectly, called an ice breaker bow.

Macelle



A small swelling below the bridge deck in some catamarans and trimarans to accommodate the helmsman's feet.

Dakum



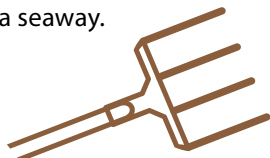
A caulking material of loosely twisted hemp or jute or other crude fibre sometimes treated with creosote or tar before use.

Panting Stringer



A secondary supporting stringer fitted at the forward end of the vessel to stiffen the hull structure forward against pounding in a seaway.

Quant



A long wooden pole with a fork at one end and a shoulder pad at the other used for propeller barges along inland waterways.

Ruffle



The serrated iron ring fitted to the barrel of the anchor winch to which the pawl is applied to prevent the chain running out during breaks in weighing.

Skeg



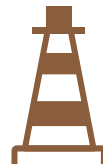
The bottom section of a cast stern frame (also called a Solepiece) or an angle or other steel structure extending beyond the after end of the keel or the heel of the stern post. On some vessels such as tugs and trawlers the name is given to a fin structure usually containing the stern tube below the afterbody.

Topgallant Rail



A light scantling rail forming the top of a topgallant bulwark.

UTS



Either ultimate tensile strength or ultrasonic thickness survey depending on context.

Van Dieren Stern



A form of stern with straight buttock lines cutting a vertical transom and after side plates having the same shape as the deck plan and often with hollow transverse sections. Usually found only on tugs and small coasting vessels.

Weepage



A process of very slow leakage, very often involving the capillary effect in addition to just water pressure from outside the hull. Weepage is not referred to as leakage because the rate is so slow that the water evaporates nearly as fast as it enters the interior of the vessel.

Yoke



A steel arm laid transversely across the top of the rudder stock on the larger vessels to enable the rudder to be turned using a twin ram hydraulic steering gear.

These terms are just a tiny extract from hundreds more that can be found in 'What a marine surveyor needs to know about small craft, ship and boatbuilding terminology' by Jeffrey Casciani-Wood. This is one of over more than twenty handy guides in the series published by IIMS.

'What a marine surveyor needs to know about small craft ship and boatbuilding terminology' and the other handy guides are available directly from the IIMS website in either paperback or electronic format at <https://bit.ly/2omzqr2>

BOOM TIME AHEAD FOR WORLDWIDE LNG SHIPBUILDING. BUT ARE WE READY FOR IT?

Reprinted from the Ship-Ahoy blog website (<https://shipahoycom.wordpress.com>)

It has been nearly a decade since the last mega LNG newbuilding program in South Korea was completed. Building forty-five LNG carriers for Qatargas at three major Korean shipyards – Hyundai, Samsung, and Daewoo — had been challenging on many fronts. Several new technologies and systems had to be qualified at the design stage, during plan approval, construction and shop trials and verified during commissioning, gas trials, and sea trials. Anomalies and deficiencies, if left undiscovered, cause rework, costly delays and considerable technical problems after delivery. Fortunately, with a handful of very experienced engineers involved in the QG project from concept to commissioning, it was a job well done in the end, to the satisfaction of all parties. What

is now imminently around the corner is something much bigger, something that will overshadow the last newbuilding boom, and bring about a welcome change to the whole marine industry across the board. Here is why:

LNG seaborne trade almost doubled between 2008 and 2018, from 235 billion cubic meters to 431 billion cubic meters. Thanks to the increasing use of LNG as fuel ashore and on ships, the next decade is likely to see even faster growth in gas transportation, and consequently, in newbuilding orders for LNG carriers.

Qatar's LNG expansion program to raise production by 33 million tonnes per year (mtpa) by 2024 will need another 112 LNG ships of

180,000 m3 capacity (less or more depending upon the carrier size). That should be welcome news for shipyards, especially the South Korean yards with unparalleled experience in building LNG ships.

By 2030 all the new build Q-Flex and Q-Max vessels, in total 45 of them, will complete twenty years of service. That means these vessels will become expensive to maintain, even if they met the existing and future regulations of the day. A replacement program for these vessels will have to start after 2025, triggering another shipbuilding boom in the next decade.

ExxonMobil is likely to finalize investment decisions on a USD 33 billion, 15.2 mtpa LNG plant for northern Cabo Delgado,

Mozambique, starting production by 2025. To lift this volume of gas, an additional 52 LNG vessels of 180,000 m³ will be required.

French energy giant Total has committed USD 25 billion in the Rovuma LNG project in the Afungi Peninsula in Mozambique. We expect it to start production by 2022. To offtake 12.9 mtpa of LNG, 44 vessels of 180,000 m³ will be needed.

ENI Coral field Offshore has already started work on 3.4 mtpa LNG production. To lift this volume, another 12 LNGCs of 180,000 m³ will be needed by 2020.

Thus, by 2025, the additional 64.5 mtpa LNG will have to be lifted, requiring at least 219 new LNG carriers of 180,000 m³ capacity. The good news is that Qatargas will be ordering 40 to 60 of the planned 100 vessels very soon. Another over a hundred vessels will have to be ordered in the next five years to meet the demand, or the charter rates will go skyrocketing. Spot rates were seen soaring recently to USD 180,000 per day as some Chinese LNG vessels dropped out of service because of US imposed sanctions against companies found dealing with Iran.

New Export Terminals

Several new LNG export terminals are being planned across the United States with an aggregated capacity of 156.9 mtpa from 17 terminals that will be ready by 2023.

Russia will add another 18.7 mtpa capacity by 2023.

Not far behind, Canada will add another 14.6 mtpa by 2023.

This additional 190.2 mtpa export capability is 60.4% of the world's entire 2018 LNG imports. Considering global demand for LNG is unlikely to rise by more than 25% in the next five years, such an increase in export capacity is unlikely to need additional tonnage.

Evolving Trade and Technology

A growing number of new LNG vessels are moving propulsion systems to advanced slow speed ME-GI (Electronically controlled Gas Injection) and XDF engines. Improved containment systems and better on-board reliquefaction plants offer minimal boil off, allowing for longer storage without cargo losses. On the spot market, ME-GI and XDF ships command a premium of USD 20,000/day over Tri-Fuel diesel-electric (TFDE) propulsion and Dual Fuel Diesel Electric (DFDE) vessels because of better fuel efficiency. ME-GI Engines are ~30% more efficient than TFDE, and >50% more efficient than old steam turbine propelled LNG vessels. Spot charters of TFDE/DFDE vessels averaged \$85,500/day in 2018, compared with \$53,400/day for steam LNG vessels.

Caution Advised

Shipbuilding is the pulse of the world economy. The last shipbuilding boom at the start of the century gave us unprecedented economic growth, ever-increasing charter rates, high inflation, rising asset prices, and lower unemployment. Unfortunately, the negative impact of this is that investors often go overboard with risky investments, often too late, when the economy overheats and becomes unsustainable. This often leads to bust, as we saw in the financial crisis of 2008. We are presently looking at an upward trend with excellent prospects but time to

make large investments is now, five years later will be a bit too late.

There are also many pitfalls ahead related to building new LNG carriers. The best of the shipyards capable of handling large LNGC projects are, without doubt, in South Korea. However, even these excellent shipyards have gone through massive retrenchments during the past few years, such that, they may not have sufficient talent left to meet the challenges of new megaprojects. With such a huge new building program in the offing, a tag of 20 billion dollars for a hundred ships, it is but natural that many shipowners and ship managers, even those without sufficient experience in operating LNG carriers, let alone building these, are jumping on the bandwagon. It should be borne in mind that building a highly advanced LNG carrier is not the same thing as operating one. The new building process must be carefully scrutinized by experienced engineers. Unfortunately, there is only a small pool of skilled talent capable of supervising LNG new buildings, and that too is scattered around the world because of the recent drought in shipbuilding. All these must be pulled into the project. Because any oversight during conception, design, or construction could be very expensive. It will be wise for Qatargas to be extremely cautious taking on new partners, and instead take on board the talent with proven and unparalleled experience from building Q-Flex and Q-Max vessels.





How to Get Super **Rich** by Selling Superyachts

BY **BENJAMIN STUPPLES**
(Bloomberg)

With assistance from Devon
Pendleton and Tom Maloney.

Gazing across the sun-dappled harbor in Monaco, even the fathomlessly rich might get the feeling that some people have more money than they know what to do with.



Floating in Port Hercules the other week — ensigns fluttering, halyards singing — was one of the most spectacular displays of seagoing craft ever seen: 125 superyachts with a combined value of \$4.4 billion.

The mine's-bigger-than-yours lineup at the Monaco Yacht Show was yet another sign of how the wealth of today's ultra-rich is remaking the world in ways that might make many ordinary people cringe. Six hundred million dollars? For a boat?

Even Henk de Vries, one of the world's foremost superyacht builders, has conceded that no one needs one.

"I make the most unnecessary product that you can want, and I make it so nice that you still want it," he said a decade ago.

Even at a time of worrying inequality and anxiety over climate change, an astonishing number of the superwealthy want superyachts — so many, in fact, that the de Vries family and their chief yacht-building rivals, the Lurssen and Vitelli clans, have become fabulously rich themselves.

"You're essentially building a small skyscraper that floats on the water," said Martin Redmayne, chairman of the Superyacht Group, a London-based media company. To be successful, these shipyard owners must have "patience, time and passion — absolute passion. It's a very long game."

The business of building ocean-going palaces really got going in the Gilded Age when robber barons and their descendants traded up from schooners. The Vanderbilts owned a 332-foot steam-fueled vessel for getaways to Europe, while the J.P. Morgan clan built multiple yachts called Corsair, each bigger and better than the last. The 343-foot Corsair IV was launched in 1930 to sail the family up and down the East Coast and across the Atlantic until it was given to the British navy at the start of World War II.

Demand slowed in the immediate aftermath of the conflict, but rebounded as Greek shipping magnates, royalty and Hollywood movie stars became yacht owners.

Paolo Vitelli got his start in 1969 after selling a nightclub business. He used the proceeds to found the yacht-maker now known as Azimut Benetti.

Italy at the time was rocked with labor unrest, but Vitelli imported boats from the Netherlands and later designed and built mass-produced luxury vessels.

He expanded when Benetti, one of the biggest names in the industry, ran into trouble in the 1980s, partly because of the costs of developing "Nabila," a 282-foot vessel whose owners have included Saudi Arabian arms dealer Adnan Khashoggi and President Donald Trump. Vitelli bought the business in 1985 and overnight turned his firm into a boat-builder for the richest of the rich.

Two years later stock markets tanked and demand tumbled, but Vitelli, 72, stuck it out through this crash and the global financial crisis two decades later.

These days, business is again booming as Middle East royalty, Russian oligarchs, technology titans and real estate moguls compete for ever bigger or more advanced boats. There are more than 350 under construction currently, according to the Superyacht Group, including a 466-footer poised to launch next year codenamed Project Redwood.

The future owner's name is shrouded in secrecy.

Azimut Benetti is the world's biggest yacht-builder by volume. It reported annual sales — measured in value of production underway — of 900 million euros (\$986 million) for the year ended August 31. That's made the Vitellis wealthy, but the family has little interest in cashing out.

"An American fund once wrote me a check for \$1.7 billion," Vitelli said in an interview at Azimut Benetti's shipyard in Livorno, Italy. He declined the offer. "Money and cash ruin the family and take away the pleasure of running the company. You have to have rules and simplicity to love the real things."

That was evident in March, when Vitelli launched "IJE" with the customary Champagne bottle shattering against the side, green, white and red confetti fluttering into a blue sky and Luciano Pavarotti's voice echoing from throbbing speakers. The 354-foot yacht, built for Australian casino magnate James Packer, comes with a cinema, sauna and fire pit.

It's a monster by most standards and spent the week of the Monaco Yacht Show off Italy's western coast. The Monaco event started in 1991 as a place for owners, brokers and fans of megaboating to gawk at the latest designs. The inaugural show featured 32 vessels. Last month, four times that number were on display during a week that drew more than 30,000 visitors to Monaco, including Robert Redford and Gwen Stefani.

But the undoubted stars of the four-day event were the gleaming boats.

Germany's Lurssen displayed the 364-foot Tis, which comes with a massage room, helipads and nine cabins. It's owned by Russian commodities trader Alexei Fedorychev and is available for mere mortals to rent for \$2.2 million a week, plus expenses.

Lurssen announced plans for Tis three years ago, a typical time frame for the biggest custom superyachts. The process starts with a naval architect and designers, and involves teams representing the owner and project managers, as well as thousands of hours of labor for shipyard workers.

Lurssen traces its roots to 1875, when 24-year-old Friedrich Lurssen started a boatyard near Bremen. At first he made only row boats, but later pioneered motorboats with a founder of automaker Daimler AG. Peter Lurssen, Friedrich's great grandson, now leads the company, which helped build the 414-foot superyacht of late Microsoft Corp. co-founder Paul Allen. About a third of the German firm's business is from repeat clients, Peter Lurssen said at a Superyachts.com event in London this year.

"So we must be doing something right," he added.

But for all the riches floating around there are ominous signs.

Rising inequality and a populist backlash has put a spotlight on the world's richest and their toys. British retail billionaire Philip Green's "Lionheart" — made by Azimut Benetti — has become a focus of outrage, highlighted by the media each time Green closes stores and cuts jobs.

In the U.S., the world's top yachting market, senators Bernie Sanders and Elizabeth Warren have proposed wealth taxes as they campaign for the 2020 Democratic presidential nomination. Across the

Atlantic, left-wing firebrand Jeremy Corbyn is vying to lead the U.K., while China's super-rich are braced for the possibility their government may go after the wealthy to provide tax cuts for the masses.

There's also the risk of another global recession that could slow sales.

And it's not just politicians and the global economy to worry about, either. The next generation of the uber-wealthy may have different attitudes towards such fuel-guzzling symbols of conspicuous consumption.

Azimut Benetti, Lurssen and Dutch yacht-builder Feadship, which is half owned by the de Vries family, have pledged to cut carbon emissions, but that's not easily done for ships that can burn 500 liters of diesel an hour.

"A lot of clients are looking at trying to be environmentally friendly," said Sean Bianchi, head of new construction at broker Burgess. Options for new yachts include on-board battery banks and installing hybrid or electric motors. But "there is only so far you can take a luxury yacht down that environmental route," he said.

Vitelli though is optimistic, as he prepares to hand the reigns to his daughter, Giovanna, 44, with hopes of sparking a dynasty to rival the Lurssens and de Vries.

"Her children, although they are young, are already dreaming of becoming the third generation at the company," Vitelli said. "The idea that we could have 100 years of history is appealing to me very much."



Biological Attack on Iron and Steel



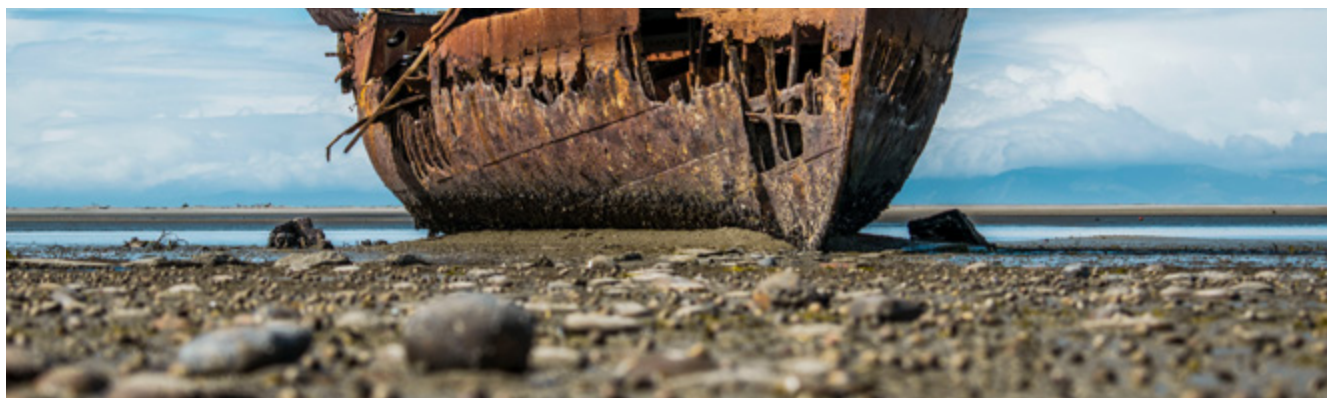
BY EUR. ING. JEFFREY
N. CASCIANI-WOOD

Boat owners and marine surveyors will, of course, be familiar with common iron rust whatever form it takes and all marine surveyors should not only be able to recognise the five different types of electro-chemical corrosion on sight and understand the conditions that cause the problem but also how to deal with these conditions in order to minimise their deleterious effects on a vessel's structure. The literature on the

subject of electro-chemical or galvanic corrosion is enormous. Although the phenomenon is well known to the mining and oil industries where it causes millions of dollars worth of damage annually. Biological attack is, however, not so widely understood or recognised in the marine world where it generally takes one of two main forms:

- **macrobiology**
- **microbiology**





Macrobiological attack is the well known phenomenon of mussels, barnacles, slimes, grasses and seaweeds attaching to the hull. These items do not usually cause serious harm to the metal but they can and do slow the boat down and increase the fuel consumption for a given speed. They are more or less satisfactorily dealt with by scrubbing the hull clean and coating with a suitable antifouling paint. However, there is a different kind of corrosion which is also found on boat hulls, particularly those lying in water such as canals or rivers containing decaying vegetable matter. Very few people are aware of the problem or that it is caused by microbiological attack. Or, in other words, metal worm. MIC is a highly unpredictable process but the marine surveyor should realise that, under the influence of microorganisms, corrosion processes can happen in a matter of months compared to the years it would take for ordinary abiotic corrosion to reach serious proportions. Further, also due to its unpredictability, it is often difficult to include microbiologically induced corrosion in risk analyses and, more often than not, its possibility is not even considered in a vessel's design phase. The impact can be enormous and an estimated 20% of all corrosion damage is caused by micro-organisms leading to costs as high as 2-5% of GDP. There has been a very large amount of data published on this subject in the civil engineering field over the last twenty years or so and it is widely recognised that not only does microbially induced corrosion stimulate general, pitting,

crevice and stress corrosion but that it is also capable of enhancing other related defects in steel such as corrosion fatigue, hydrogen embrittlement and cracking. Since micro-organisms are very wide spread in nature, most natural and man made environments are sufficiently contaminated to encourage bacterial activity to proceed to a greater or lesser extent. This type of corrosion is not a new form recently discovered but it is only in the last three or four decades that its seriousness has been fully appreciated. These organisms are commonly found in ballast tanks where the vessel has ballasted by taking on muddy river water or lying in the mud of harbours or in the waters of canals particularly those running through farm land where surface water often deposits chemical fertilizers into the canal. The author discovered the severity of the problem some forty odd years ago when employed as a superintendent engineer for a company running a number of general cargo Liberty ships which often loaded ballast water for return trips from the West African coast. The ballast water was, from the nature of its loading from the rivers, often heavily polluted with vegetable matter and very muddy. On inspection of the ballast tanks at the classification surveys very severe pitting of a clearly defined and characteristic type was frequently found under mud deposits in the tanks and a great deal of time - and money - was spent in trying to find the cause of the problem. It was eventually identified as

microbiological in origin when specimens of the corroded steel were sent for laboratory analysis. The per diem corrosion rates were often as high as 860 mg/dm² or, if it is easier to understand, pits several centimetres in diameter, 8 to 10 millimetres deep were often found in 18 millimetre thick mild steel plates in less than two years. Such microbiologically assisted reactions are well known in the big ship field to be an important factor in marine corrosion and there is, again, an extensive and increasing literature on the subject. This type of corrosion has been described for a number of different structures in the marine environment for aluminium and copper alloys and stainless steels as well as ordinary shipbuilding quality wrought iron and mild steel structures. The presence of such micro-organisms has many complex and inter-related effects and they can also generate environments favourable for the better known electro-chemical processes to occur. They can, for example, destroy anti-corrosion additives in coatings, depolarise cathodic processes and produce severe changes in local oxygen percentages that lead to differential aeration and concentration cells. The micro-organisms that contribute to corrosion are many and varied and include aerobic bacteria, fungi, algae and diatoms, yeasts and other organisms. They are able to colonise surfaces producing biofilms up to 100 mm thick and acquire the ability by genetic mutation to adapt easily to environmental changes. The systems are thus dynamic and can, and do, change with time.

The bacteria themselves are invisible to the naked eye and fall mainly into four types:

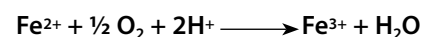
1. Slime formers which form slimy coverings over surfaces, reducing oxygen transport and trapping particles of debris.
2. Sulphur oxidising bacteria (SOB) which produce hydrogen sulphide from dissolved sulphates in anaerobic conditions. The bottom of the pit that results is black. Wet hydrogen sulphide is reported to corrode mild steel at rates that can exceed 2.5 mm/cm²/year but does not corrode aluminium to any significant extent.
3. Sulphur reducing bacteria (SRB) which produce tetrahydrated ferrous sulphate and the highly corrosive sulphuric acid. The bottom of the pit that results is silvery white.
4. Iron oxidising bacteria (IOB) which oxidise soluble ferrous iron to insoluble ferric or ferrous hydroxide.

Although it can be assumed that microbial corrosion will ensue in any environment in which the micro-organisms can survive, the extent of the activity of any specific species may be limited and conditions favourable to one type may be quite inimical to another. The bacteria associated with the corrosion of metals are unicellular, possessing a thick, rigid cell wall, dividing by binary fission and some have a flagellum to enable them to swim and thus be mobile. These organisms can be either autotrophic or heterotrophic, aerobic or anaerobic. Autotrophs obtain their energy from light or by the oxidation of inorganic materials and their carbon by assimilation. Heterotrophs are those bacteria that obtain both their energy and their carbon requirements from organic sources and assimilate carbon dioxide to only a limited extent. Anaerobic microbes do not require oxygen for their growth whereas aerobic bacteria do. The unicellular bacteria have three basic shapes: rod like, curved or spirillid and spherical. They vary considerably in size with, typically, a maximum size of about 1 µm.

The white deposits in the photograph are tetra-hydrated ferrous sulphate also known in its mineral form as rozenite [FeSO₄·4(H₂O)]. Note also the high surface area/depth ratio of the pitting. There are also signs (the small red-brown rusticles) of attack by microbes of the symbiotic species *Gallionella Ferruginea*. The presence of the sulphate prevents the steel underneath from rusting (oxidising). The vessel photographed was constructed of Siemens-Martin mild steel.

Sulphur Oxidising Bacteria

Of the four groups mentioned, however, the most important group associated with the corrosion of ferrous metals are those in whose metabolism sulphur and/or its compounds play an important part. The aerobic bacteria of the genus thiobacillus usually referred to as sulphur oxidising bacteria or SOB perform the oxidation of sulphur to sulphuric acid. The acids produced can cause deep pits to appear in the ground metal though their involvement in the corrosion process is only slight compared to the sulphur reducers. The bacteria are autotrophic, acidophilic, short non-sporulating rods approximately 0.5 x 1.0 – 1.5 µm in size. They occur as single cells or in pairs and are motile. The optimum temperature for growth is 25-30°C but they die at temperatures above 55-60°C. *Thiobacilli* are colourless, rod-shaped, Gram negative bacteria with polar flagella. They possess an iron oxidase, which allows them to metabolize metal ions such as ferrous iron:



They are strictly aerobic bacteria and all species are respiratory organisms and are obligate autotrophic organisms, meaning that they require inorganic molecules as an electron donor and inorganic carbon (such as carbon dioxide) as a source. They obtain nutrients by oxidizing iron and sulphur with O₂. *Thiobacillus*



Photograph 1 - Attack on a Steel Narrowboat by Microbes of the **Genus Thiobacillus**

microbes do not form spores; they are gram-negative proteobacteria. Their life cycle is typical of bacteria with reproduction by cell fission. The two main strains are *thiobacillus thioparus* and *thiobacillus ferrooxidans* which includes the strain *thiobacillus concretivorus*. *Thiobacillus ferrooxidans* affects the precipitation of ferric iron solids. The bottoms of the pits formed by their action are usually covered in white tetra hydrated ferrous sulphate ($\text{FeSO}_4 \cdot 4\text{H}_2\text{O}$).



Photograph 2 - Extensive *Gallionella Ferruginea* attack on a Narrowboat

Sulphur Reducing Bacteria

In engineering, sulphate reducing bacteria can create problems when metal structures are exposed to sulphate containing water. The interaction of water and metal creates a layer of molecular hydrogen on the metal surface and the sulphate reducing bacteria then oxidize the hydrogen while creating hydrogen sulphide which contributes to corrosion. The completion of the sulphur cycle, the Type 2 bacteria of the genera *desulfotomaculum reducens* and *desulfurovibrio desulfuricans* carry out the reduction of sulphate to hydrogen sulphide. *Desulfotomaculum reducens* is a sulphur reducing prokaryote and is more active than the *desulfurovibrio* genus of bacteria. The prokaryotes are a group of organisms whose cells lack a membrane bound nucleus or karyon. The word prokaryote comes from the Greek prefix πρό (*pro*) meaning before and καρύον (*karyon*) meaning nut or kernel. The organisms whose cells do have a nucleus are called eukaryotes. The main genus *desulfurovibrio desulfuricans* is a strain of Gram negative sulphate reducing bacteria and some species are capable of transduction. *Desulfurovibrio* is a genus of Gram negative sulphate reducing bacteria commonly found in aquatic environments with high levels of organic material and sulphate. As the sulphate is reduced to sulphite, the latter interacts with the ferrous iron to generate a black medium. The insoluble new medium is ferrous sulphide



Photograph 3 - Contrast - Galvanic Pitting

and the blackening indicates that sulphate reduction is taking place and that the iron is acting as a detoxifier for the harmful sulphide thus enabling a higher growth yield for the sulphate reducing bacteria to grow. Like other sulphate reducing bacteria, *desulfurovibrio desulfuricans* was long considered to be obligately anaerobic. That is not strictly correct as, while growth may be limited, these bacteria can survive in oxygen rich environments. These types of bacteria are known as aerotolerant. The bacteria are straight or curved rods, are highly heat resistant and a free living fixer of atmospheric nitrogen. *Desulfotomaculum desulfuricans* is a strain of Gram positive, sulphate reducing bacterium usually identified by the release of hydrogen sulphide gas with its characteristic rotten eggs smell. They are motile with a flagellum and are commonly found in canal and harbour waters.

These latter bugs, which can live in a lively partnership with the Type 3, are anaerobic in nature and obtain their requirement for sulphur primarily by dissimilatory sulphate reduction. It is not intended in this Manual to go into their extremely complex biochemistry but, basically, the animal works by assimilating a small amount of reduced sulphur but the majority of that absorbed is released into the surrounding water as sulphide ions, these are then hydrolysed to form free hydrogen sulphide. In that manner the SRB provide a cathodic process to support and maintain the anodic dissolution of iron and steel. Once the bacterium has started to produce sulphides, the local conditions then become favourable to growth and that can result in a population explosion of the bugs all reproducing highly corrosive sulphides. Any source of water which contains soluble



or decayed organic material makes an ideal environment for these bacteria and such water can have a very high expectation of contamination with SRB. The usual nutrients available are phosphates, sulphates and nitrates all of which are free flowing into the canal system which is a prime example of such water particularly if they are generally peritrichous polluted or running through farmland where non-organic methods of fertilization and the use of chemical fertilizers may be expected. Marinas fed by rivers are another such example and it is well known that harbour muds are highly contaminated by sulphides produced by these creatures. Sulphide films are, by their very nature, highly corrosive and the presence on steel surfaces of hydrogen sulphide can lead to corrosion rates as high as 12.8 millimetres *per annum*. One form of sulphide known as Greigite is even more corrosive and rates up to 120 millimetres *per annum* are not uncommon. In the case of elemental sulphur even that rate can be multiplied by up to eight times. The water environment can be free flowing or stagnant, fresh, brackish or salt - it seems to make no difference. At sites with low oxygen levels the reactions are generally anodic and where there are reasonably high levels of oxygen the reactions are usually cathodic. Both the temperature and the pH value of the surrounding water also affect the activity of the organisms. The bugs normally prefer ambient water temperatures of between 5 and 50 degrees Celsius and a neutral pH for growth and, again, the canal system fulfils these criteria. They can, by a form of chemical and biological metamorphism, survive the coldest of English winters and, as the wreck of the *r.m.s. TITANIC* shows, survive under enormous pressures in water with no free oxygen. See Photograph 4. The discovery by a marine surveyor of such microbiological corrosion is often difficult and requires some experience because it is not always readily visible. It is usually found under muddy and slimy surfaces, sometimes even behind paint

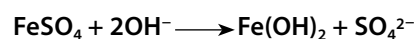
coatings and a very careful visual inspection is necessary to locate it and the marine surveyor to know exactly what he is looking for. It is not amenable to discovery by non-destructive testing such as ultrasonic thickness measurement, eddy current testing or the magnetic method familiar to most marine surveyors. Electro-chemical methods of identification such as the SIG sulphide test can be used under controlled conditions, but the techniques are usually rather difficult to apply in the field, take a long time to run and are rather unselective. They are, therefore, not very reliable. Furthermore, the bacteria are often found inside oxidised welds or at areas which contain physical defects such as porosity, overlap or lack of penetration. The common practice of not blacking the underside of the bottom plate of narrowboats in the canals, for example, can only encourage this form of corrosion and, indeed, the author has often found it on the bottom plates of such boats. If it is discovered, the only cure is to thoroughly clean the hull with high pressure fresh water, allow the hull to dry off, then to coat it with a good quality biocide (bleach), wash off again and afterward carefully recoat with a compatible paint. Within the author's experience the best paint to apply is a good quality tar epoxy with at least four coats and a minimum total thickness of at least 250 μ . An approximate method of identifying the particular bacterium found causing hull corrosion sufficient for most marine surveying needs is given in Table 1.

Gram staining which is also-called Gram's method is a method of differentiating bacterial species into two large groups (Gram positive and Gram negative) and was invented by Hans Christian Gram. It differentiates bacteria by the chemical and physical properties of their cell walls by detecting peptidoclycan which is present in a thick layer in Gram positive bacteria. A Gram positive results in a purple/blue colour while a Gram negative results in a pink/red colour.

Iron Bacterium or *Gallionella Ferruginea*

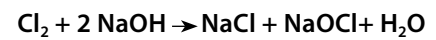
The so-called iron bacterium *Gallionella ferruginea* is an iron oxidizing chemolithotrophic bacterium (IOB) that lives in low oxygen conditions and has been found in a variety of different aquatic habitats. It has been known for about 180 years (it was first named by Ehrenberg in 1836 and was mentioned by Barnaby in his 1954 book *Basic Naval Architecture*) that these bacteria play an important part in oxidizing and fixing iron but in order to get energy out of this process, they must live in a relatively specific environment that contains reduced iron, the right amount of oxygen and sufficient amounts of carbon, phosphorus and nitrogen. The bacterium obtains its energy from carbon dioxide fixation by oxidising ferrous ions in solution to ferric ions with the consequent precipitation of ferric and, on normal shipbuilding quality mild (low carbon) steel, manganic hydroxides in the form of clearly visible tubercles on the underwater shell of the vessel. These encourage the co-accumulation of aggressive anions such as chlorides and the steel underneath will develop deep local pitting. This type of attack is often found on the lower sides and the underside of the bottom plates of narrowboats and, for example, Dutch barges used as houseboats. They were brought to public attention when Dr Robert Ballard found them on the wreck of the *r.m.s. TITANIC* and dubbed them 'rusticles' because they look like icicles made of rust. Despite the name, they are not true rust and must not be confused with it. As a direct result of the attack by the microbes which are reducing their iron at a rate of 0.30 grammes per square centimetre of area per year it is estimated that within the next one hundred and fifty years or so the remains of the *r.m.s. TITANIC* will have completely disappeared and turned into a mountain of ferrous and ferric hydroxide at the bottom of the ocean. The iron bacteria are rather like living porous concrete

and start with a threadlike polymer structure and then crystallise iron, calcium and a tiny bit of aluminium. The outer skin of the rusticle is heavy with iron that protects the resident colonies of bacteria. The outer skin grows harder and darker with age which fact helps the marine surveyor to spot newer growth. The young rusticle absorbs more and more iron from the parent source which is consumed into the communal structure. If they stop consuming they die but if they carry on consuming the ends of the rusticle becomes too heavy and breaks off and the microbes inside then die. The old ones fall off leaving a clean gap on which a new colony can start. Iron(II) hydroxide is poorly soluble (1.43×10^{-3} g/l). It precipitates from the reaction of iron(II) sulphate and hydroxide ions (from a soluble compound containing hydroxide ions).



Common household bleach or sodium hyperchloride makes a good, cheap biocide. Sodium hyperchloride is a chemical compound with the Formula NaOCl. It is commonly known as bleach and is frequently used as a disinfectant. The chemical is produced today by the Hooker process. In this process sodium hyperchloride (NaOCl) and sodium chloride (NaCl) are formed when chlorine is passed into cold and dilute sodium hydroxide solution. It is prepared

industrially by electrolysis with minimal separation between the anode and the cathode. The solution must be kept below 40°C (by cooling coils) to prevent the undesired formation of sodium chlorate.



Household bleach is a 3-6% solution of sodium hyperchloride at the time of manufacture. Strength varies from one Formulation to another and gradually decreases with long storage. Sodium hyperchloride reacts with metals gradually, such as zinc, to produce the metal's oxide or hydroxide:



A one part bleach to four parts water dilution of household bleach is effective against many bacteria and some viruses. The marine surveyor should be aware that the solution is corrosive and the treated area needs to be thoroughly washed afterwards. Sodium hyperchloride is a strong oxidizer and the products of the oxidation reactions are corrosive. He should also be aware that solutions may burn the skin and cause eye damage, particularly when used in concentrated forms. However, only solutions containing more than 40% sodium hyperchloride by weight are considered hazardous oxidizers. Solutions less than 40% are classified as a moderate oxidizing hazard.



Photograph 4 – Microbiological attack on the wreck of *r.m.s. TITANIC*

In 2010, scientists also isolated *halomonas titanicae*, a Gram negative, heterotrophic, aerobic, non-endospore forming bacterial strain and motile by peritrichous flagella, designated strain BH1T, from a 'rusticle' sample collected from the wreck of the *r.m.s. TITANIC*. The pitting from microbiological sources has a high surface area/depth ratio the sides of the pits being stepped and the bottom of the pit flat. Sulphur reducing microbes leave the bottom of the pit coated with a soft black substance, easily cut with a penknife and giving off the characteristic bad eggs smell of hydrogen sulphide. Sulphur oxidising microbes leave the bottom of the pit coated with a bright silver coloured very hard substance. The 'rusticles' left behind by the gallionella microbes form a brown powder with a hard but brittle crust. They are a mixture of ferrous [Fe(OH)₂] and ferric [Fe(OH)₃] hydroxides which are insoluble in water and are also known as ferrous or ferric hydrate or iron hydroxide. The steel underneath often has the black lustrous characteristic of ferrosferric oxide (magnetite). If full identification is needed for, say, legal purposes then a full

laboratory test is necessary. The vessel should also be fitted with an adequate number of properly electrically connected anodes whose material is suitable to the salinity of the water in which she lies. Anodes should not, of course, be painted but it is surprising how often that, even these days, one finds on surveys that that reasonably obvious rule is totally ignored particularly if the paint is applied by spray. A good practice when painting the boat is to clean the anodes all over right back to bright metal and then to coat them with soft soap or Vaseline before

applying the paint to the hull. Any paint accidentally applied to the anode surface will then wash off with the soap when the boat is floated taking the unwanted paint with it. Experience has shown that, in the absence of sulphur reducing bacteria, adequate protection of mild steel is often achieved when there are sufficient anodes such that the electric potential is depressed by -0.85V with a silver/silver chloride reference anode. Where microbial activity is high or the risk is known to be present, however, the potential must be reduced to at least -1.00 V.

Table 1 Bacteria Field Identification

Bacterium	Type	Identifier
<i>Desulfovibrio spp</i> <i>Desulfotomaculum spp</i>	Sulphur reducing bacterium SRB	Black hydrogen sulphide at the bottom of layered pitting
<i>Thiobacillus ferrooxydans spp</i>	Sulphur oxidising bacterium SOB	White tetra-hydrated ferrous sulphate at the bottom of layered pitting
<i>Gallionella ferruginea</i>	Iron oxidising bacterium IOB	Yellow/brown crusted 'rusticles' of ferric and ferrous hydroxides.

Microbially Induced Corrosion –
A. K. Tiller.
Manual of Biocorrosion –
Hector A. Videla.

REFERENCE DOCUMENTS

Antimicrobial Copper Alloys: Guidance for Selection –
Pub 214 - Copper Development Association Square
Covert, Caynham, Ludlow, Shropshire SY8 3BJ, UK



A small-scale LNG vessel design by Wärtsilä
(Source: <https://bit.ly/35hLObS>)



SMALL SHIPS: THE NEXT BIG THING

BY ANNA SHIRYAEVSKAYA
(Bloomberg)

Giant ocean-going tankers built the liquefied natural gas industry into a \$150-billion-a-year business. The next expansion opportunity may come from ships a seventh of the normal size.

Fifty-five years after the first commercial LNG tanker sailed from Algeria, this segment of the gas industry is pushing into ever more niche markets, upending the economics of energy supply in the process.

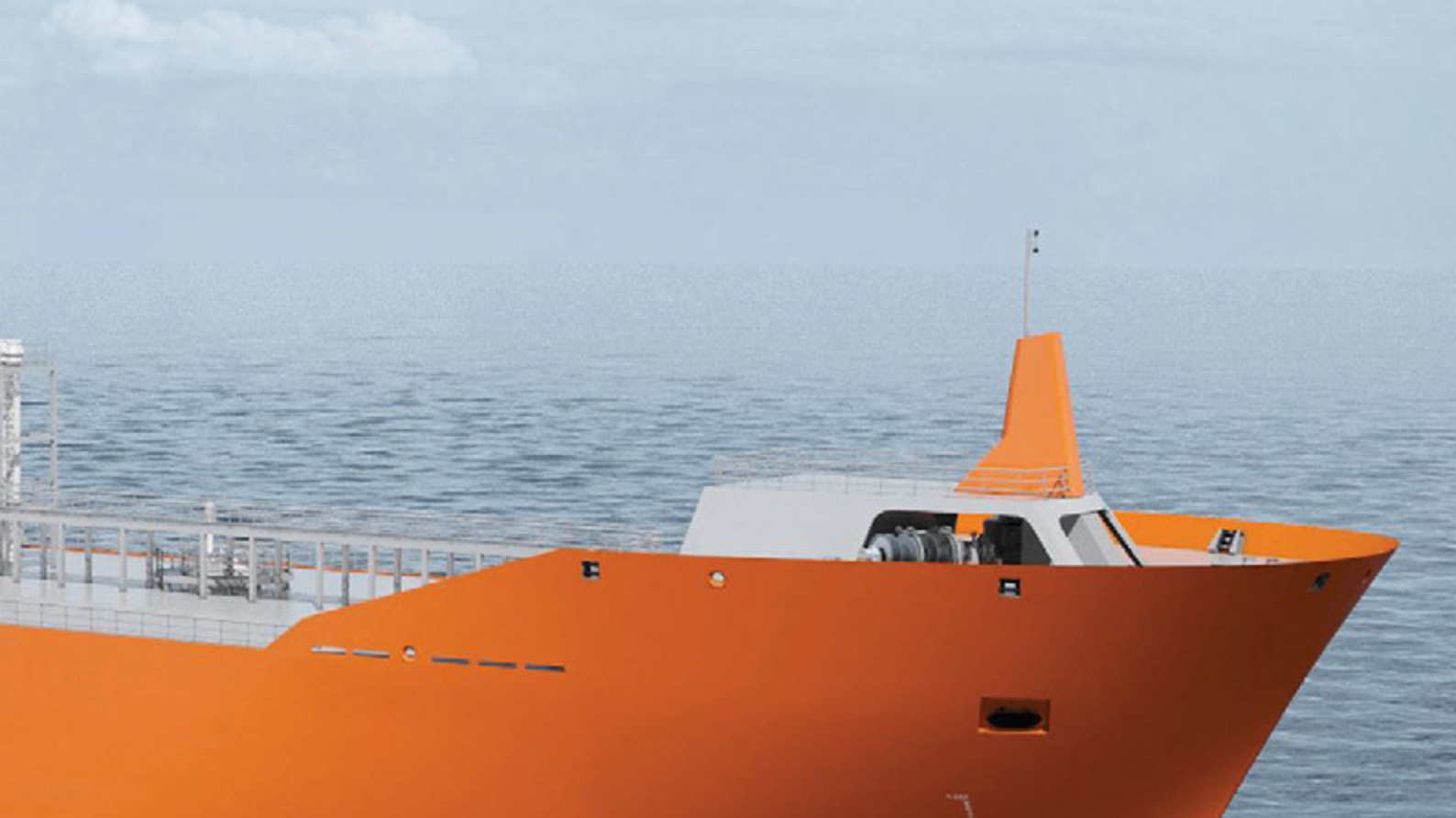
Its next leap forward will be serving customers whose ports or budgets are too small to handle regular LNG tankers. Known as small-scale LNG, the idea is to make the fuel chilled to minus 160-degrees Celsius (256 Fahrenheit) accessible to factories, trucks, ships and even households. That's set to spur production capacity growth of 58% over the next five years, more than double the pace of the industry in total.

"We are just at the end of the beginning," said Andrew Pickering, the chief executive officer of Avenir LNG Ltd, a London-based supplier set up less than a year ago to focus on the small end of the business. "Let the established players continue to develop large scale and see how we can connect the two."

LNG already is the quickest growing part of the fossil fuel industry as customers switch away from more polluting forms of energy like coal. The super-chilled fuel is helping reduce smog in cities, it's bringing affordable energy to isolated markets and even become a bargaining chip in U.S. trade talks.

The International Gas Union classifies a small-scale LNG vessel as one with capacity under 30,000 cubic meters. That's about 1/7th of the biggest tankers from Qatar, the world's biggest LNG producer.

The traditional ships helped create a global trade in the fuel, building an alternative for utilities and industrial customers to gas that arrives by pipeline. Smaller tankers can help LNG reach a growing number of buyers that only need a fraction of the cargo that a regular tanker can carry.



Not So Little League

Gas burns more cleanly than coal, giving it less prominence in the debate about how to rein in climate change. Nations from China to the U.S. are investing in LNG as an alternative that allows the flexibility that doesn't come with billion-dollar pipelines that link customers directly to often distant production fields.

With an LNG terminal, customers can take shipments from any of the countries that produce the fuel — a group as far flung as Australia, the U.S., Algeria, Angola, Qatar and Russia. As new LNG production plants come online, market players are searching for where to place the increasing supply and finding small customers can absorb great volumes.

Global small-scale production is about 25 million tons per year. That's a tiny part of the entire LNG industry, which handled more than 300 million tons last year.

Still, the small-scale end of the business may grow 6% a year, according to the IGU. Pickering expects the sector can also make better use of floating import terminals, which may yield another 100 million tons in the next 10 years.

That's caught the eye of some of the leading LNG producers. Qatar Petroleum and Royal Dutch Shell Plc and others are considering investments on the small-scale side of the industry.

OMV AG and the Italian pipeline operator Snam SpA said last month they may build a small-scale liquefaction plant in Austria to meet demand for LNG-powered trucks. Facilities for serving ferries are operating in Norway and gas-burning vessels are entering cruise ship fleets.

New Fortress Energy LLC, a venture of billionaire Wes Edens, plans to sell LNG across the Caribbean, Central America and West Africa and is already shipping the fuel to Jamaica. It's seen benefiting from the "secular natural gas demand story, which is being driven by cheap and abundant" fuel in North America, said Gregory Lewis, an analyst at brokerage BTIG LLC.

Avenir, an offshoot of shipper Stolt-Nielsen Ltd., intends to cover everything from ships and import facilities to distribution. It even hired a veteran LNG trader, Milorad Doljanin, as chief operating officer to wring as much value as possible out of supplies.

With six vessels and an LNG import terminal in Sardinia under construction, the London-based company is also looking to build in Scotland, the South Pacific and Latin America. Avenir is backed by Golar LNG Ltd. and Hoegh LNG Holdings Ltd., the biggest providers of floating terminals.

"Small scale is going to be a huge, huge part of the LNG industry going forward," Hoegh LNG CEO Sveinung Stohle said at the Oil & Money conference in London. "We are extremely bullish on this."

One big source of small-scale LNG will be from shipping as stricter regulations by the International Marine Organization on the sulfur content of marine fuel kick in from next year. LNG is one of the alternatives to replace dirtier oil product-based fuels.

"Are we too early? We think because of IMO 2020 and because the general awareness that gas is both environmentally better and clearly cheaper than conventional fuels that this is going to take off very quickly," Avenir's Pickering said. "So I'd rather be a little bit early to a party than too late."

Up to 6% of the Global Fleet Will Use Scrubbers by the End of 2020 to Comply with IMO 2020 Sulphur Cap Regulations

Environmental regulation is closing in on shipping

A few months from now, the new regulations by the International Maritime Organization (IMO) will take effect. Current sulphur exhaust is capped by the IMO at 3.5% of total exhaust by ships in most of the open seas, and 0.1% in the so-called Emission Control Areas (ECA's) along the EU and US coasts. From 1 January 2020, the maximum share of sulphur exhaust is no longer allowed to be higher than 0.5%.

For shipping companies, the three most viable options to reduce their sulphur exhaust to 0.5% are: switching to ultra-low sulphur

fuel oil (ULSFO); fitting an exhaust scrubber (a device that washes the exhaust gasses) or a switch to Liquid Natural Gas (LNG).

To ensure compliance it will be illegal for ships that are not fitted with scrubbers to have high sulphur fuel oil (HSFO) on board from 1 March 2020 onwards. The IMO is part of the United Nations and has no authority to enforce the new guidelines itself. Enforcement is delegated to national governments via annex VI of the MARPOL agreement of 1973. Till now, 59 countries have ratified this annex.

Enforcement relies on these countries and is likely to be ensured by port authorities via Port State Control Inspections (PSCI's).

Smaller ports of countries that do not have the capacity or have not ratified annex VI, may not enforce the new regulations. In particular, ports along regional shipping routes between smaller countries may lack enforcement. Therefore, shippers along these routes have an incentive for non-compliance. Industry experts said that the expectation for non-compliance is about 10% of all shipping movements.

How to comply with the new rules

1. Ultra-low sulphur fuel oils (ULSFO)

To meet the current restrictions, the majority of the shippers will switch to burning (ultra-) ultra-low sulphur fuel oils (after this ULSFO). Most ships already have a separate fuel tank and already burn (0.1% compliant) ULSFO when entering the ECA's along the European and US coasts. The ports along these coasts facilitate ULSFO bunkering. But it remains a question of how much refiner capacity is available to facilitate the mass transition to ULSFO.

Also, the different ULSFO types are not necessarily compatible. Even the same type of fuel from the same refiner but bunkered in two different locations may be incompatible. This means that a fuel tank should be more or less empty before a different ULSFO is bunkered. This requires more extensive fuel planning by engine technicians and shippers in comparison to traditional high sulphur fuel oil (HSFO).

If low sulphur fuel is unavailable in a port, vessels can get a waiver and are allowed to bunker high sulphur fuels (HSFO). However, this is also quite costly for shippers as they will need to unbunker the high sulphur fuel and clean fuel tanks at the first next port that offers bunkering of low sulphur fuels.

2. Scrubbers

The second option for compliance is fitting ships with so-called exhaust scrubbers. An exhaust scrubber is a device that cleans exhaust gasses with water. Ships with scrubber installations are allowed to run on HFSO under the new regulations. This means that they can benefit from the lower price of HSFO.

Most common are open-loop scrubbers that wash the exhaust with seawater and dispose of the wastewater after some cleaning back in the sea. This reduces the amount of chemicals to be disposed of onshore. Alternatively, there are closed-loop scrubbers

that store the scrubbing waste on board. In addition, there are also hybrid scrubbers that can do both.

Closed-loop scrubbers require ship owners to dispose of the exhaust waste, which is difficult and costly. However, open-loop scrubbers are a source of environmental concerns. The chemicals and exhaust waste washed into the sea are reasons for large ports to prohibit the use of scrubbers in their waters. In addition, there are concerns about a possible future prohibition of open-loop scrubbers by the IMO. Although industry experts say that any regulation by the IMO will only target new scrubber installations and not existing ones, considerable uncertainty remains as to how long scrubbers will be allowed. This is especially the case given the IMO 2050 cut in carbon exhaust to 50% of 2008 levels.

3. Liquid Natural Gas (LNG)

LNG is a particular type of ULSFO. Switching to LNG requires a more intensive and costly conversion process compared to the other solutions. It requires a modification of the engine that may not be possible for every ship that is not LNG-ready. In addition, LNG bunkering infrastructure is lacking and unavailable in most ports. Therefore, a backup fuel tank needs to be present. The installation of a separate gas tank means that, often, transport capacity will be lost and that the ship, likely, will need to be rebalanced. This is a costly process to keep a ship idle for a while. On a large scale, LNG only seems a viable consideration for new-build ships. New ships will face the problem that few ports offer LNG bunkering infrastructure. LNG is environmentally the cleanest option, as carbon exhaust is about 20% less than with traditional fuels. Despite being momentarily the cleanest solution, LNG is not compatible with the IMO 2050 carbon cut of 50%.



The costs of ultra-low sulphur fuel oil (ULSFO)

In the months up to the imposition of the new sulphur limit, most ships will switch to burning ULSFO. After this switch, it will still take a couple of months before the sulphur exhaust by ships decreases to 0.5%. This is because it takes a while before the remains of high sulphur fuel oil (HSFO) in the tanks wash away. Switching too late to ULSFO will mean that shippers will need to have the fuel tank cleaned to meet the rules by 1 January, which is a costly process.

The cheapest option for compliant fuel will be 0.5% compliant ULSFO blends. Unfortunately, there are currently no reliable market forward rates[1] for these fuels yet. Therefore, we look at the forward rate of 0.1% compliant Marine Gas Oil (MGO), which is more expensive. Currently, 0.5% compliant ULSFO is trading US\$90 per ton cheaper than 0.1% compliant MGO. Therefore, we assume that the spread between the forward rates of 0.5% compliant

ULSFO and HSFO would be up to US\$100 less than the forward spread between ULSFO and MGO.

We expect that the price difference between MGO and 0.5% compliant ULSFO will initially become smaller as demand for 0.5% fuel oil will be higher since this is the cheapest option. As supply catches up with demand, the price difference will slide back to what we observe currently. Our estimated bandwidth for the 0.5% ULSFO – HSFO price spread is US\$165 to US\$300.

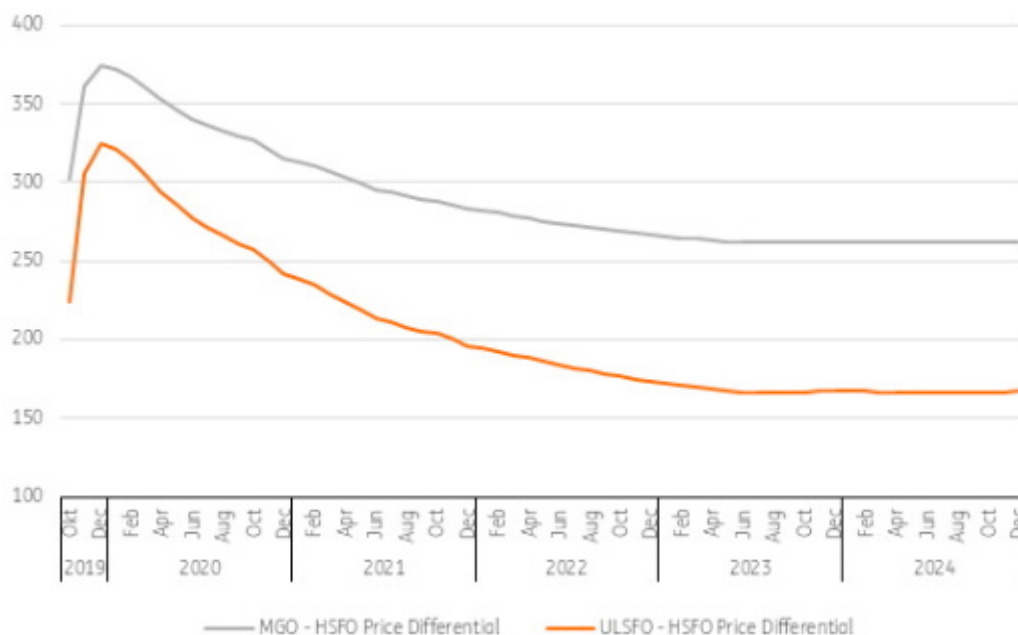
In anticipation of the regulation, most ships will switch to ULSFO in the last quarter of 2019. This is reflected in the steep widening of the price spread between the prices of low sulphur fuels and high sulphur fuel (Figure 1). On one hand, higher demand for ULSFO oils will push up its price. On the other hand, lower demand for HSFO will lead to lower prices of heavy fuels. In particular, because HSFO is a residual product with limited options for other use.

In the medium term, the price difference is expected to narrow again (Figure 1). As refineries are adjusting their supply to the increased demand, prices of ULSFO are expected to decrease a bit. On the other hand, as more refineries upgrade cracking capabilities (the ability to further refine HSFO), demand and prices of HSFO are expected to rise again.

How will the industry cope with higher fuel prices

It is expected that most container shippers will try to pass through the higher fuel costs to their clients. Depending on ship type and route, the increase in freight rates is expected to be up to 25% (see Annex ii). However, due to overcapacity, the

Figure 1: Expected price difference in high sulfur fuels and IMO 2020 complaint fuels



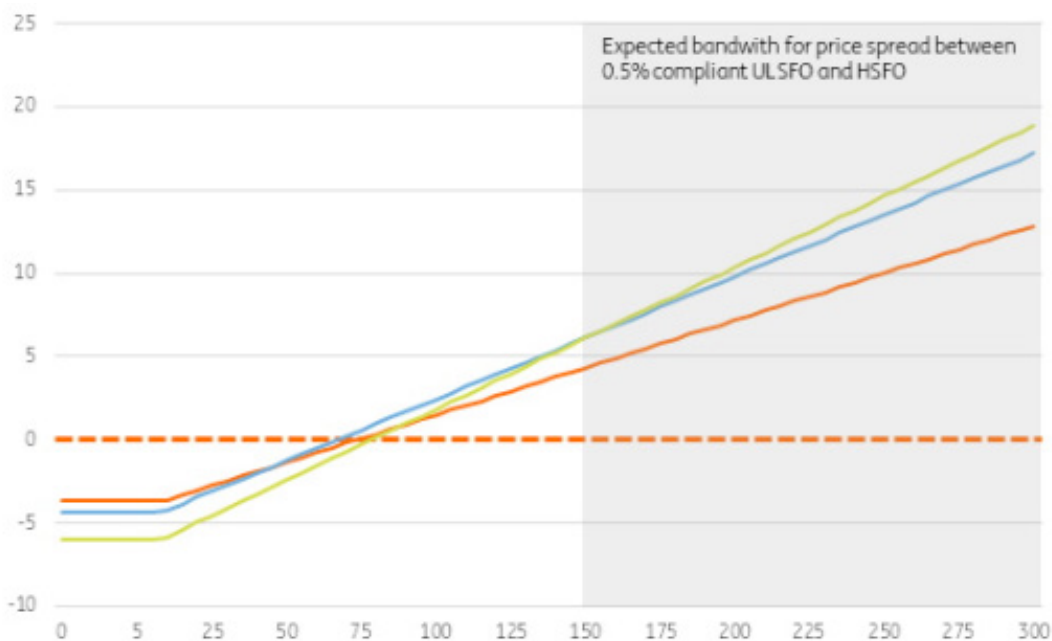
Difference in forward prices between 0.1% compliant gasoil (MGO) and HSFO. Price difference between ULSFO HSFO is an ING estimate. Spreads in US\$ per Metric ton (mt) of fuel. Source: Bloomberg, ING Research

use of scrubbers and competition, the increase may be less. Another way shippers could deal with higher fuel prices is by reducing speed. Since fuel consumption is an exponential function of speed, shippers will be able to cut their fuel bills considerably by reducing speed. Depending on the extent to which this may occur, reducing speed potentially reduces shipping capacity as well as the supply of containers.

Scrubber Economics

Scrubber installations allow the shipowner/operators to surf the spread between low and ULSFOs. The spread between the two types of fuel can be considered as the gross-income of investing in a scrubber. The larger the price difference between ULSFO and HSFO, the more attractive scrubbers are.

Figure 2: NPV for large vessels (five year investment horizon)



NPV in US\$m for a given fuel price differential between ULSFO and HSFO. Ships with a deadweight tonnage > 100,000. Source: ING Research

The investment appraisal of a scrubber

The most important costs associated with scrubbers are:

- Investment costs, which are the costs of fitting the scrubber and the opportunity costs of the ship being idle during the installation works.
- Operating costs that are made up of additional fuel use to power the scrubber, maintenance costs, the costs of disposing of waste chemicals, and financing costs.

On the basis of this information a net present value (NPV)[1] of the investment in a scrubber can be computed for different ship types and a rough comparison can be made. The NPV of a scrubber varies with the spread between HSFO and ULSFO and per ship type.

We computed an expected NPV, using a bandwidth for the expected average fuel spread between HSFO and 0.5% compliant ULSFO of US\$150 to US\$300.

Box i: Objections to scrubbers

- Environmental concerns:

Open-loop scrubbers wash exhaust gasses with seawater. Although the emitted sulphur may not be blasted into the air, it raises concerns about wastewater discharged in the seas. As of now, the environmental effects of open-loop scrubbers are not clear and more scientific studies are needed on the effects.

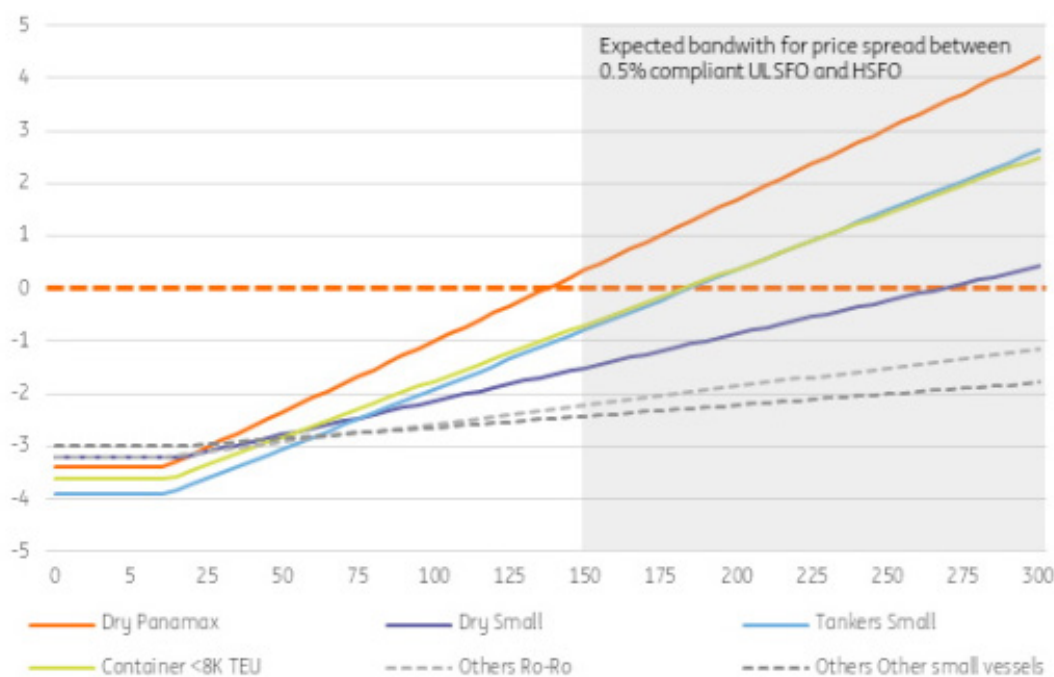
- Inefficiency and higher CO2 emissions:

Scrubbing is argued to be an inefficient industry model. Instead of removing sulphur at the refinery stage with all the scale benefits, individual ships will be converted into small factories that isolate the sulphur. Since the desulphurization process is taking place less efficiently, the CO2 footprint of a ship fitted with a scrubber increases.

For the NPV we assume a Weighted Average Cost of Capital (WACC) of 8.08% [1], a five-year project horizon and no rest value or further use of the scrubber beyond that term. We find a NPV of US\$5 million to US\$20 million for the investment in scrubbers for larger ship types (Figure 2). Large ships can achieve a positive NPV investment within the first 2 years with a spread above US\$150 and within the first 4 years with a spread above US\$100.



Figure 3: NPV for small vessels (five year investment horizon)



NPV in US\$m for a given fuel price differential between ULSFO and HSFO. Ships with a deadweight tonnage < 100,000. Source: ING Research

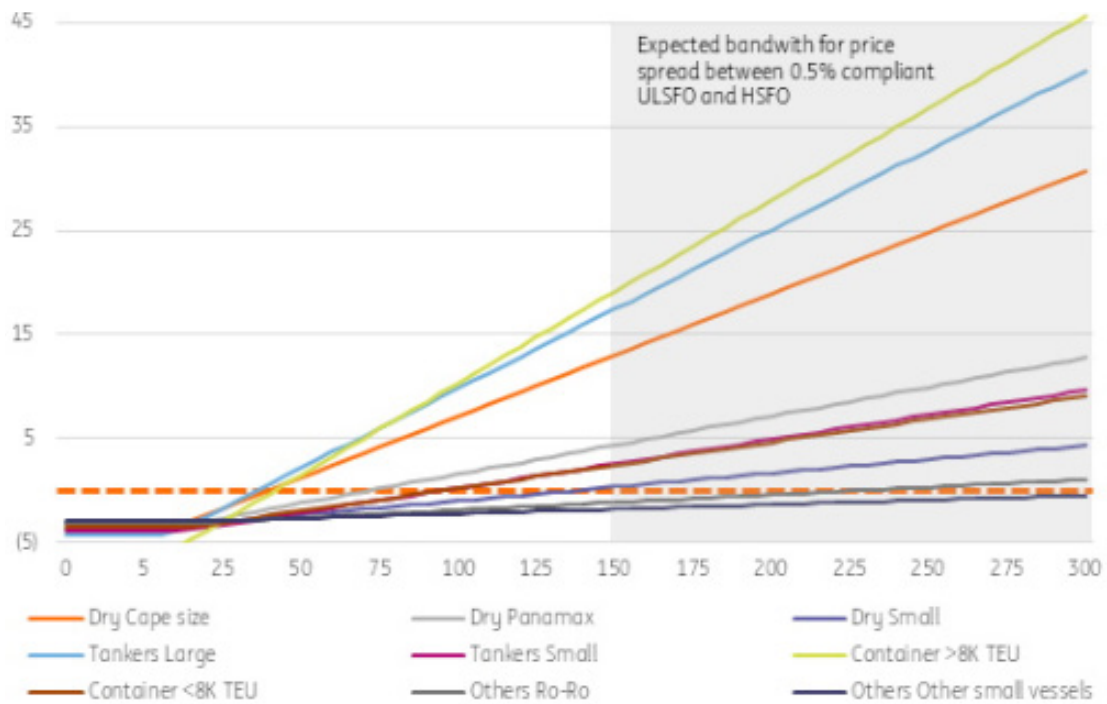
For smaller ships, the NPV's are considerably lower. For most Panamax vessels and smaller, the NPV varies between -US\$1 million and US\$5 million. Small tankers and small container vessels only have positive NPV from a spread of US\$185. If the spread were to be lower, there is the risk of a negative NPV for these ships over a planning horizon of five years. For Small dry bulk carriers, the NPV is negative for the majority of the expected spread. Role on and Role off (Ro-Ro) vessels and other small ships

show a negative NPV for any given spread (Figure 3).

If we assume a longer life span of scrubbers we can easily get higher values for the NPV. Figure 4 shows that with a life span of 15 years scrubbers on smaller ship sizes become economically viable for lower spreads. However, there are two major uncertainties: It is unknown how the spread between HSFO and ULSFOs will develop and the uncertainty increases significantly

with time. It can very well be that the spread between high and ULSFO becomes smaller over time due to new innovations by refineries. The second major uncertainty is future regulation that restricts the use of scrubbers. Although it has been said that new IMO regulations will not affect the use of existing scrubbers, there are no guarantees. Especially since attention for environmental standards and climate change is growing globally.

Figure 4: NPV of all vessels (planning horizon of 15 years)



NPV in US\$m for a given fuel price differential between ULSFO and HSFO. Source: ING Research

Adoption of scrubbers

Figure 2 and Figure 4 show that especially for large ships, scrubbers are a yielding investment. If the spread remains between the US\$150 and US\$300, most Panamax size vessels and larger will install scrubbers (Panamax size vessels include container ships larger than 5K TEU and comparable tankers). Due to the uncertainty about the fuel spread between compliant fuel and ULSFOs, purchases of scrubbers are expected to remain limited for the smallest ship sizes.

If the spread remains high, more ships may invest in scrubbers. This fuels demand for HFSO and thereby reduces the price differential between ULSFO and HFSO.

Despite high returns, not all large vessels are switching to scrubbers at 1 January 2020. This is partly rooted in the wait-and-see mentality of the industry, the objections discussed in Box I and dry dock planning. But also at play, is the lack of capacity to install scrubbers. Even if shippers are

willing to invest in scrubbers, there is a waiting list at the major suppliers. Some shippers will first switch to ULSFO before installing a scrubber later in 2020 or thereafter. Therefore, the use of scrubbers will continue to increase after 1 January 2020.



Box ii: Which side of a charter contract will reap the scrubbers' profits?

Where ship owners charter-out ships with scrubbers to other parties, the question arises: who will reap the benefits from the scrubber installation? The answer to this will depend on the specific location and term for when the ship is chartered. If charterers can choose from multiple vessels with scrubbers from different owners for a particular location and term, some competition will arise. Competition between the shippers will drive down the charter rates of ships with scrubber installation below those of ships without scrubbers. For small ships, we expect that only a small share of the world's fleet will be fitted with scrubbers. Therefore, competition between scrubber-fitted vessels (from different owners), will remain limited for smaller ships. This means that most of the time the ship owner will profit from the scrubber. However, for the large ship types, competition may drive down prices on some occasions.

The environmental road ahead – the next big thing

Currently, the number of scrubbers on order is somewhere around 600 units and 3,500 scrubbers have already been installed. The view of analysts is that over 4,000 scrubbers will be installed by January 2020, which is approximately 11% of the global fleet by tonnage and 4.5% by vessel count. This is expected to increase to 15% of the global fleet by weight towards the end of 2020 (over 6% by vessel count). Following from the NPV analysis adoption will be the highest among the largest ship types.

All in all, on scrubbers can be a lucrative investment (also beyond 2020) if they are fitted on large vessels. Smaller vessels may be better off switching to ULSFO. Despite being a lucrative investment compared to having to switch to low sulphur fuels, scrubbers still imply a higher fuel bill, relative to the current situation. All else equal, this would also mean that vessels with scrubbers may sail at lower speeds to limit the rise in fuel costs.

The IMO 2020 sulphur cap is a major step in improving the air quality of exhaust gasses. This has far-reaching implications for the industry as we have seen. From 2020 onwards, however, the focus in shipping will shift towards climate action. In 2018 member countries within the IMO agreed to cut carbon emissions by 50% in 2050 versus 2008. Although shipping lags other sectors in this goal-setting, this will even be much more challenging.

Maersk, one of the leading shipping companies, has the ambition to move even faster to catch up with the Paris climate goals. Currently, no realistic techniques are available yet to meet the IMO 2050 regulations. Improving fuel efficiency and ship design have potential and will be the first focus. Transition fuel blends of biofuel and LNG will probably be the next call. Finally, future replacement

options might be: synthetic fuels, methanol and hydrogen. However, these options require a lot of research and innovation before they become technically and economically viable. Depending on the dominant solution, this will also require substantial investments in different ship configurations.

For the medium term, scrubbers can be a lucrative investment if they are fitted on larger vessels. Smaller vessels (smaller than Panamax) may be better off switching to ULSFO. The increased fuel bill resulting from the transition to scrubbers or ULSFO will drive up transport prices. However, shippers may reduce shipping speed in order to limit the price increase and save fuel costs. If this would happen on a large scale, this potentially restricts the shipping capacity of the world's fleet.



Annexes

Annex i.a: Assumptions for different ship types used in NPV calculation.

Ship category	Ship size	Dead weight Tonne	Ship count in 1000s	Average fuel consumption in tn's per day (incl. idling)	Scrubber costs	
					CAPEX (US\$m)	OPEX (US\$1000 pa.)
Dry bulk	Cape	Large>100,000	1.7	40	3.7	62
	Panamax	Small<100,000	2.5	19	3.4	38
	Other	Small<100,000	7	9	3.2	26
Tankers	large	Large>100,000	2.7	52	3.9	77
	small	Small<100,000	11.8	16	3.4	35
Container	> 8k TEU	Large>100,000	1	60	4.4	89
	< 8k TEU	Small<100,000	4.3	15	3.6	34
Ro-Ro + Px	all	Small<100,000	9.6	5	3.2	21
General	all	Small<100,000	15.1	3	3	17

Source: Goldman Sachs and ING

Annex i.b: Formula NPV calculation

$$NPV = \left(\sum_{t=0}^{\text{planning horizon}} (1 - WACC)^t * i(\text{Fuel consumption} * \text{fuel spread}) - i(\text{operating costs scrubber}) \right) - \text{Investment outlays}$$

$$\text{Where: } i = \begin{cases} 1 & \text{if } (\text{Fuel Consumption} * \text{fuel spread}) > \text{Operating costs scrubber} \\ 0 & \text{if } (\text{Fuel Consumption} * \text{fuel spread}) \leq \text{Operating costs scrubber} \end{cases}$$

Annex ii. Increase in transport costs

A price increase of up to 25% is a rough estimate. Assuming that a container ship carries about 12,000TEU from Shanghai to Rotterdam, being on route for 30 days, burning 400ton fuel per day. The extra fuel bill is approximately US\$250 per container (assuming a spread of US\$250, 400t*US\$250*30days = US\$ 3,000,000, 3,000,000/12,000teu = US\$250). Assuming the price of shipping 20ft container from Shanghai to Rotterdam is about US\$1000 per TEU, the increase in freight costs would be about 25% if the full price is fully billed to clients. Fuel consumption of 400ton per day on cruising speeds are common, but new, more energy-efficient vessels, are able to burn half or even less than half the fuel. These ships would also see halve the extra full costs per container.

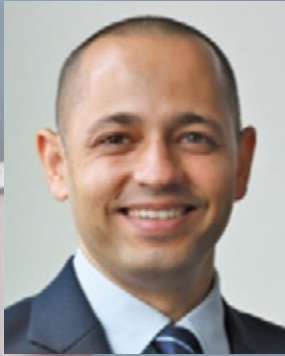
Assumptions about fuel economy are taken from Transportation, Environment, and Society, by Dušan Teodorović, Milan Janić, in Transportation Engineering, 2017

Attributions:

For this study we spoke with various industry experts including Harry Vasse (BEBEKA), Ronald Backers (Port of Rotterdam), Nick Lurkin (KVNR), Stefan Engel (Structured finance, shipping, ING), and Warren Patterson (Commodity Analyst, ING)

Source: ING. Rebulished here courtesy of ING.

Learning as we go: challenges with the use of exhaust gas scrubbers



BY **SIDDHARTH MAHAJAN**
Loss Prevention Executive Asia,
Singapore, Gard P&I Club

IMO 2020 is fast approaching and it is estimated that nearly 3,000 vessels will have scrubbers installed by 2020. For the majority of owners and their crew members, scrubber systems are new technology and, as with any new system, teething problems can be expected.

Compliant fuels too, would bring about their own challenges.

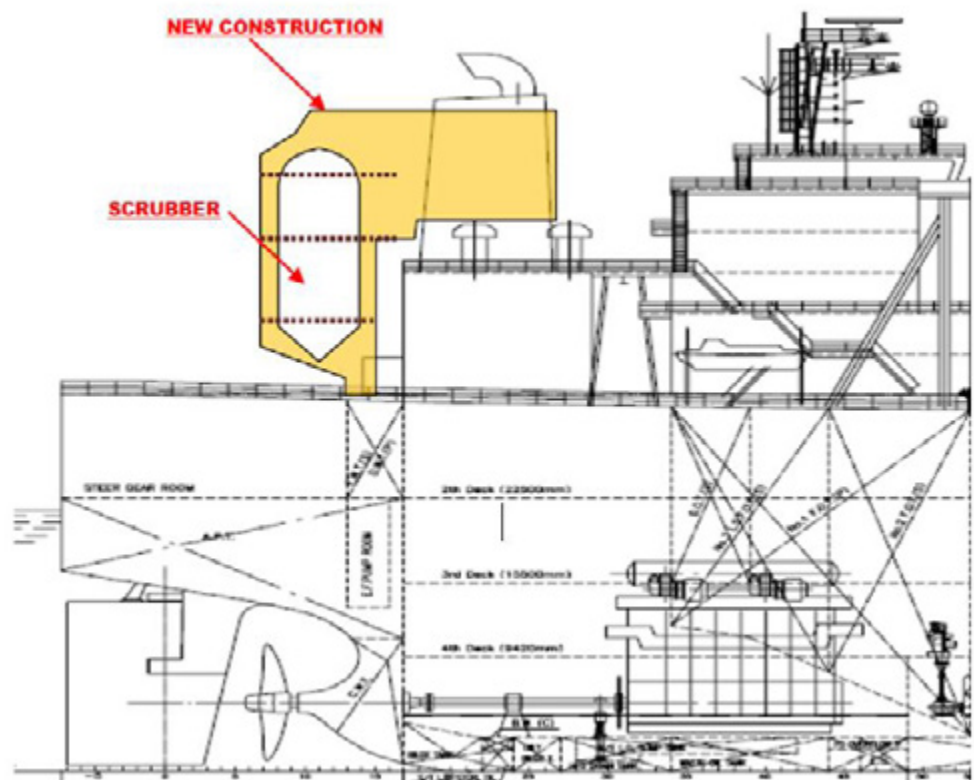
Gard has handled a few scrubber related claims and in this article, we look back at cases where there has been a breakdown of or damage to or by the scrubber.

FIRE DURING RETROFITTING OF SCRUBBER

Scrubber installation requires extensive hot work to facilitate the extension of the funnel area and attaching the scrubber tower to the vessel's structure.

There are concerns associated with both of the two most popular options to comply with IMO 2020; use of compliant fuels and SOx Exhaust Gas Cleaning Systems (EGCS), often referred to as scrubbers. However, what is important is that after an incident has occurred, the maritime industry learns and prevents similar cases in the future.

General view of scrubber retrofitting area



Gard has seen a few fire incidents where sparks from welding, metal cutting, and other hot work activities fell into the inner chamber of the scrubber through uncovered openings, and in one case the fire also spread to the engine room through glass reinforced epoxy (GRE) piping. Heat generated from the steel cutting for the supporting brackets, also contributed to the build-up of heat inside the scrubber. In all these cases the yard firefighting team responded and extinguished the fire with vital assistance from crew.

Photographs of fire damage



Burnt mist eliminator



Damaged scrubber

Later investigations revealed that crew had requested that the yard to cover the openings but this was not done. The fire risk to scrubber packing during the hot work activity had not been identified by yard personnel, and many of them were not aware that internal components of the scrubber were combustible. These fire incidents arising from shortcomings in hotwork safety procedures are not peculiar to scrubbers and can occur in any location onboard a ship where welding, cutting or grinding works are undertaken.



SEA WATER INGRESS DUE TO CORROSION

Scrubber waste is corrosive, and we have seen a few incidents where within 10-15 months of the open loop scrubber being installed, corrosion of overboard distance piece or in its immediate vicinity has resulted in water ingress into areas such as the engine room, ballast tanks and cargo holds. Absence of or poor application of protective coatings on the inside of the pipe and at the welds, along with poor application of paint on hull plating near the washwater discharge were identified as the causes of accelerated corrosion. In all these cases, temporary repairs to plug the leak were carried out by divers followed by permanent repairs at a yard.

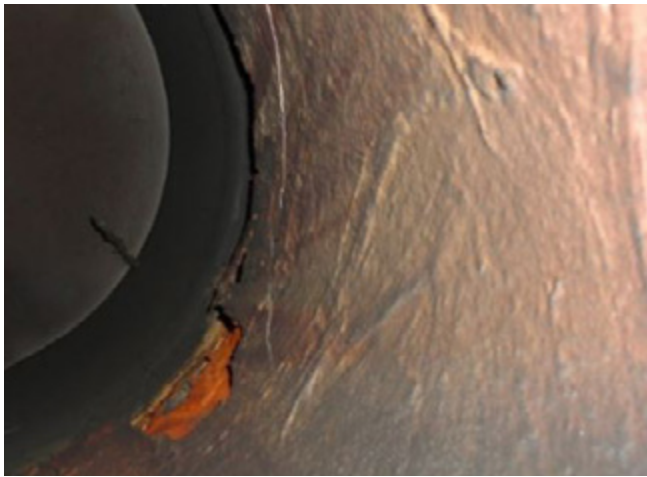
Photographs of damages



Cracks near distance piece leading to water ingress



Temporary repairs on hull performed by diver on another vessel



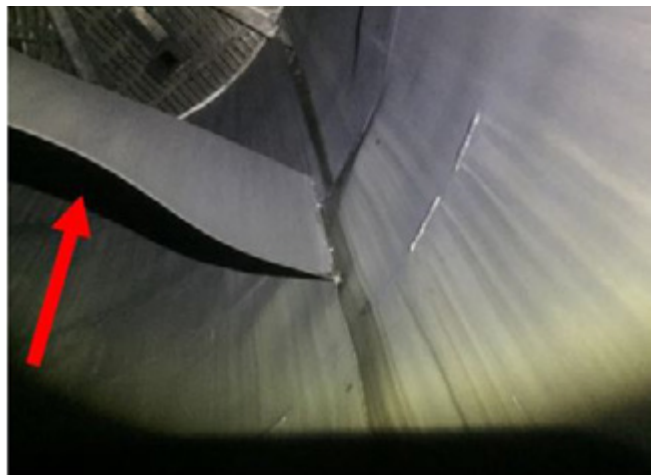
Protective coating inside disch. pipe flaking off a flange

SCRUBBER DAMAGE DUE TO POOR WORKMANSHIP AND THERMAL SHOCK

A vessel was regularly trading in Northern Europe and had installed an open loop scrubber. It had to changeover to low sulphur fuel when visiting a port that had regulations in place banning discharge of washwater from open loop scrubbers. It was still required to run the scrubber in dry mode, i.e. with washwater supply pumps turned off, to allow for the passage of hot exhaust gasses with a temperature of nearly 400° C. After departure from port, washwater pumps would be started and cold sea water sprayed through the nozzles inside the scrubber. During inspection of the scrubber by crew, damage was noticed to the nozzles, demister housing and the drains.



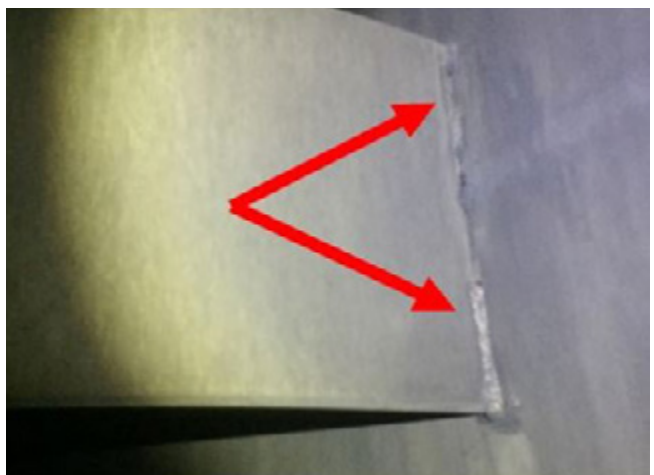
Photographs of damages



Cracks near distance piece leading to water ingress



Temporary repairs on hull performed by diver on another vessel



Protective coating inside disch. pipe flaking off a flange

A survey was carried out and indicated a variety of concurrent causes, such as thermal shock, poor workmanship by the yard, for example, only spot welding done on demister supporting plates; and poor design. The scrubber had been in service for nearly two years.

RECOMMENDATIONS

As any other equipment or machinery onboard the ship, scrubbers are not immune from breakdown and damage. For the incidents discussed above, our recommendations would be:

- Fires during retrofitting: Fire risks can be mitigated if hot work safety procedures are followed. The risk assessments carried out prior to the work should cover which parts of the scrubbers are flammable. These should be protected during the hot work by covering any openings to prevent sparks from finding their way to these parts. Measures should also be put in place to prevent transfer of any heat generated during metal cutting, welding, grinding, and other hot work activities. Owners should ensure that yard workers, who will ultimately be undertaking these hotwork activities are aware of these risks and appropriate barriers are put in place to shield these areas. Crew members are advised to not rely solely on the yard safety watchman, but to monitor the hot work activities themselves. Firefighting equipment should be maintained in a ready to use state and crew should be familiar with how to use them.
- Ingress of water due to corrosion: The metallic distance piece is normally coated for enhanced protection. There should be a regime to measure the wall thickness. For many classification societies, such as DNV-GL (Class rules, Part 7, Ch. 1, Section 2, pt.3.1.9) this is a survey item. Any reduction in thickness is indicative of a breakdown of the coating. For leakages from welded joints and holes or cracks in the hull, the quality of workmanship and the paint application should be scrutinised. Also, the bilge alarm and pumping arrangements should be checked regularly so that the crew is alerted of and can respond to any water ingress.
- Damage due to poor workmanship and thermal shock: When in operation, the scrubber unit will be subject to different types of stresses, which will test the quality of the welding and housing structure. Supervision by owners during the time of installation can help mitigate this risk. With regards to design related issues, owners are recommended to have a dialogue with manufacturers to mitigate such risks. In this particular case of thermal shock, as preventive action, shipowners changed the design and installed a water-cooling system for the scrubber which will continuously run in a closed loop when the scrubber is operating in dry mode.

As a general note, owners should also consider approaching their scrubber manufacturers and request them to regularly share technical failure related scrubber incidents occurring on ships belonging to other owners.

In time, managers, their crew, and the manufacturers gain more experience in such matters and the frequency of such incidents will decrease. Until that time, it is important for the industry to share the lessons learned from scrubber related breakdowns to benefit the industry overall.



This article was first published on the Gard website at <https://bit.ly/32rmuPy> and is reprinted here with their kind permission.

ABOUT GARD

Assuranceforeningen Gard was founded in Norway in 1907. The establishment of this new marine mutual reflected the historical importance of Arendal as a shipping centre, but it was also driven by owners of sailing ships' reluctance to subsidise the liabilities arising from steam operations. Although Gard's P&I business has its origins from this period, its marine activities can be traced back to as far as 1867 with the establishment of Æolus, which later became part of the Storebrand group.

With time, the importance of Arendal as a major Norwegian shipping hub began to wane and also the Second World War took a heavy toll on the Association's owners. As a result, by 1945, the Gard's membership had shrunk severely. In the post-war period, Gard progressively regained its position as a major P&I Club. This development was characterised by two factors, the substantial growth of the Norwegian national fleet between 1950 and 1970, and the increasingly international nature of the membership. While the Association retains its Norwegian identity, it has become a global P&I club, where less than 30% of the current entered tonnage is Norwegian owned or controlled.



Marine Surveying International FEST 2019

O V E R **II** D A Y S

Tuesday 10th December

Thursday 12th December

**Yacht & Small
Craft Surveyors**

**Commercial
Ship Surveyors**

Each day is an online only event and will be anchored and hosted from the IIMS head office in the UK, from 06.00 to 18:00 (London UK time). Each hour on the hour, a new presentation will be delivered on a surveying related or relevant business topic.

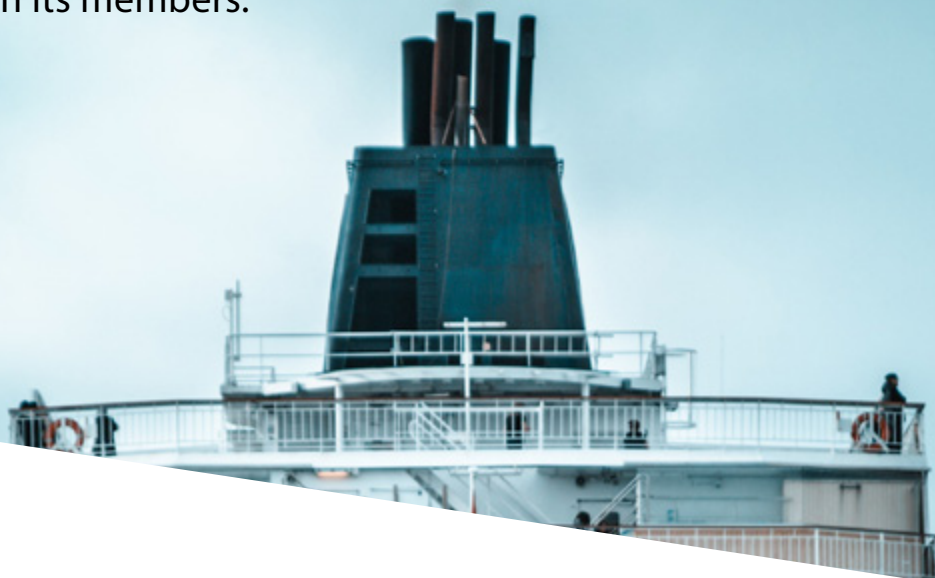
For more details visit the relevant link below:

<https://bit.ly/374jmfc>

<https://bit.ly/2CLfMIM>

Use of IMO 2020 Compliant Fuels

With just a few weeks to go until the introduction of the 0.50% global sulphur cap, The Standard P&I Club has issued this advice to its members to provide clarity on their compliance strategy to meet the new IMO 2020 regulations. IIMS is pleased to share this valuable information and advice with its members.



For those who have chosen to achieve compliance by using low sulphur fuel oil, this article serves to understand the specific aspects and variabilities of the 0.50% fuels. Multiple fuels are expected to bring uncertainty post-2020 and running engines reliably and safely will inevitably require greater understanding and more sophisticated fuel handling strategies than today.

A proactive approach will need to be implemented when addressing these issues. This can be achieved by making sure that the relevant ship and shore staff are aware of the fuel characteristics and efficiently manage the requirements related to the fuel oil storage, segregation, handling, switching, treatment and usage onboard.

Bunker Fuel Terminology

There are two basic types of marine fuels – distillate and residual. A third type is a mixture of these two, colloquially known as ‘intermediate’.

Distillate fuel, commonly called marine gas oil (MGO), is composed of petroleum fractions that are separated from crude oil in a refinery with a ‘distillation’ process.

Residual fuel, or heavy fuel oil (HFO), is comprised of process residues – the fractions that did not boil – and has an asphaltene content of between 3-10%. HFO also includes other products such as high sulphur fuel oil (HSFO), low sulphur fuel oil (LSFO) and ultra-low sulphur fuel oil (ULSFO).

The blends of distillates and residual fuel are described as marine diesel oil (MDO) or intermediate fuel oils (IFO). In practice, ‘marine diesel oil’ refers specifically to blends with a very low proportion of heavy fuel oil.

With IMO 2020 there is a likelihood of a number of different fuels with differing properties being sold under the umbrella term of very low sulphur fuel oil (VLSFO). These might be blends of distillates and residuals, or they might come from less traditional streams from the refinery process or by using new refining techniques.

Standards for Compliant Fuel

An assessment of the quality of a supplied fuel may be divided into three categories:

1. Statutory requirements: SOLAS Chapter II-2 and Regulations 14 and 18.3 of MARPOL Annex VI include mandatory specific requirements for parameters such as flashpoint and sulphur content, as well as mandatory general provisions for fuel oil quality and safety. Verification of compliance with these requirements falls within the jurisdiction of the Port State in which the suppliers are registered.

2. Defined limits: The basic requirements for marine fuels are defined in the International Organization for Standardization (ISO) 8217 standard. Fuel oil suppliers are expected to supply fuel which meets the limits in respect of certain physical properties, composition or performance indicators – as given in the Table 1 (distillate fuels) or Table 2 (residual marine fuels) test requirements of the ISO 8217 standard. In accordance with ISO 8217, residual fuels are categorised into six fuel types depending on their kinematic viscosity (RMA, RMB, RMD, RME, RMG and RMK); while distillate fuels are characterised as (DMX, DMA, DFA, DMZ, DFZ, DMB and DFB).

3. General requirements: Apart from the statutory and defined limits, the fuel oil supplied must

be acceptable for use and should not contain harmful or damaging materials in concentrations that may cause damage as defined in Clause 5 of ISO 8217 and Regulation 18.3 of MARPOL Annex VI. Clause 5 of ISO 8217 differs in each edition (2017 being the current) but in general terms it requires the fuel delivered to be a homogenous blend and free from materials that could cause harm to an engine or people.

Similar requirements are also included in Regulation 18.3.1 of the MARPOL Annex VI, which states that:

The fuel oil shall not include any added substance or chemical waste which either:

- (a) jeopardizes the safety of ships or adversely affects the performance of the machinery; or
- (b) is harmful to personnel; or
- (c) contributes overall to additional air pollution.

ISO has recently published a Publicly Available Specification (PAS) 23263:2019 to help deal with new VLSFO products. The document does not include any new fuel specifications or an updated table; and is designed to be used in conjunction with ISO 8217. It provides general consideration on the expected characteristics of the known new fuel products as well as providing guidance on stability and compatibility.

Distillate Fuel with FAME Content

In some locations, bunker suppliers may only be able to offer automotive diesel fuel containing biodiesel or Fatty Acid Methyl Ester (FAME) in accordance with the ISO 8217:2017 standard which provides a marine biodiesel specification (DFA/DFB) with up to 7.0% by volume of FAME.

In preparation for these situations, members are advised to check with their bunker suppliers on the extent to which biodiesel or FAME is in a fuel stem. It is recommended that shipowners and operators consult manufacturers of engines, boilers and other auxiliary equipment such as oily water separators, filters etc. in order to ensure their ability to handle these kinds of fuels.

Such fuels should be analyzed to check the total acid number (TAN) and oxidation stability. This should also include checks to determine if there is a presence of microbial contamination.

It is recommended to avoid storage periods in excess of six months to avoid fuel oxidation and degradation that could damage equipment if used in this condition.

Further information on handling these fuels can be accessed through CIMAC's 'Guideline for Ship Owners and Operators on Managing Distillate Fuels up to 7.0 % v/v FAME (Biodiesel)' available on the right.



New Fuel Risks

Industry wide there has been some flow of information about compliant fuel availability, product offering and regional supply locations. Some of the fuel testing companies have been able to sample some of the available new compliant fuel blends; however, this has been on a very limited scope so far. Anticipated issues with the new blended 0.50% sulphur fuels are:

Stability issues due to heavy blending

Stability is the potential for a fuel to change condition in storage in certain circumstances, depending on its resistance to breakdown. Bulk fuel stored for long periods can become unstable – the asphaltene content can precipitate out of solution causing the formation of sludge. This has the potential to block filters and pipes, leaving tanks with an unpumpable residue.

The 'break up' is dependent on the nature of the liquid hydrocarbons in which the asphaltenes are suspended. If the medium is aromatic (hydrocarbons in ring formation) then they will remain in suspension but if it is paraffinic (linear hydrocarbon formation) the asphaltenes may have a propensity to coalesce into sludge. Once a fuel has chemically broken down there is no way to satisfactorily reverse the process. Precipitated asphaltene cannot be re-dissolved.

Compatibility issues due to use of complex fuel blends

Compatibility is the tendency of fuels to produce deposits when mixed. The issue may immediately occur when fuels comingle. Individually, the new fuels may pass the stability criteria of the ISO 8217 but become unstable when mixed together – therefore incompatible. The composition of blends is anticipated to vary significantly between regions. These differences raise a serious concern of

incompatibility; and not just incompatibility between different products but even between batches of the same product.

Incompatibility results in sludge formation caused by precipitation of asphaltenes. This leads to blocking of filters, centrifugal separators and, in extreme cases, fuel pipes. The risk of losing propulsion or electrical power becomes very high.

In practice it is often not possible to ensure against a degree of comingling and although the rule of thumb is not to comingle or load on top in excess of 20% mix ratio, the only way to ensure there are no issues is to test a sample mix.

Testing for stability and compatibility

A number of options have been made available over the years for on-board testing (using portable test kits) to assess aspects like compatibility, viscosity, density, water and catalyst fines. However, such units are only able to provide indications. While such indications could prove useful and important, they do not provide a basis on which to challenge whether the specification has been met, or to inform decisions as to whether a fuel should be considered usable or unusable, unless the results are confirmed by an analysis at an accredited shore-based laboratory.

On the ship, one of the good ways to measure the compatibility of marine fuels is the ASTM D4740 spot test. For this test a blend composed of representative volumes of the sample fuel and the blend stock is heated and homogenized. The ideal percentage mix is 50/50 as this is the worst-case scenario.

A drop of the blend is put on a test paper and heated to 100°C. After 1 hour, the test paper is removed from the oven and the resultant spot is examined for evidence of precipitation and rated for compatibility against D4740 reference spots.

Other concerns

- Cold flow properties – significant operational problems may arise if supplied fuels are inappropriate for the ambient conditions. New blended products with a high distillate content are more paraffinic (linear hydrocarbon formation) in nature and could be prone to wax formation at lower temperatures.
- Cat fines – risk of catalytic (cat) fines is predicted to increase when more products derived by secondary blending enter the market. Elevated levels of cat fines may lead to accelerated abrasive wear of engine fuel pumps, injectors and cylinder liners.
- Lubricity – new blended products containing desulphurised components are expected to be prone to lubricity problems (eg sticking of fuel pump plungers) due to the aggressive nature of the desulphurization process. These issues may result in accelerated wear of fuel pumps and injection equipment; therefore, additives may need to be added to the fuel.
- Viscosity – large difference in viscosity (may range between 10~380 cSt (centistokes)) will affect fuel injection and combustion efficiency. Decrease in fuel oil viscosity may also cause an increase in fuel oil leakage between the fuel pump plunger and barrel of diesel engines. Internal leakages in the fuel injection system may result in reduced fuel pressure to the engine, which may have consequences for the engine performance.
- Density – the new fuel blend densities will in general be lower than conventional residual fuel oils. This may require adjustment of centrifuges to ensure adequate cleaning of the fuel oil.



- Total Acid Number (TAN) – some compliant fuels derived from plant and animal matter may not contain sulphur but may still have a high acidic content since the fuel is derived from fatty acids. Fuel oil with a high acid number may cause accelerated damage to various parts of the combustion unit including the fuel injection equipment.
 - Flash point – as per SOLAS, the minimum flash point of any fuel used or carried in the tanks of a ship should be not less than 60°C. Fuels with lower flashpoint (less than 60°C) will also fall outside the ISO 8217 specifications and create enhanced risk of fire and explosion. Consequently, the flashpoint of a fuel supplied to the ship should be properly verified by checking the documentation before commencement of the bunkering operations.
- Recommendations**
- Members are recommended to carefully consider the specific technical and operational challenges that new fuel products may pose; and, where necessary contact the fuel oil supplier or original equipment manufacturers (OEM) for the considerations/preparations to be made for safer operation.
 - The ship tank configuration and fuel system may require adjustments. A fully segregated fuel system for distillate fuels and blended fuels is recommended. Ship tank configuration and segregated fuel system will also allow for better management of potentially incompatible fuels.
 - Fuel oil with very low viscosity may lead to leakages, increased wear or seizure of fuel oil pumps. Members may consider installing fuel pumps and injection nozzles suitable for such fuels. Engine and boiler makers should be consulted to ensure its safe and efficient operation. Implications for validity of NOx certification (EIAPP Certificate) should be considered.
 - While some compliant fuels may not require heating, others will require heating. It would therefore be prudent to review the heating arrangements; and where appropriate maintain the required temperature.
 - Equipment maker recommendations should be consulted for adequate testing, maintenance and possible installation of coolers etc. Also, some parts of the fuel oil supply system, ie fuel pumps, pipefittings and gaskets may need to be overhauled to ensure integrity.
 - Members shall ensure the lubricating oil and/or cylinder oil in use is appropriate for the sulphur level of the fuel being used. Advice in this respect should be sought from the engine manufacturer and lubricating oil supplier.
 - It is expected that many shipowners may initially switch to distillate fuel as a preferred method of compliance for IMO 2020; however, distillate fuel will also have its own problems. There will be lubricity problems, micro-bled contamination and high acid corrosion, as well as cold flow. It is however possible to successfully manage cold flow properties through good fuel management, from procurement to technical operation, by considering the following:
 - ship's trading area
 - where the risk is higher of getting fuels with poor cold flow properties
 - whether the required cold flow properties be can specified in the fuel contract
 - what the actual low-temperature flow properties of the bunkered fuel is
 - actions that must be taken in order to safely consume the bunkered fuel (eg tank and filter heating).

The Standard Club

Web site: www.standard-club.com

It is just around the corner: IMO 2020 SULPHUR CAP

“IMO 2020, the regulation to cut marine fuel sulphur emissions from 3.5% to 0.5%, will set off a tsunami.”

- Tradewinds, 20 May 2019.



BY K MURALI PANY
Managing Partner
Joseph Tan Jude Benny LLP

The Uncertainties

The regulations have not yet been tested in Court so there is no judicial guidance. However, on a reading of the Regulations, no grace period appears to be provided. Thus, if there is a carriage or use of non-compliant fuel, it is an immediate breach under MARPOL Annex VI.

IMO's philosophy is for equal and strict application of the Regulations to avoid market distortion. However, some Port Authorities or Flag States may not take such a strict approach.

Issues will arise if:

- a ship is unable to obtain low sulphur fuel
- the fuel is not or becomes non-compliant because of inherent defects/properties
- the scrubbers break down
- the breach is due to residual non-compliant fuel in the tanks or pipes.

This leads to two common questions:

“The operational challenges will be manifold and the costs astronomical. We estimate the total global impact of this rule on various sectors in the energy space, as well as other industries, will be in excess of \$1 trillion over five years.” - S&P Global Platts Analytics

(1) Are there any available defences to a compliance breach? The “Proper Chain” of Documents

Regulation 3 of MARPOL Annex VI states that there will not be any penalties if the (a) emission resulted from damage to the vessel or its equipment, (b) all reasonable precautions were taken after the occurrence of the damage or discovery of emission and (c) the owner/master did not act with intent or recklessly to cause damage. However, it remains to be seen whether said Regulation would cover inherent vice – for instance, if scrubbers fail due to a manufacturing defect or poor maintenance.

Under the International Convention for the Prevention of Pollution from Ships (“MARPOL”) Annex VI, from 1 January 2020, the sulphur content of any fuel oil used on board ships shall not exceed 0.50% m/m. MARPOL Annex VI also prohibits the carriage of fuel oil with sulphur content exceeding 0.50% m/m from 1 March 2020 onwards.

By way of the Section 3 of the Prevention of Pollution of the Sea (Air) Regulations, the MARPOL Annex VI has been adopted in its entirety in Singapore.

Nonetheless, in order to have any chance of availing themselves of the defences and exceptions, Owners must be able to show that they practiced due diligence, e.g.:

- (a) when they took on fuel;
- (b) in relation to scrubbers;
- (c) if fuel is unavailable.

This involves what we call the “Proper Chain” – proper planning, proper purchase, proper contracts, proper training, proper maintenance, proper operation, proper responses and proper records. A full set of records and documents is going to be the key to any defence.

(2) What approach is the Regulator in Singapore going to take in the case of breach? Comply or Be Detained

The Regulator in Singapore is the Maritime Port Authority. Section 9 of the Prevention of Pollution of the Sea (Air) Regulations provides that the owner and master may be liable on conviction to a fine not exceeding \$10,000 or to an imprisonment not exceeding 2 years or both.

However, the relatively low level of the fine is unlikely to encourage compliance. Imprisoning a host of owners and masters is also not going to be practical. Rather, we believe that the Regulator's approach towards enforcement is going to be to require compliance and detain the vessel until then.

The vessel would have to offload non-compliant fuel, clean its tanks and lines and then load compliant fuel. This would inevitably cause significant delays to the vessel's voyage.

The costs and financial impact to Owners/Charterers by this approach would be considerable and is thus seen as a far better mechanism to deter breach and encourage compliance.

K Murali Pany, Managing Partner, JTJB LLP can be contacted by email at: murali@jtjb.com.

Does IMO 2020 expose shipbuilders to claims for breach of contract?



BY BETH BRADLEY
Partner, Hill Dickinson LLP

Since the adoption of the 0.50% m/m maximum global limit on sulphur content by the IMO in October 2016 much consideration has been given to the practical and legal challenges facing shipowners in meeting the global limit effective from 1 January 2020. However, there has been little focus on the potential impact on shipbuilders, specifically their potential exposure for breach of contract.

Regulation 14.1.3 Annex VI of the Marpol Convention applies directly to shipowners, reducing the permissible sulphur content of fuel on board intended for use as bunkers from 3.5% to 0.50% m/m (the 'sulphur cap'), in addition to Regulation 14.4.3 which remains in effect and applies in emission control areas where the permissible sulphur content is 0.10% m/m.

Guidance on the implementation of Regulation 14.1.3 names shipbuilders as interested parties to which the Regulation applies.

Consequently, shipbuilders may be liable for fines in circumstances where, for example, sea trials are taking place should the fuel being consumed violate the sulphur cap. However, shipbuilders may also be exposed to claims for breach of contract as a consequence of the implementation of Regulation 14.1.3.

One area of potential concern relates to the shipbuilders obligations in relation to class and 'other regulatory bodies' after 1 January 2020.

There is, as yet, no published guidance or commentary in this regard, consequently, while it is not known whether it will be more difficult to obtain class approval from 1 January 2020 for vessels which are built without emission abatement technology on board (and it can probably be safely assumed that at least to begin with it probably will not be) there are risks. Will class, for example, make recommendations, restrictions or qualifications in relation to newbuilds delivered in an area where there is an issue concerning the availability of compliant fuel? Will there be seaworthiness issues if there are doubts about the availability of compliant fuel?

Will some classification societies decide to approve only vessels with scrubbers on board? Or, as more ports ban the use of open loop scrubbers, will a newbuild with open loop scrubbers struggle to obtain class approval? May there be conditions or recommendations on the class certificate? These could lead to knock-on claims.

The approach of class and other regulatory bodies in this regard is important (and may become increasingly so) since the shipbuilder usually commits to delivering a vessel which is compliant with rules, regulations and requirements.

Under Article I of the Shipbuilders' Association of Japan form of shipbuilding contract ('SAJ Form') the builder commits to deliver a vessel which complies with rules, regulations and requirements of Class and other regulatory bodies in force as at the date of the contract. (By contrast the Newbuildcon places this obligation at the date of delivery.)

Arguably therefore the approach of class in this regard will only bite on those contracts on the SAJ Form entered into after 1 January 2020. But, Article V SAJ Form provides a mechanism to change the vessels' specifications in response to compulsory and

non-compulsory changes in class requirements or regulations during the build (Articles V.2(a) and V.2(b) respectively) accordingly it is potentially relevant to all contracts on the SAJ Form where delivery is due after 1 January 2020. Until it becomes clear whether there will be additional issues in relation to obtaining class and other regulatory bodies' approval, there is a risk of increased exposure to costs and delays for the builder arising out of requests for alterations in the specification, particularly those which are non-compulsory.

A further, perhaps more pressing issue, arises from the characteristics of low sulphur fuel. The experience in the emission control areas suggests that low sulphur fuel has different performance criteria to high sulphur (higher consumption and lower speeds) and that there can be ignition issues and compatibility issues.

In Article III of the SAJ Form the builder warrants (among other things) the fuel consumption and speed by reference to the engine's rating and power output, the agreed minimum specification of bunkers and draft. It further provides for the price to be adjusted and the buyer to claim liquidated damages or, in the worst case, cancel the contract for breach.

In circumstances where performance is being warranted without reference to the properties of low sulphur fuel (particularly with the added challenge that not all low sulphur fuels behave in a uniform way), the builder may be exposed unless there has been a careful adjustment to the contractual performance parameters to bring them in line with the likely characteristics of low sulphur fuel, or an amendment to the warranty to account for different performance on the basis of low sulphur fuel.

Since it is also known that low sulphur fuel can cause ignition issues and may have compatibility issues, both of which may affect the smooth running of sea trials, the shipbuilding contract should be amended to deal with the technical challenges which may arise, such as ignition failure, in order to keep the parties' obligations intact.

The IMO 2020 and the sulphur cap is certainly going to impact on the shipping market as a whole. The challenges that builders will face are largely practical in nature, but also commercial and legal. This is an area which will, no doubt develop once the new Regulation takes effect.

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Adapting the Free Wing Concept to Sailboat Propulsion



BY HARRY VALENTINE

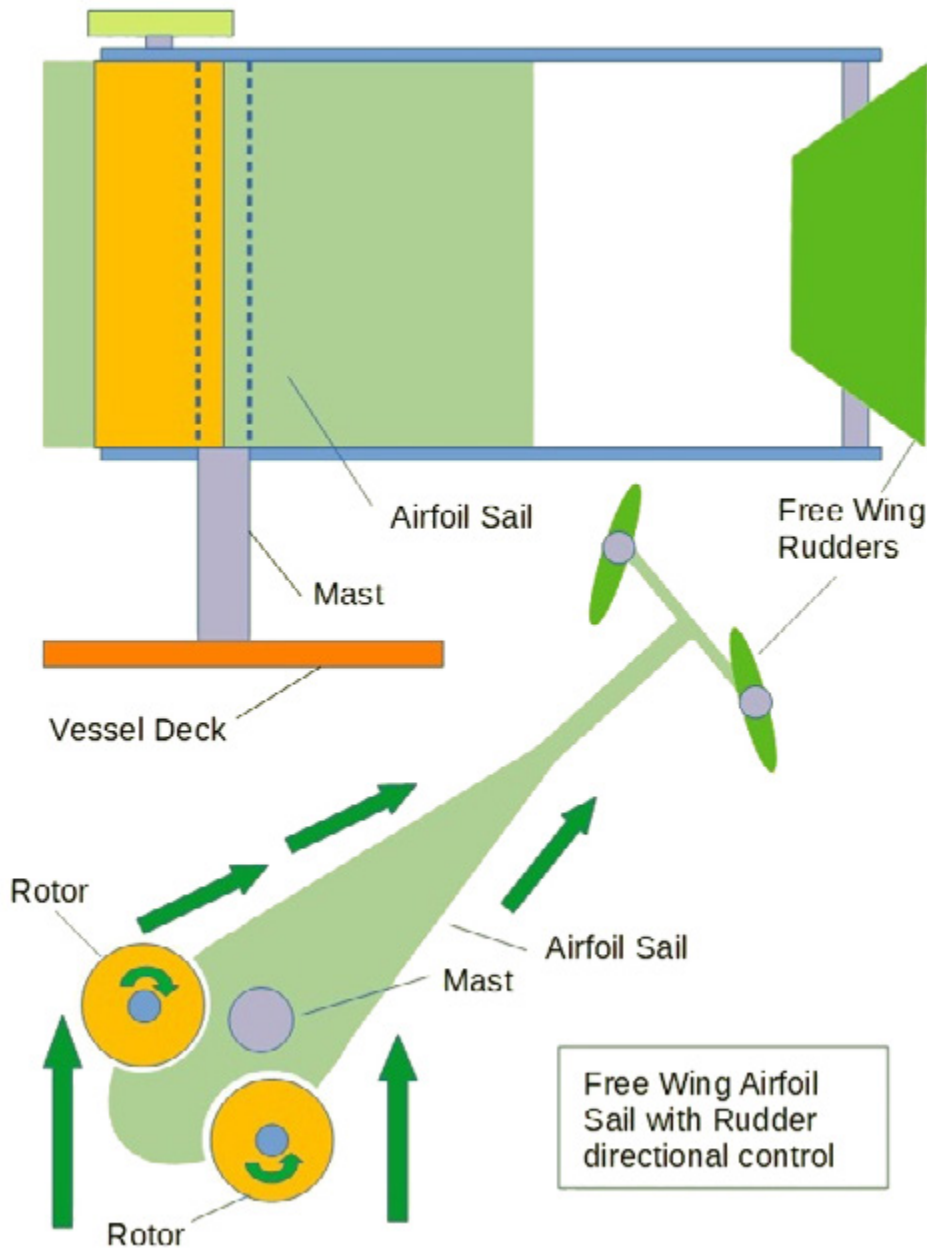


During the mid-1940's, an innovation called the "free-wing" was developed in the U.S. to improve flight stability of small aircraft. A flap mounted at the end of a long lever that extended rearward behind the wing, maintained wing angle during flight. The free-wing concept may be adapted to sailing vessels propelled by an aeronautical-style airfoil-sail or wing-sail in place of a more traditional fabric sail.

Introduction

Using traditional sails to propel a boat requires that each crew member be highly skilled in rapidly re-adjusting sails in response to changing wind conditions and to changes in ship sailing direction. Adding wind-driven propulsion to modern ships offers potential reductions in fuel costs and lower ship exhaust emissions. Modern wind-driven ship propulsion needs to deliver high propulsive effort and be easy to operate, perhaps even dispensing with the ropes used to re-adjust angles of ship sails. The requirement calls for a different design of sail controlled by a different operating system.

Using wind energy to maintain and adjust the angle of a wing-sail relative to ship's hull reduces need for ropes and cables. Resetting the angle of wing-sail relative to hull requires use of large and powerful electric motors to drive large worm gear mechanisms to reset wing-sail angle. Using a smaller downstream wing-sail(s) mounted to an extended length lever to adjust the angle between hull and the large upstream propulsion wing-sail would require smaller electric (or hydraulic) motors driving smaller worm gear mechanisms. Re-adjustment of hull/wing-sail angle would require less energy.



Increasing Propulsive Force

The option to install wind-sails to masts that extend skyward from the deck can also allow for a hybrid wind-sail configuration. On an airplane accelerating along a runway, topside wing profile allows air to simultaneously accelerate to higher speed while reducing topside air pressure to well below surrounding area atmospheric pressure. The difference between higher underside and lower topside dynamic air pressure produces lift. Likewise with a wing-sail installed above the deck of a sail powered vessel, the difference between higher upstream side and lower shadow side dynamic air pressure generates propulsion.

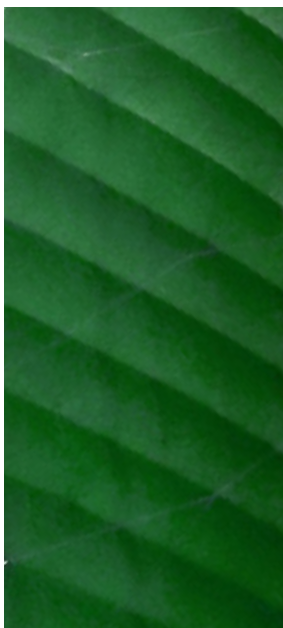
Airplane wings will only develop lift under certain flight conditions and at certain flight speeds, otherwise the wing stalls with an increase in wing topside dynamic air pressure. Likewise, depending on wing-foil design and angle, the shadow side of the wing-sail can also undergo stall. Due to flexibility in wing-foil weight on a ship's deck, it becomes possible to incorporate a pair of vertical-axis, counter-rotating rotors near the leading edge. One the wing-sail downwind or shadow side, the rotor's boundary layer effect would direct rapid flow of air into that area and maintain extremely low dynamic air pressure.

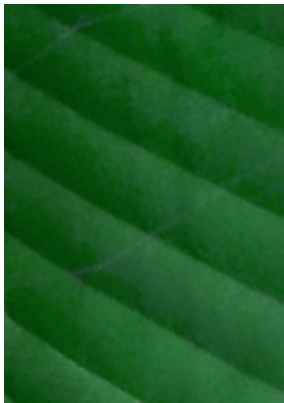
Sails and Ships

Ships designed to carry different types of cargo would require different types of sails. A container ship requires maximum available deck space to carry payload, leaving bow-area installed and retractable kite-sails as a possible option to assist propulsion along sections of the voyage that are parallel to prevailing trade winds. Due to the nature of the payload that has to be carried below the deck, bulk carrier ships may use the combination of retractable bow-area installed kite-sails as well as deck mounted masts for sail technology or for vertical-axis wind turbines such as Magnus rotors driving electric generators.

Rotor Wing-Sail

Designing wing-sails to include spinning rotors at the leading edge allows each rotor's boundary-layer effect to redirect the wind-stream through a severe angle. It is possible to install small vertical-axle wind turbine above each rotor to initiate rotation, subsequent to which wind induced boundary layer effect would sustain rotor spin. A twin rotor system can allow for extreme width at the wing-sail leading edge, placing its shadow or downstream side at such an extreme angle, that only spinning rotors could produce the necessary





boundary layer contact and extreme low dynamic air pressure on the shadow side.

The wing-sail wide leading edge combined with larger diameter rotors would allow for installation of extreme diameter main masts capable of withstanding extreme wind-induced dynamic shear loading. Such installations would be compatible for freight ships that require a high level of propulsive force and comparatively low sailing speeds, compared to smaller passenger and recreational sail-powered vessels that would sail at higher speeds. For high-speed wind-powered sailing, a narrower leading edge with small diameter rotors would allow for a different wing-sail optimal angle to produce the required propulsive force at higher sailing speed.

Parallel Downstream Wing-Sails

While installing upper and lower downstream wing flaps behind the main flight wing of a free-wing aircraft, the versatility offered by vertical-axis free wing-sail installed on the deck of a ship allows for application of parallel downstream wing flaps installed to the extension levers behind main propulsion wing-sails. In the neutral setting, wide spaced placement of parallel downstream wing flaps would extend beyond the width of the counter-rotating rollers, allowing them to operate within the wind stream. When the steering mechanism is activated, one downstream wing flap would remain in the wind stream.

To optimize angle setting of the main propulsion wing-sail, independent steering control would allow for each the downstream wing flaps to be set at a different angle, relative to the main propulsion wing-sail. Wide spaced placement of downstream wing flaps behind the main wing-sail would reduce impediments to a fast flow air stream leaving the trailing edge of the propulsion wing-sail and flowing behind it.

Trade Winds Sailing

When sailing parallel to Trade Winds, the retractable airborne kite-sail would capture propulsive energy from more powerful winds that blow at higher elevation above ocean. Deck mounted wing-sails would capture propulsive energy from powerful cross winds that blow toward the ship from angles between 20 degrees to 120 degrees from the bow. Beyond 90 degrees from the bow, airborne kite sails would assist deck mounted wing-sails and do so exclusively as wind direction moves beyond 120 degrees from the bow (60 degree toward the stern).

Submerged Free Wing-Sail

The combination of an available market for transportation service, high fuel cost, environmental considerations, suitable water current through narrow channels and suitable locations to secure restraining cables to guide kinetic ferry vessels. Such technology has long provided service across inland waterways. Further development of the technology could introduce

kinetic ferries to suitable inter-island, comparatively narrow oceanic channels where water current flows sufficiently fast. Submerged free wing-sails could be developed to either provide high propulsive force at low speed for freight service or faster sailing with reduced propulsive force for passenger service.

There are several potentially suitable channels located internationally where further evaluation is required. Off the coast of the U.K., candidate narrow and shallow channels occur at the Outer Hebrides Islands, Orkney Islands, Shetland Islands, Scilly Islands and Faroe Islands. A few narrow and shallow channels occur between the Philippine Islands where current may be sufficient to sustain kinetic ferry service. At the south end of South American, ocean current sustains fast flowing water between nearby islands where kinetic ferry service may be considered. In the Caribbean, the channel between St. Kitts and Nevis would be a possible candidate.

Conclusions

While the idea of the free wing had its origins in the aircraft industry, the free wing concept has potential to be adapted to maritime sails, using airfoil wing-sails in place of traditional fabric sails. The concept may even be applicable to wing-sails that incorporate counter rotating cylinders installed just behind the leading edge. It would have application above water on the decks of wind powered ships, also below the hull to propel water current driven kinetic ferries. Modern wind powered ships would sail with a variety of wind technologies that will include the airborne kite sail for sailing parallel to trade winds.

SS WARRIMOO



The passenger steamer *SS WARRIMOO* was sailing its way through the waters of the mid-Pacific on its way from Vancouver to Australia. The Captain, at the time, was John D. S. Phillips. The ship's position was latitude 00 31' N and longitude 179° 30' W. It was the night of December 31st, 1899. First Mate Payton broke in and told the crew they were close to the intersection lines of the Equator and the International Date line. Captain

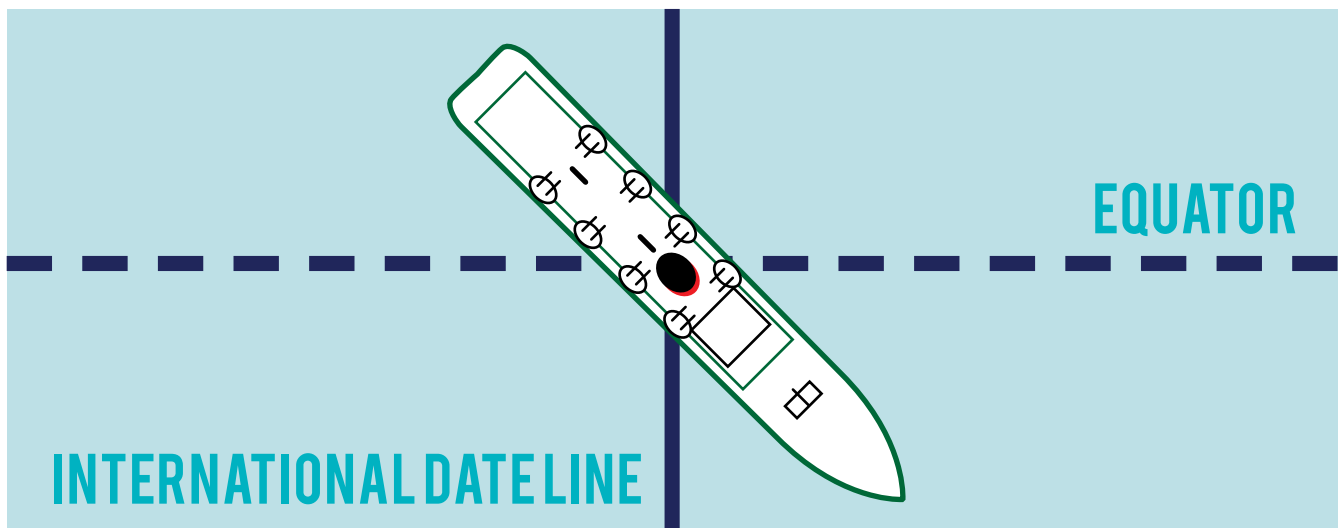
Phillips was going to do something no one else had come across.

He called his navigators to the bridge to check and double check their position.

The ship lay on the Equator at exactly the point where it crossed the International Date Line. That meant several different things at once: The forward end of the ship was in the southern hemisphere and

in the middle of summer. The stern was in the northern hemisphere and in the middle of winter. The date at the stern was 31st December, 1899, and at the bow 1st January, 1900.

This ship was in two different days, two different months, two different years, two different seasons, but in two different centuries. All at one time. It had never been done before. What Captain Phillips came across on that day was truly remarkable.



SO, JUST HOW RISK AVERSE ARE YOU?



In his occasional look at business management topics, Mike Schwarz, turns the spotlight on to the complex and often overlooked subject of risk assessment and management.

"IF YOU DON'T INVEST IN RISK MANAGEMENT, IT DOESN'T MATTER WHAT BUSINESS YOU'RE IN, IT'S A RISKY BUSINESS."

Gary Cohn

A definition of risk -

"A SITUATION INVOLVING EXPOSURE TO DANGER."

Let's face it, we take risks every day in our normal lives as well as in our jobs. It is a fact. Think about it for a moment. There are things we routinely do daily. Do we risk assess them? Should we risk assess them? A few examples of things we might routinely do are shaving in the morning (for beardless men) using a sharp razor, crossing a busy road at rush hour, approaching a set of traffic lights which is turning from green to red and even making a poached egg for breakfast. These all seem quite harmless and routine activities on the face of it, but there are risks associated with all of them. What's more, you will have risk assessed each activity, albeit it subconsciously and perhaps fleetingly. After all, no-one would just walk into a busy road without stopping to look to see if a vehicle was approaching. Once you have looked, you then assess if you have sufficient time and can cross

ahead of the vehicle safely or wait until it has passed by. You have completed a simple risk assessment and successfully managed the risk allowing you to cross the road without incident!

Perhaps I am over simplifying things? But now apply this scenario to the environment in which a marine surveyor routinely spends his day when at work on survey. The word routinely is the key. With routine often comes complacency. That's quite natural too. Having done that thing one hundred times before without incident does not mean that something will not go awry on the one hundredth and first time you do it.

A few obvious scenarios present themselves for consideration without too much thought. For a small craft surveyor who is about to survey a vessel hull, are the

chocks secure and is it safe to go beneath to inspect? I suspect that is often overlooked. And the man working on the hull next to you is sanding and creating potentially hazardous dust. Having done your risk assessment, a mask may be a sensible idea. And one well known IIMS member, tasting what he believed to be fresh water, ended up in hospital in a serious condition as it was contaminated.

And what about commercial ship surveyors? There are dangers lurking everywhere to think about. Climbing a ladder on a ship can be a challenge, especially if it is corroded or rotten. I know of several surveyors who have had nasty incidents caused by ladders that have not been in serviceable condition. But the most obvious one is entry into enclosed spaces. The number of fatalities from enclosed space incidents remains shockingly high. For this particular activity, a high-level assessment is essential in order to manage the risk, which is critical, including assessing the necessary equipment to ensure it is in good order.

Some of the potential risks are not always so obvious. Here are a few other examples to think about:

Excessively high noise levels

Extreme weather conditions, including high winds, snow and ice

Poor air quality and pollution

Chemical hazards caused by improper storage or use of flammable, poisonous, toxic or carcinogenic substances

Biological hazards caused by viruses, bacteria, fungi or pests

The threat of data loss through cyber-attack, combined with an awareness that defences can be vulnerable

Ergonomic hazards prompted by an unusual or poor workplace design and layout (it has been known for small craft surveyors to get stuck in bilges)



WHAT IS A RISK ASSESSMENT?

The UK Health & Safety Executive's definition of a risk assessment is:

"A careful examination of what, in your work, could cause harm to people and yourself, so that you can weigh up whether you have taken enough precautions or should do more to prevent harm."

There are no fixed rules on how a risk assessment should be conducted, but you need to find a system that works for you which you are comfortable operating. However, there are a few general principles that should be followed.

Phase 1: Identify the hazards

In order to identify potential hazards, you need to understand the difference between a 'hazard' and a 'risk'. A hazard is something with the potential to cause harm and a risk is the likelihood of that potential harm actually happening. Hazards can be identified by using a number of different techniques. Observation is a good start (something surveyors excel at). Or you might simply walk around the area in which you are about to work to check it out. You might seek advice from others operating nearby. And, importantly, you should bring your knowledge and experience into play.

Phase 2: Consider and decide who might be harmed and how

Once you have identified what may well be a number of hazards you need to understand who might be harmed and in what way. This could include colleagues, crew members and even the public.

Phase 3: Evaluate the risks and decide on control measures

Once you have identified and noted

the hazards and have decided who would be harmed, you must devise a basis on which those in the potential firing line can be protected from harm. Sometimes the hazards can be removed and eliminated entirely, and the risks controlled so that the chance of injury is unlikely or reduced to a minimal level.

While the complete elimination of all risk is rarely possible, a risk avoidance strategy could be deployed to deflect as many threats as possible in order to avoid the costly and disruptive consequences of a damaging event.

A risk reduction strategy may also be worth considering. This is achieved by adjusting certain aspects and parameters of the overall project, or by reducing its scope if possible. Risk sharing is also possible. Sometimes, the consequences of a risk can be shared, or distributed among several of the project's participants.

Phase 4: Record your findings

If you have 5 or more employees, it is a legal requirement in the UK to write down and record your findings. Even if you are a sole operator though, recording the findings briefly could be very helpful if you need later to demonstrate you carried out an assessment in the event something does go wrong.

Step 5: Review your assessment and update as and when necessary

You are reminded never to forget that each place you operate in, or every vessel you board is likely to be different. So, your risk assessment should be reviewed and updated with this in mind; and it should be fit for the environment in which you propose to work in.



THE ISO 31000 PRINCIPLES

Risk management standards have been developed by the International Organization for Standardization (ISO). These standards are designed to help identify specific threats, assess unique vulnerabilities to determine their risk, identify ways to reduce these risks and then implement risk reduction strategies.

The ISO 31000 principles, for example, provide frameworks for risk management process improvements that can be used by anyone, regardless of the organisation's size. ISO 31000 is designed to increase the likelihood of achieving objectives, improve the identification of opportunities and threats, and effectively allocate and use resources for risk treatment.

ISO 31000 recommends the following target areas, or principles, should be part of the overall risk management process:

- The process should create value for the individual or organisation.
- It should factor into the overall decision-making process..
- It must explicitly address any uncertainty.
- It should be systematic and structured.
- It should be based on the best available information.
- It should be tailored to the project.
- It must take into account human factors, including potential errors.
- It should be adaptable to change.

DESIGNING A SIMPLE RISK ASSESSMENT MATRIX

A risk matrix is a simple chart. One axis indicates the likelihood and the other indicates the consequence. Likelihood can be expressed as probability or as frequency. A risk matrix is used when doing a risk assessment. Potential unwanted events and incidents are identified. Each is then individually assigned to a likelihood category and to a consequence category.

The likelihood category indicates the probability that the event will occur from very unlikely to almost certain. The consequences category indicates the severity of the outcome from almost none to severe. The most popular size for a risk matrix is a box 5 x 5 but there is no minimum or maximum. Once the extreme and high risks have been identified, an action plan can be developed to ensure the outcome can be managed and mitigated in the best way possible.

CONSEQUENCES:		Negligible	Minor	Moderate	Significant	Severe
PROBABILITY:	Almost Certain (81%-100%)	Low Risk	Moderate Risk	High Risk	Extreme Risk	Extreme Risk
	Likely (61%-80%)	Minimum Risk	Low Risk	Moderate Risk	High Risk	Extreme Risk
	Moderate (41%-60%)	Minimum Risk	Low Risk	Moderate Risk	High Risk	High Risk
	Unlikely (21%-40%)	Minimum Risk	Low Risk	Low Risk	Moderate Risk	High Risk
	Rare (1%-20%)	Minimum Risk	Minimum Risk	Low Risk	Moderate Risk	High Risk



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New buoyant PLB introduced by ACR Electronics

ACR Electronics has introduced its latest range of safety equipment, including the ResQLink View Personal Locator Beacon (PLB), a buoyant PLB designed using survivor feedback. Featuring ACR's optical display technology, the ResQLink View's digital display shows the beacon's operational activities, including GPS coordinates, operating instructions, usage tips, transmission bursts, as well as battery power.

The PLB includes a new infra-red strobe light in addition to the ultra-bright strobe light to assist rescue crews using night vision goggles.



Vetus unveils new thrusters

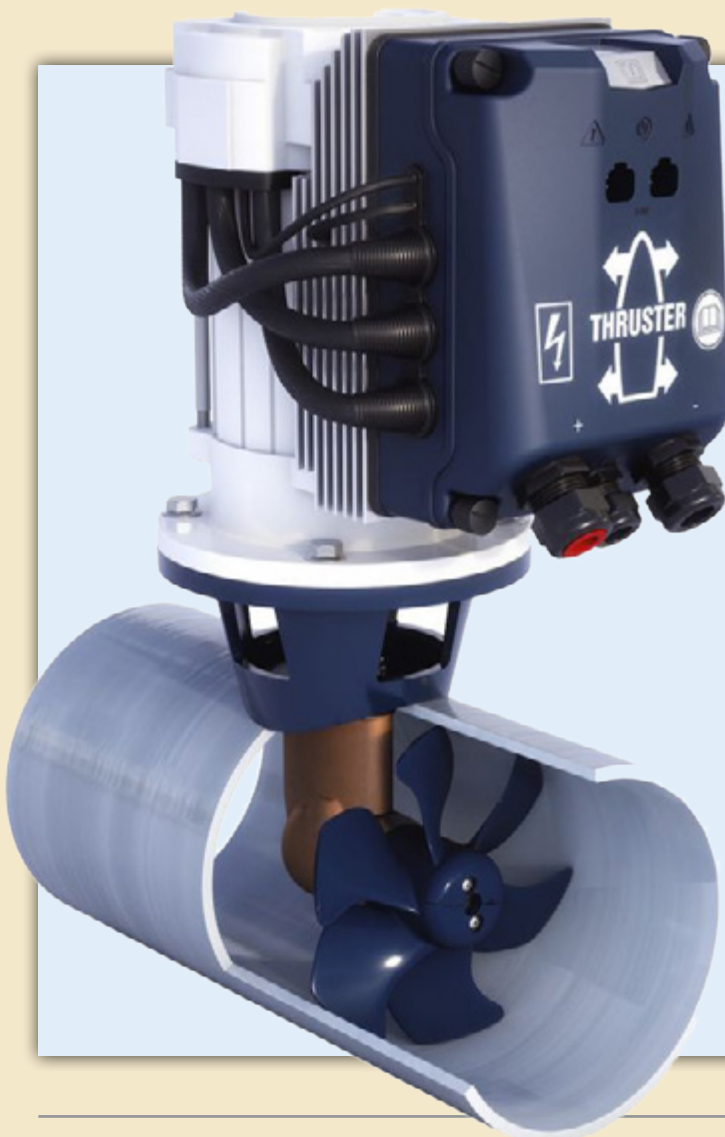
The new BOW18024D is a bow thruster providing 180kgf on a 24V power supply. An evolution of the C version, the thruster has the latest features such as temperature sensor and low noise six-blade propeller.

The FTR330..M is a family of heavy-duty water strainers suitable for fast semi-planing and planing boats. The strainers feature filter housing made from NAVIDURIN and 19, 25, 32 or 38mm hose connections.

The 15-litre NLP3..15L series of waterlocks achieve a sound reduction of 10dB over traditional waterlocks. The waterlock's inlet chamber can be rotated 360°.

Further new products include the ultra-slim PL Series portlights, suitable for panel thickness of 2mm to 20mm, and the PPL2 ergonomic, hinged window and portlight knobs.

The latest addition to the VETUS line of flush hatches is the FGHF series of straight flush hatches.





New blocks from Allen Bros

Allen Bros has a new range of plain bearing blocks using 100% recycled plastics and 20% less material than the previous version. The blocks use the outer cheek and ultra-strap from the 20 and 30mm dynamic range, allowing Allen Bros to manufacture the products more efficiently.

It also helps to reduce the long-term impact of plastics and un-recyclable materials on the environment. The new range also features a grey sheave to differentiate them from the existing dynamic range, that has black sheaves.

The blocks' static loading capabilities makes them suitable for take-up systems or applications that don't require high dynamic performance.

New wireless engine kill switch by OLAS Guardian

Acting as a virtual kill cord it will stop the engine within two seconds of a person going overboard.

The product works by wirelessly logging and tracking up to 15 crew members to an engines' kill switch via small, wearable transmitters, the OLAS wrist Tags or OLAS Float-On light.



If the transmitter is submerged overboard, or is separated by distance, the connection is broken, cutting the engine and triggering an inbuilt 85 decibel alarm and if connected, an alarm on a mobile phone.

The engine can be restarted after five seconds and a rescue can be performed.

"OLAS Guardian enables leisure and professional drivers to move freely around their powerboat, without constantly having to remember to detach and re-attach a wire kill cord," explained Exposure Lights, product manager Tom Harrop.

The product has been designed to run alongside an existing kill cord and will operate even if the physical kill cord is not attached to the driver.

It is supplied with an OLAS Tag, power and kill cord connection wires, a stainless steel control switch and a quick start guide.

NEW PRODUCTS

TriNav high performing positioning sensor coming soon

Digital Yacht's new TriNav GPS160 is a new, high performance positioning sensor using GPS, Glonass and the new Galileo satellite systems for positioning accuracies and redundancies.

The company says typical accuracy is better than 1m and data can be set to output at up to 18Hz for smoother plotter track displays. TriNav software technology also improves positioning vulnerabilities that could occur through spoofing and local interference.

The device can be field programmed for a variety of modes such as single GNSS operation such as Galileo only as well as output configurations such as update rate or NMEA sentence structure.

The GPS160 is available with a NMEA 0183 output and a USB variant for PC, MAC and Linux. For NMEA 2000 systems, a bundle is available with a Digital Yacht iKonvert NMEA 2000 gateway.

Galileo is the new global navigation satellite system (GNSS) that has been developed over the past two decades. It joins the GPS and GLONASS systems and offers mariners a third reliable positioning source. It is planned to be fully operational in 2020.

The PLB includes a new infra-red strobe light in addition to the ultra-bright strobe light to assist rescue crews using night vision goggles.

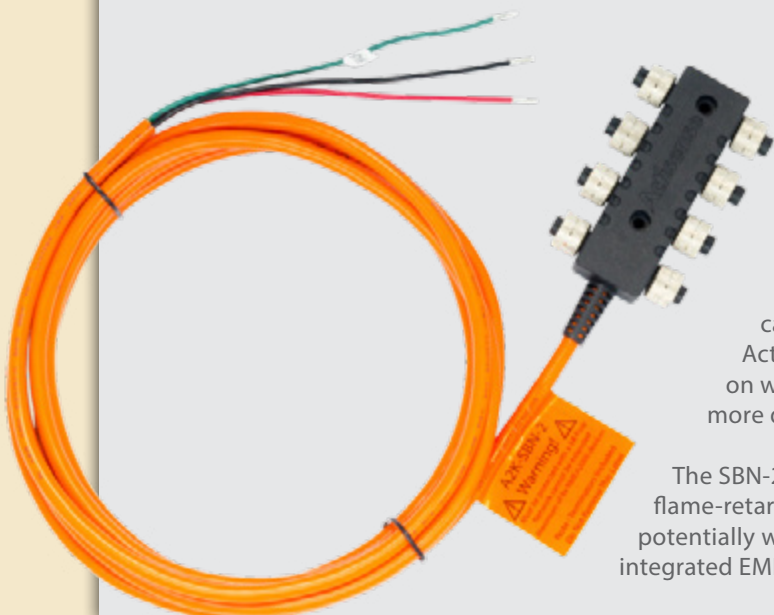


NMEA connections are doubled by Actisense

The new SBN-2 device from Actisense has been developed to give boat owners and installers the ability to set up a plug and play NMEA2000 network with a NMEA2000 backbone in a single device. With built in termination resistors, the SBN-2 provides eight NMEA2000 drops, allowing up to eight NMEA2000 devices to be connected.

"When we released the SBN-1 a couple of years ago, it came with four NMEA2000 drops," said Phil Whitehurst, Actisense CEO. "Our engineering team has been working on ways to give our customers the ability to connect even more devices to their vessels."

The SBN-2 is manufactured using ruggedised, watertight and flame-retardant over-moulded housing, making it suitable for potentially wet and harsh marine environments. It comes with an integrated EMI shield and a 3m UL-rated power cable.



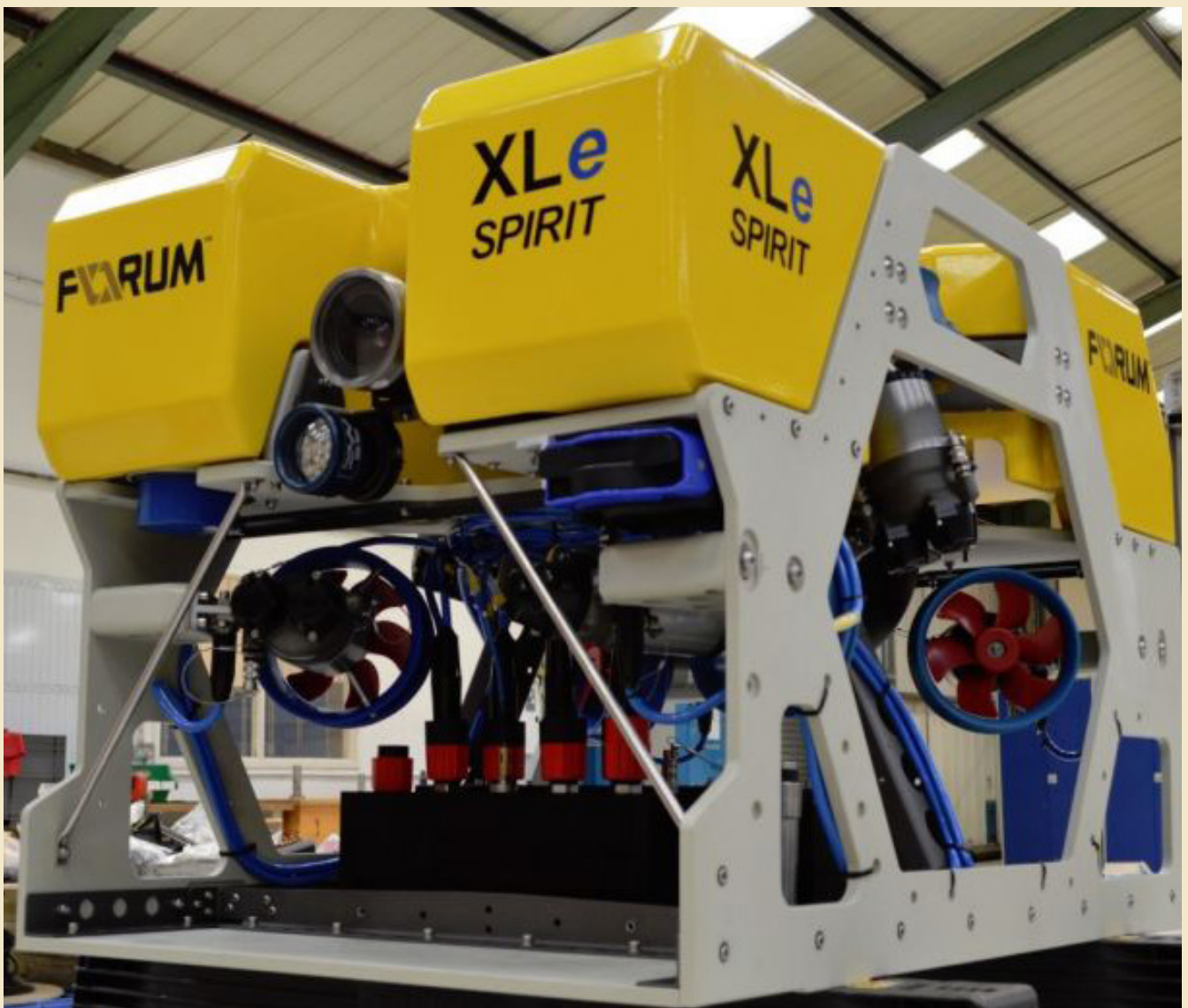
The Forum XLe Spirit represents the first of a new generation of electric observation class ROVs

The Forum XLe Spirit is the smallest in a new range, and powerful enough to perform subsea maintenance and repair work. Forum says it is ideally suited to the aquaculture market and capable of tasks such as net and tank inspection.

Working with its Norwegian partner, Innova AS, Forum recently tested the XLe Spirit at a fjord with a 500m water depth. The standard equipment function testing was confirmed utilising all ancillary equipment, including cameras, lights, altimeters and sonars.

The XLe Spirit benefits from an optional electric or hydraulic five-function manipulator arm. The self-regulating power feature compensates for tether losses ensuring a constant and stable power delivery to the vehicle, regardless of tether length. The trials follow a twelve-week assessment, which took place at Forum's test tank in Kirbymoorside, Yorkshire, UK.

All Typhoon's drysuits are waterproof and breathable and incorporate reinforced knees and seat. The company offers a three-year warranty on materials and workmanship upon registration of a purchased product.



NEW PRODUCTS

The new suits from Typhoon

The new range includes three key models which are based on tried and tested suits while benefitting from updates now made possible by new fabric technology and design innovations.

The company's flagship drysuit for 2020 is the PS440 hinge entry suit featuring a cutting-edge zip off storm collar system, splash proof map pocket and attachment patch on sleeve.

The company's MS Rapid back entry system suit and the entry level Ezeedon 4 suit prioritises mobility and comfort.

One of the lightest suits to wear, the Ezeedon is articulated throughout and is the easiest wetsuit to put on. This suit is also available in women's and junior sizes.

All Typhoon's drysuits are waterproof and breathable and incorporate reinforced knees and seat. The company offers a three-year warranty on materials and workmanship upon registration of a purchased product.



New radio from Standard Horizon

The 6 inch by 4 inch GX1400GPS/E is waterproof to IPX8 standard and features programmable scan, priority scan and multi-watch functions. The unit also has programmable soft keys, DSC test calling and a pre-set recall for up to ten commonly used channels.

The GPS element provides a built-in 66 channel with output that can be used to add position data to DSC calling. The set can also be connected to a compatible chart plotter via NMEA 0183.

With the use of clear voice noise reduction technology, the microphone eliminates unwanted background sounds and also features buttons that allow direct access to Channel 16, the main calling and distress channel together with up/down access to sub channels.

The operator can also toggle easily between 1 Watt and 25 Watts and the unit carries the automatic transmitter identification system mode, mandatory for most pleasure vessels on commercial waters in Europe.

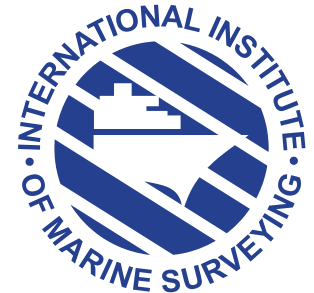
Professional Qualification in
Yacht & Small Craft
Marine Surveying

Professional Qualification in
Commercial Ship
Marine Surveying

2

Professional Qualifications in Marine Surveying

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Insurance Claims are on the Increase!

What can you do about it?

As an insurance intermediary we are passionate about helping our client's reduce the risk of claims occurring against them and so we are working with the IIMS to produce a series of talks and articles that we hope you will find useful in your everyday working life.

From one of our recent talks we received a very interesting email that raised the question of the effectiveness of the terms that some insurers are requesting their insured's put in their terms and conditions.

This is such an important and interesting area that we would like to share this topic with you so below is the story of what occurred.

We presented in Scotland in November this year a talk on "The Number and Size of Insurance Claims Is Rising. What can Surveys Do to Prevent This If Possible" – if you wish to obtain a copy of the

slides, the updated version can be obtained from the IIMS. If you have the luxury of some time you can watch my presentation at the recent Portsmouth IIMS training day.

We received an interesting email from one of the attendees that said that they are asked by insurers to include certain phrases in their terms and conditions:

These were the phrases apparently suggested by insurers:

- *No dismantling work was carried out except for the removal of normally portable hatches and sole boards.*
- *We have not inspected parts of the structure or machinery which are covered, unexposed or inaccessible and we are, therefore, unable to report that any such parts are free from defect.*
- *Without prejudice to the whole terms of this report the main recommendations are noted below.*

Our comments were as follows:

- *No dismantling work was carried out (except for the removal of normally portable hatches and sole boards. I think this is superfluous).*
- *We have not inspected parts of the structure or machinery which are covered (by what? A coat?), unexposed (by what a coat?) or inaccessible (everything is accessible if you have tools) and we are, therefore, unable to report that any such parts are free from defect.*
- *Without prejudice to the whole terms of this report the main recommendations are noted below. See appropriate sections for details.*

The problem is that not many people, including underwriters, have the time to consider case law and there is much case law around the definition of what we deemed nebulous words (because they are not defined with parameters) such as accessible and not visible.



The Courts consider the understanding of *"the person on the omnibus"*. What would they, the person on the omnibus, understand from not visible, not accessible and not exposed? What would they consider is reasonable for their professional person to have undertaken during their surveys? If you wish to leave it to the lawyers or Court's decision as to the application of these words then you have an unknown in your terms and conditions, but if you either define them or use a different phraseology then you are potentially controlling the outcome of a dispute.

So, our thoughts on what could be included I have outlined here from our recent talk...

A problem frequently occurs with the use of the word "inaccessible", because it has been held in case law that an area behind a hatch was accessible because it only required a few screws to be removed. If they had said that no screws would be removed to access areas or tools used to access areas the outcome in that case we suggest would have been different.

So consider including some of the following, but before doing so make sure it is appropriate for the contract between you and your client and actually reflects what you do, or do not do, during your survey and after post your survey if applicable:

- > No parts of the vessel are dismantled and no bolts are drawn or screws removed or tools used to access areas for inspection of:
 - parts of a vessel
 - vessel structures
 - vessel appliances
 - vessel machinery (if machinery not inspected then remove this as there would no doubt be a specific exclusion excluding liability and inspection of machinery and no doubt engines)

And in these terms and conditions and any report or

communication the above parts of a vessel, vessel structures, vessel appliances or vessel machinery will be deemed to be "inaccessible" or "not accessible".

- > Parts of the vessel, vessel structures, vessel appliances or vessel machinery which are not visible at the time of the survey will not be inspected including but not limited to those behind linings, beneath fixed floors or sole boards and in these terms and conditions and any report or communication the phrase "not visible" will be deemed to include such parts of the vessel, structures, appliances or machinery.
- > We are unable to report or provide advice on inaccessible and not visible parts of a vessel, its structures, its appliances or its machinery and hence we are unable to report that such inaccessible and not visible parts, structures, appliance or machinery are free from defects.
- > Engines and machinery and appliance are not inspected and where applicable the client would be advised to instruct appropriate experts in their fields to advise on these parts of the vessel.

You should we suggest consider including certain phrases and words also in your report when you are “telling the story” of what you did in each area of the vessel. So here are some thoughts for the month.

When you write your report:

- > Say what you did in an area – tell the story – and what you found
- > Say what you did not do in an area and why – e.g. unable to access X,Y or Z because of X,Y or Z (may be screw needed removing and you do not remove screws) and therefore unable to check for cracks
- > It may be appropriate to advise they consider taking separate advice or action such as considering engaging an expert, or boat builder, to further investigate where you could not access or even where you did access and identified something that you have brought to their attention.
- > Likewise for potential cost of repairs; surveyors do not normally provide costs of repairing, unless you have experience, as this is a boatyard’s area of expertise.

You may wish to refer to previous problems found (state facts as where the information came from – not specific because of data protection but perhaps say from experience or perhaps information in the public domain) in areas accessed and not accessible.

Always keep continuity by that we mean if you use a phrase or word in your terms and conditions and want to draw it to the attention of your client in your report, use the same word or phraseology where possible.

Finally, “Recommendations”. Should there or should there not be a recommendation at the end of a report? Should you have recommendations in each section?

Should you at times consider saying “you may wish to consider” because it is more appropriate that a recommendation. Only you can decide depending on the facts but our thoughts are if you wish to have a recommendation section at the end of your report perhaps instead of using the heading “Recommendations” or as some people do “Main Recommendations” use the following:

“Without prejudice to the whole content of this report we would like to draw your attention to the following findings and comments:”

This may be a bit legalistic for you but you can change the phraseology but with this type of phrase you are not setting yourself up, unless you want to, as categorising what is a more important than other issues in the report and hence for criticism should another professional consider you missed an important point from your report in the Recommendation Section. As we have said The Courts always take the view:

“What does the person on the omnibus understand by the word or phrase”

I would say it means to the person on the omnibus the most important recommendations so if you then miss something off your list under the section of main recommendations you have potentially set yourself up for criticism.

Everyone writes in a different style and uses different phraseology so there are no specific rights or wrongs but what is important is thinking about how the person reading your report will interpret it and what are their expectations.

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A day in the
life of...

David Pestridge

Mike Schwarz tracked down David Pestridge, Proprietor of White Hat Marine Surveying Ltd, who has finally settled in the rural beauty of Dartmoor National Park in West Devon following a successful career in the British Army. David was recently appointed to the IIMS Management Board as part of the organisation's succession planning.

Q1. What were the principle factors that encouraged you to enter the marine surveying profession full-time after a long career in the Army?

The seed of the idea to retrain as a marine surveyor was planted by the Chief Engineer on RFA Mounts Bay whilst we deployed to Sierra Leone in 2006. The career sounded varied, interesting, intellectually challenging and a good mixture of getting on with people and putting my engineering knowledge to good use. I then looked into the training needed and was partly funded by the MoD to do the IIMS Yacht & Small Craft Surveying Diploma as part of my resettlement package. Looking back on that decision and the path that has led me to where I am today, it was a good decision and an enjoyable path albeit with

the frustration of having to move house every year or two. I would commend the job and the industry as a whole to any service leaver as most service leavers have plenty to offer any subsequent employer.

Q2. I understand from others who have left service life behind that returning to 'civvy street' can present challenges. How easy was it for you to make the transformation from Army life to running your own survey business and what were the key hurdles to overcome?

Civvy Street can be a daunting destination for many service leavers and I think the key to managing this is preparation and planning. In many ways resettlement is an activity that is best started as early

in your military career as possible so that it can guide one's career choices along the way. Too many service personnel leave it too late to develop an effective resettlement plan, which then limits their second career choices, the re-training options and funding available to them. If you fail to prepare, prepare to fail.

Q3. Linked to the previous question, what particular skills (if any) did the Army teach you that you were able to bring into the surveying profession, thus helping you to establish and manage your own small business?

Setting up as a newly qualified small craft surveyor (in the north of Scotland as I did initially) was a daunting prospect. There were brokers and yards to visit, websites to build, contacts to make and hopefully the first of many commissions to manage. Military service brings with it an ethos of trying to be the best at whatever you do, to be an effective part of

any team and to think for yourself as a part of something bigger. The training seeks to develop resilience under pressure, quick thinking and decision making and the determination to see things through. All of these things were very valuable in getting a new business up and running. But people skills are what make the greatest impact; the ability to chat to new people, be they the junior welder or a superyacht captain, to understand what they need from you and how best you can answer their questions.

Q4. What is your area of surveying specialism and which aspects of the job give you the most pleasure?

Having been a small craft surveyor for 11 years now, my work is roughly split 60:40 iron/steel to FRP. The most specialised element of my work is surveying riveted iron and steel barges; the largest to date was 32m (not really a small craft!). Having specialised in metallurgy whilst studying mechanical

engineering at university I do find corrosion fascinating, but it is hardly the most engaging of dinner party topics.

The jobs which have given me the most pleasure are the ones where you know something is amiss but the reason for what caused your senses to perk up proves elusive to identify. To then use your training, experience and intuition to find and identify the defect and then to get that across to the client in an understandable and useful manner is most satisfying.

Q5. What is the strangest incident that has occurred whilst on survey that you are happy to share with readers?

Pre-purchase surveys on liveaboard vessels often reveal the unexpected; one narrowboat in particular demonstrated exactly that when on entering the forward cabin I was faced with a very authentic looking dungeon together with a large collection of accessories...



Q6. I know you have a keen interest in the education and development of marine surveyors. What is your message to those contemplating a career in surveying and what tips might you offer them?

I have known many people come into marine surveying from a diverse range of professional backgrounds but the requirements of a marine surveyor are pretty standard no matter the discipline we end up working in. We should be, by nature, inquisitive and methodical in surveying any vessel regardless its size or material of construction. Having a thorough approach to the task in hand usually pays dividends. I occasionally refer back to some of my IIMS tutor marked assignments I completed as part of the Y&SC Diploma and it serves to remind me of the learning journey that started then and continues to this day. It is rare to not learn something new every time one undertakes a survey or visits a new yard or speaks to a new industry professional and we should all be alive to that - every day is a school day.

Q7. How important is it for IIMS to continue to drive surveying standards higher and what is your opinion on so-called hobby surveyors who operate in the sector?

For the IIMS to be taken seriously in the national and international maritime environment it is essential that we seek to drive standards continuously higher. From the training we offer to the CPD we undertake, the mentoring of newly qualified surveyors, the Institute's Certifying Authority work on behalf of the MCA and the many international branches in various parts of the world, the Institute should aim to be the best. Our reputation must be built on firm professional foundations to show that we take pride in producing, training and developing the best marine surveyors in the world.

It is too easy to cast our eyes down on so-called hobby surveyors and we must be careful to not alienate those whose annual turnover is low compared to the industry average. From the newly qualified surveyor struggling to get their first ten commissions to the old hand winding down and looking to hang up the hammer, both might merit the label yet both have much to offer the industry. As an institute we need to support and encourage both and CPD is a key part to this no matter how junior or senior the surveyor.

Q8. Where do you see the future opportunities for IIMS as the leading worldwide professional body for the surveying profession?

There is much development work already going on and it has been a fascinating privilege for me to join the IIMS Board and to have a ringside seat. To become the leading worldwide professional body requires us to be both excellent at what we do internally and in how we engage with external agencies and governments to work for the betterment of the marine industry as a whole. This work will present many challenges and opportunities for our members and the Board and we as an institute should all pull together for the greater benefit of the industry.

As many small craft surveyors will attest, there are yacht brokers who will only engage with surveyors from a particular professional body. This is in part I suspect due to their poor experiences in the past with a particular surveyor from any particular professional body. To undo that bias and prejudice we need to better prepare our own surveyors to thrive in the commercial environment. We cannot hope to attain a reputation as the world's best marine surveying professional body unless we strive to produce the best surveyors.

Q9. I know from our previous discussions that you led a fairly nomadic existence due to your career in the Army, how pleasing does it feel to be finally settled?

Fabulous. After 3 decades on the road first with my Army career and then 11 years following my wife Tess' RAF career I have lived in enough magnolia military houses to last a lifetime. To be in my own home at last is very satisfying and to have the freedom to do as we wish with the house and the garden is very liberating. I often joke that when an extra shelf or storage was needed in a military quarter that a couple of bits of cheap pine would do the job, but in my own home I choose nice wood, good paint or varnish and even get my spirit level out!

Q10. Having visited many parts of the world, including many trouble spots no doubt, are you able to give me a couple of places which inspired you because of either their natural beauty, or the strength of human spirit?

At the last count I have been to 52 countries and there have been many amazing places and people along the way. Some highlights were spending my 30th birthday on exercise in the northern Sahara in Egypt and watching the sun rise over the desert, ski patrolling under the Northern Lights in Norway, being in the jungle in Sierra Leone, jumping from the flight deck of a ship into the Med and teaching young soldiers to sail whilst crossing the Bay of Biscay. Military life is, at its best, an adventure with like minded people in pursuit of a common goal and the friendships formed during adversity are the ones that endure. The adventure can also include learning new skills and sports within a permissive environment where CPD is seen as an everyday activity; I had never sailed before joining the military and left with my Yachtmaster ticket.



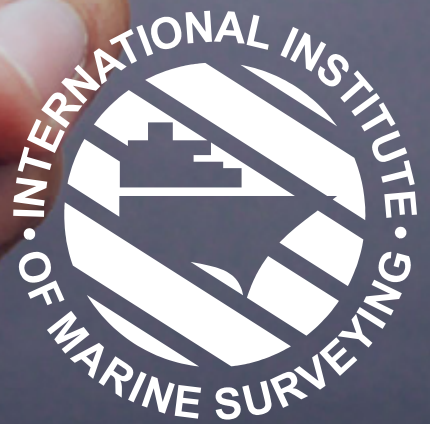
Q11. How might we find you choosing to relax when the work is done?

With two young children under ten, family life presents a typical mix of hard work interspersed with moments of joy. Outside of that I have taken up paragliding in the last couple of years and am slowly building my experience and flight hours. It is a fabulous sport with so many elements to master to enable one to fly cross country, especially in the UK. Being a kilometre above the ground, thermalling with vultures or eagles whilst planning your next move in a game of 3D chess with the landscape and elements is very engaging and a perfect escape to the challenges of modern life.

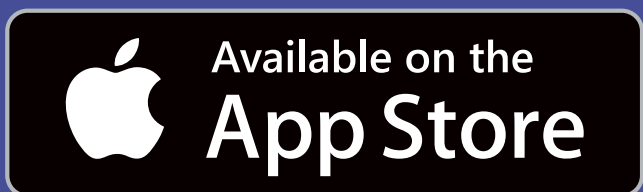
And when the weather precludes paragliding, walking the dog on the moors or a spot of fly fishing usually do the trick in helping me relax.

Q12. If you could meet a famous person, who would it be and why?

A few weeks back I went to one of Professor Brian Cox's stage shows and was fascinated to learn more about how the universe works and our place within it. I have been interested in cosmology and astronomy for many years and Tess bought me a fabulous telescope for my 50th birthday this year. So I would very much like to spend some time with him learning more about cosmology and astrology because as we all know - every day is a school day.



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